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1.315 python 3.10.12-1~22.04.9
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1.320 jackson-xc 2.18.2
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1.322 @npmcli/node-gyp 3.0.0
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1.325 sysv-init 3.01-1ubuntu1
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1.334 quartz 2.3.2

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1.337 asm 11.0.27-1

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1.342 libcap-ng 0.7.9-2.2build3

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1.343 @sigstore/verify 1.2.1

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1.345 proto-google-common-protos 2.48.0

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1.349 metrics 4.1.0
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1.492 write-file-atomic 5.0.1

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1.493 @sigstore/sign 2.3.2

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1.512 promise-retry 2.0.1

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From strings/apr_strnatcmp.c,
include/apr_strings.h:

strnatcmp.c -- Perform 'natural order' comparisons of strings in C.
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1.5 hamcrest-core 1.3

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1.6 javax-servlet-api 3.1.0

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1.7 antlr-runtime 3.5.2

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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/RewriteRuleNodeStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/NoViableAltException.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/TreeNodeStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/MismatchedTreeNodeException.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/MismatchedNotSetException.java
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 /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/DFA.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugEventListener.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/RewriteCardinalityException.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/RecognizerSharedState.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugEventHub.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/TreeVisitorAction.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/RewriteRuleTokenStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/RemoteDebugEventSocketListener.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/RewriteRuleElementStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugTreeAdaptor.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/BaseTreeAdaptor.java
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 /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugEventRepeater.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/misc/IntArray.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/TreePatternParser.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/ANTLRReaderStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/SerializedGrammar.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/CommonTree.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/TreeIterator.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/misc/LookaheadStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/RecognitionException.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugTokenStream.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/Tree.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/RuleReturnScope.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/Token.java

* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/Parser.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/TokenStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/BufferedTreeNodeStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/LegacyCommonTokenStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/Lexer.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugEventSocketProxy.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/CommonTreeNodeStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/misc/Stats.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/ClassicToken.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/UnbufferedTokenStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/ParserRuleReturnScope.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/TokenRewriteStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/Profiler.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/TreeVisitor.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/BlankDebugEventListener.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/ANTLRInputStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/debug/DebugTreeNodeStream.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/ANTLRStringStream.java
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* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/RewriteEarlyExitException.java
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/antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/TreeAdaptor.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/BitSet.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/BaseTree.java
* /antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/tree/ParseTree.java
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/antlr-runtime-3-5-2-sources-jar/org/antlr/runtime/UnwantedTokenException.java
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1.8 jetty-server 9.4.18.v20190429

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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
 * javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
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module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
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http://openjdk.java.net/legal/gplv2+ce.html

OW2

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org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

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org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

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org.mortbay.jasper:apache-jsp
org.apache.tomcat:tomcat-jasper
org.apache.tomcat:tomcat-juli
org.apache.tomcat:tomcat-jsp-api
org.apache.tomcat:tomcat-el-api
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-api
org.apache.tomcat:tomcat-util-scan
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-el-api

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The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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%% winjs version 4.4.0 (https://github.com/winjs/winjs)
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1. Seti UI - A subtle dark colored UI theme for Atom. (https://github.com/jesseweed/seti-ui)

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```
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```

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```
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```

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1.12 spf13-cobra v1.4.0

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// Commands similar to git, go tools and other modern CLI tools
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1.13 tdb 1.46.5

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This package was added to the e2fsprogs debian source package by
Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))
```

```
install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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written by Theodore Ts'o <tytso@mit.edu> and Remy Card
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==========
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371
Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
-   Unix SMB/CIFS implementation.
+   trivial database library - standalone version

-   trivial database library - private includes
-
-   Copyright (C) Andrew Tridgell   2005
+   Copyright (C) Andrew Tridgell   1999-2005
+   Copyright (C) Jeremy Allison   2000-2006
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Gadi Oxman, August 1995

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Theodore Ts'o
23-June-2007

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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That's all there is to it!
This is the Debian GNU/Linux prepackaged version of the EXT2 file
system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were
written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

Sources were obtained from http://sourceforge.net/projects/e2fsprogs

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This package was added to the e2fsprogs debian source package by
Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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This package was put together by Yann Dirson <dirson@debian.org>, from sources obtained from a mirror of: tsx-11.mit.edu:/pub/linux/packages/ext2fs/

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1.14 libsemanage2 3.3-1build2

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1.15 libsepol2 3.3-1build1

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1.16 glibc 2.27-3ubuntu1.6

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dos/config.h was generated with autoheader, which tells Autoconf to
output a script to generate a config.h file and then runs it.

Files: po/Makevars
Origin: gettext-runtime/po/Makevars (gettext-0.12)
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1.23 libdebconfclient0 0.261ubuntu1

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1.24 libaudit 1:3.0.7-1build1

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its purpose remains meaningful.

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a purpose that is entirely well-defined independent of the
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1.25 libcrypt 1:4.4.27-1

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1.26 libhogweed6 3.7.3-1build2

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Although the Lesser General Public License is Less protective of the

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4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

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Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

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<signature of Ty Coon>, 1 April 1990
Ty Coon, President of Vice

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Upstream-Name: keyutils
Upstream-Contact: David Howells <dhowells@redhat.com>
Source: http://people.redhat.com/~dhowells/keyutils/

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1.29 json 20220924

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Manifest-Version: 1.0
Automatic-Module-Name: org.json
Bnd-LastModified: 1664055213171
Build-Jdk: 1.8.0_271
Built-By: stlea
Bundle-Description: JSON is a light-weight, language independent, data i
nterchange format. See http://www.JSON.org/ The files in
this package implement JSON encoders/decoders in Java. It also i
ncludes the capability to convert between JSON and XML, HTTP hea
ders, Cookies, and CDL. This is a reference implementation. Ther
e is a large number of JSON packages in Java. Perhaps someday th
e Java community will standardize on one. Until then, choose car
efully.
Bundle-License: https://github.com/stleary/JSON-java/blob/master/LICENSE
Bundle-ManifestVersion: 2
Bundle-Name: JSON in Java
Bundle-SymbolicName: json
Bundle-Version: 20220924.0.0
Created-By: Apache Maven Bundle Plugin
Export-Package: org.json;version="20220924.0.0"
Require-Capability:
 osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.6))"
Tool: Bnd-3.0.0.201509101326

Found in path(s):
* /json-20220924-jar/META-INF/MANIFEST.MF
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<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>org.json</groupId>
  <artifactId>json</artifactId>
  <version>20220924</version>
  <packaging>bundle</packaging>

  <name>JSON in Java</name>
  <description>
    JSON is a light-weight, language independent, data interchange format.
    See http://www.JSON.org/

    The files in this package implement JSON encoders/decoders in Java.
    It also includes the capability to convert between JSON and XML, HTTP
    headers, Cookies, and CDL.

```
    This is a reference implementation. There is a large number of JSON packages
    in Java. Perhaps someday the Java community will standardize on one. Until
    then, choose carefully.
  </description>
<url>https://github.com/douglascrockford/JSON-java</url>

<parent>
    <groupId>org.sonatype.oss</groupId>
    <artifactId>oss-parent</artifactId>
    <version>9</version>
</parent>

<scm>
    <url>https://github.com/douglascrockford/JSON-java.git</url>
    <connection>scm:git:git://github.com/douglascrockford/JSON-java.git</connection>
    <developerConnection>scm:git:git@github.com:douglascrockford/JSON-java.git</developerConnection>
</scm>

<licenses>
    <license>
        <name>Public Domain</name>
        <url>https://github.com/stleary/JSON-java/blob/master/LICENSE</url>
        <distribution>repo</distribution>
    </license>
</licenses>

<developers>
    <developer>
        <name>Douglas Crockford</name>
        <email>douglas@crockford.com</email>
    </developer>
</developers>

<properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
  </properties>


<dependencies>
    <dependency>
        <groupId>junit</groupId>
        <artifactId>junit</artifactId>
        <version>4.13.1</version>
        <scope>test</scope>
    </dependency>
    <dependency>
        <groupId>com.jayway.jsonpath</groupId>
```

```
      <artifactId>json-path</artifactId>
      <version>2.1.0</version>
      <scope>test</scope>
    </dependency>
    <dependency>
      <groupId>org.mockito</groupId>
      <artifactId>mockito-core</artifactId>
      <version>1.9.5</version>
      <scope>test</scope>
    </dependency>
  </dependencies>

  <build>
    <plugins>
      <plugin>
        <groupId>org.apache.felix</groupId>
        <artifactId>maven-bundle-plugin</artifactId>
        <version>3.0.1</version>
        <extensions>true</extensions>
        <configuration>
          <instructions>

           <Export-Package>
                org.json
              </Export-Package>
              <Bundle-SymbolicName>${project.artifactId}</Bundle-SymbolicName>
          </instructions>
        </configuration>
      </plugin>
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-compiler-plugin</artifactId>
        <version>2.3.2</version>
        <configuration>
          <source>1.6</source>
          <target>1.6</target>
        </configuration>
      </plugin>
      <plugin>
        <groupId>org.apache.maven.plugins</groupId>
        <artifactId>maven-source-plugin</artifactId>
        <version>2.1.2</version>
        <executions>
          <execution>
            <id>attach-sources</id>
            <goals>
              <goal>jar-no-fork</goal>
```

```
            </goals>
        </execution>
    </executions>
</plugin>
<plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-javadoc-plugin</artifactId>
    <version>2.7</version>
    <executions>
        <execution>
            <id>attach-javadocs</id>
            <goals>
                <goal>jar</goal>
            </goals>
            <configuration>
                <additionalparam>-Xdoclint:none</additionalparam>
            </configuration>
        </execution>
    </executions>
</plugin>
<plugin>
    <groupId>org.apache.maven.plugins</groupId>
    <artifactId>maven-gpg-plugin</artifactId>
    <version>1.5</version>
    <executions>

   <execution>
            <id>sign-artifacts</id>
            <phase>verify</phase>
            <goals>
                <goal>sign</goal>
            </goals>
        </execution>
    </executions>
</plugin>
<plugin>
    <groupId>org.sonatype.plugins</groupId>
    <artifactId>nexus-staging-maven-plugin</artifactId>
    <version>1.6.3</version>
    <extensions>true</extensions>
    <configuration>
        <serverId>ossrh</serverId>
        <nexusUrl>https://oss.sonatype.org/</nexusUrl>
        <autoReleaseAfterClose>false</autoReleaseAfterClose>
    </configuration>
</plugin>
<plugin>
    <groupId>org.apache.maven.plugins</groupId>
```

```
            <artifactId>maven-jar-plugin</artifactId>
            <version>3.2.0</version>
             <configuration>
               <archive>
                  <manifestEntries>
                     <Automatic-Module-Name>org.json</Automatic-Module-Name>
                  </manifestEntries>
               </archive>
            </configuration>
         </plugin>
      </plugins>
   </build>
</project>
```

Found in path(s):
* /json-20220924-jar/META-INF/maven/org.json/json/pom.xml

1.30 httpcore 4.4.16

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1.31 httpclient 4.5.14

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Id

1.34 libncurses 6.3-2ubuntu0.1

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when there is no Makefile.

This script is compatible with the BSD install script, but was written
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-- vile: txtmode file-encoding=utf-8

1.35 apr 1.7.4

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From strings/apr_strnatcmp.c,
 include/apr_strings.h:

 strnatcmp.c -- Perform 'natural order' comparisons of strings in C.
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From
strings/apr_snprintf.c:

*
* cvt - IEEE floating point formatting routines.
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Julian Seward, jseward@bzip.org
bzip2/libbzip2 version 1.0.6 of 6 September 2010

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Version 3.1, 31 March 2009

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(28) Artem Bityuckiy (--enable-newlib-iconv)

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bzip2/libbzip2 version 1.0.6 of 6 September 2010

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The snowball stemmers in
 analysis/common/src/java/net/sf/snowball
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The snowball stopword lists in
 analysis/common/src/resources/org/apache/lucene/analysis/snowball
were developed by Martin Porter and Richard Boulton.
The full snowball
 package is available from
 http://snowball.tartarus.org/

The KStem stemmer in
 analysis/common/src/org/apache/lucene/analysis/en
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analysis/common/src/resources/org/apache/lucene/analysis/ar/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/fa/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/ro/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt
See http://members.unine.ch/jacques.savoy/clef/index.html.

The German,Spanish,Finnish,French,Hungarian,Italian,Portuguese,Russian and Swedish
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analysis/common/src/java/org/apache/lucene/analysis/de/GermanLightStemmer.java
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analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java

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analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
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1.40 githubcompelletiergotoml v1.9.4

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localtime.go, localtime_test.go:

Originals:
  https://raw.githubusercontent.com/googleapis/google-cloud-
go/ed46f5086358513cf8c25f8e3f022cb838a49d66/civil/civil.go
  https://raw.githubusercontent.com/googleapis/google-cloud-
go/ed46f5086358513cf8c25f8e3f022cb838a49d66/civil/civil_test.go
Changes:
  * Renamed files from civil* to localtime*.
  * Package changed from civil to toml.
  * 'Local' prefix added to all structs.
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1.41 spf13-pflag v1.0.5

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* /okio-jvm-3-6-0-sources-jar/commonMain/okio/internal/-Utf8.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/Util.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/internal/ByteString.kt
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* /okio-jvm-3-6-0-sources-jar/commonMain/okio/PeekSource.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/-DeprecatedUtf8.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/-DeprecatedOkio.kt
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* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/GzipSource.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/Sink.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/SegmentPool.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/SegmentPool.kt
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/okio-jvm-3-6-0-sources-jar/jvmMain/okio/DeflaterSink.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/BufferedSink.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/InflaterSource.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/RealBufferedSource.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/ForwardingSink.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/Timeout.kt
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* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/ForwardingSource.kt
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* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/GzipSink.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/RealBufferedSink.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/ForwardingSource.kt
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* /okio-jvm-3-6-0-sources-jar/commonMain/okio/Sink.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/Buffer.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/BufferedSource.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/Source.kt
*
/okio-jvm-3-6-0-sources-jar/commonMain/okio/RealBufferedSource.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/Timeout.kt
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* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/Path.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/JvmSystemFileSystem.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/ExperimentalFileSystem.kt
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* /okio-jvm-3-6-0-sources-jar/commonMain/okio/SegmentedByteString.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/SegmentedByteString.kt
* /okio-jvm-3-6-0-sources-jar/jvmMain/okio/ForwardingTimeout.kt
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* /okio-jvm-3-6-0-sources-jar/commonMain/okio/internal/RealBufferedSink.kt
* /okio-jvm-3-6-0-sources-jar/commonMain/okio/internal/RealBufferedSource.kt
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1.45 kotlin-stdlib 1.9.10

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1.46 metrics-core 4.1.0

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1.47 kotlin-stdlib-jdk8 1.9.10

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1.48 kotlin-stdlib-common 1.9.10

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1.49 kotlin-stdlib-jdk7 1.9.10

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1.50 zlib 1.2.3

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NR START END SECTORS SIZE NAME UUID
1 32 7679 7648 3.7M 8f8378c0-01
2 7680 16383 8704 4.3M 8f8378c0-02
5 7936 12799 4864 2.4M
6 12544 16127 3584 1.8M

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NR START END SECTORS SIZE NAME UUID
1 32 7679 7648 3.7M 8f8378c0-01
2 7680 16383 8704 4.3M 8f8378c0-02
5 7936 12799 4864 2.4M
6 12544 16127 3584 1.8M

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*/

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NR START   END SECTORS SIZE NAME UUID
1   32 7679   7648 3.7M   8f8378c0-01
2 7680 16383   8704 4.3M   8f8378c0-02
5 7936 12799   4864 2.4M
6 12544 16127   3584 1.8M
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1.57 logsave 1.46.5-2ubuntu1.2

1.57.1 Available under license :

This package was added to the e2fsprogs debian source package by
Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))

install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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Index: tdbsa/tdb.c
===
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
- Unix SMB/CIFS implementation.
+ trivial database library - standalone version

- trivial database library - private includes
-
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Gadi Oxman, August 1995

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Theodore Ts'o
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<signature of Ty Coon>, 1 April 1990
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system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were
written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

Sources were obtained from http://sourceforge.net/projects/e2fsprogs

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This package was put together by Yann Dirson <dirson@debian.org>,
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1.58 libext2fs2 1.46.5-2ubuntu1.2

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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))

install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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Index: tdbsa/tdb.c
===
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
- Unix SMB/CIFS implementation.
+ trivial database library - standalone version

- trivial database library - private includes
-
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Gadi Oxman, August 1995

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Theodore Ts'o
23-June-2007

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system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were
written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

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1.59 libss 1.46.5-2ubuntu1.2

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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))

install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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Index: tdbsa/tdb.c
===
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
- Unix SMB/CIFS implementation.
+ trivial database library - standalone version

- trivial database library - private includes
-
- Copyright (C) Andrew Tridgell 2005
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Gadi Oxman, August 1995

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Theodore Ts'o
23-June-2007

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That's all there is to it!
This is the Debian GNU/Linux prepackaged version of the EXT2 file
system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were
written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

Sources were obtained from http://sourceforge.net/projects/e2fsprogs

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1.60 libcom-err 1.46.5-2ubuntu1.2

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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))

install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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files of the EXT2 file system utilities. The EXT2 utilities were
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Index: tdbsa/tdb.c
==========
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371

Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
- Unix SMB/CIFS implementation.
+ trivial database library - standalone version

- trivial database library - private includes
-
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Gadi Oxman, August 1995

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Theodore Ts'o
23-June-2007

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That's all there is to it!
This is the Debian GNU/Linux prepackaged version of the EXT2 file
system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were
written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

Sources were obtained from http://sourceforge.net/projects/e2fsprogs

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This package was added to the e2fsprogs debian source package by
Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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This package was put together by Yann Dirson <dirson@debian.org>,
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1.62 aspectjrt 1.8.13

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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/annotation/DeclarePrecedence.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/reflect/UnlockSignatureImpl.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/DeclareSoft.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/annotation/ajcDeclareEoW.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/InterTypeFieldDeclarationImpl.java
*
 /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/AdviceImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/AdviceKind.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/NoSuchPointcutException.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/InterTypeDeclaration.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/annotation/ajcPrivileged.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/DeclareSoftImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/SignaturePatternImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/DeclareErrorOrWarning.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/InterTypeFieldDeclaration.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/Pointcut.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/PointcutExpressionImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/annotation/DeclareWarning.java
*
 /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/StringToType.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/InterTypeMethodDeclaration.java

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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/InterTypeConstructorDeclaration.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/TypePatternBasedPerClauseImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/PerClauseKind.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/AjTypeImpl.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/InterTypeMethodDeclarationImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/annotation/ajcDeclareSoft.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/PointcutImpl.java
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/aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/DeclareAnnotationImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/DeclareParents.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/AjType.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/InterTypeConstructorDeclarationImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/reflect/PerClauseImpl.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/internal/lang/annotation/ajcDeclareAnnotation.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/internal/cflowstack/ThreadStackFactoryImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/internal/cflowstack/ThreadStackFactoryImpl11.java
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*
 /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/CFlow.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/reflect/JoinPointImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/CatchClauseSignature.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/reflect/SourceLocationImpl.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/SourceLocation.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/Signature.java
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* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/lang/reflect/ConstructorSignature.java
* /aspectjrt-1-8-13-sources-1-jar/org/aspectj/runtime/reflect/ConstructorSignatureImpl.java
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1.66 mongo-sdk 1.0.2

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1.67 libbrotli1 1.0.9-2build6

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1.68 libssl3 3.0.2-0ubuntu1.19

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jQuery UI v1.13.2

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The implementations of GSSAPI mechglue in GSSAPI-SPNEGO in
"src/lib/gssapi", including the following files:

lib/gssapi/generic/gssapi_err_generic.et
lib/gssapi/mechglue/g_accept_sec_context.c
lib/gssapi/mechglue/g_acquire_cred.c
lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c

lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c
lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c
lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c
lib/gssapi/mechglue/g_store_cred.c
lib/gssapi/mechglue/g_unseal.c
lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
slave/kpropd_rpc.c
slave/kproplog.c

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lib/gssapi/generic/gssapi_err_generic.et
lib/gssapi/mechglue/g_accept_sec_context.c
lib/gssapi/mechglue/g_acquire_cred.c
lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c
lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c
lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c

lib/gssapi/mechglue/g_store_cred.c
lib/gssapi/mechglue/g_unseal.c
lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
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include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
kprop/kpropd_rpc.c
kprop/kproplog.c

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lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
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include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
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slave/kpropd_rpc.c
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cmd/krb5/slave/kpropd_rpc.c
lib/gss_mechs/mech_krb5/et/kdb5_err.c
lib/gss_mechs/mech_spnego/mech/gssapiP_spnego.h
lib/gss_mechs/mech_spnego/mech/spnego_mech.c
lib/krb5/kadm5/kadm_host_srv_names.c
lib/krb5/kdb/kdb_convert.c
lib/krb5/kdb/kdb_hdr.h
lib/krb5/kdb/kdb_log.c
lib/krb5/kdb/kdb_log.h
lib/libgss/g_accept_sec_context.c
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lib/libgss/g_initialize.c
lib/libgss/g_inquire_context.c
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lib/libgss/g_inquire_names.c
lib/libgss/g_process_context.c
lib/libgss/g_rel_buffer.c
lib/libgss/g_rel_cred.c
lib/libgss/g_rel_name.c
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lib/libgss/g_seal.c
lib/libgss/g_sign.c
lib/libgss/g_store_cred.c
lib/libgss/g_unseal.c
lib/libgss/g_userok.c
lib/libgss/g_utils.c
lib/libgss/g_verify.c
lib/libgss/gssd_pname_to_uid.c
uts/common/gssapi/include/gssapi_err_generic.h
uts/common/gssapi/include/mechglueP.h

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lib/gssapi/mechglue/g_acquire_cred.c
lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
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lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c
lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c

lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c
lib/gssapi/mechglue/g_store_cred.c
lib/gssapi/mechglue/g_unseal.c
lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
kprop/kpropd_rpc.c
kprop/kproplog.c

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lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
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lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c

lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
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lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c

lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c
lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c
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lib/gssapi/mechglue/g_unseal.c
lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
kprop/kpropd_rpc.c
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operating system, as well as its variant, the GNU/Linux operating
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linked with the Library has the freedom and the wherewithal to run
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``work based on the library'' and a ``work that uses the library''. The
former
contains code derived from the library, whereas the latter must
be combined with the library in order to run.

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``Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

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@item
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is invoked, then you must make a good faith effort to ensure that,
in the event an application does not supply such function or
table, the facility still operates, and performs whatever part of
its purpose remains meaningful.

(For example, a function in a library to compute square roots has
a purpose that is entirely well-defined independent of the
application. Therefore, Subsection 2d requires that any
application-supplied function or table used by this function must
be optional: if the application does not supply it, the square
root function must still compute square roots.)
@end enumerate

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 2 above provided that you accompany
it with the complete corresponding machine-readable source code, which
must be distributed under the terms of Sections 1 and 2 above on a
medium customarily used for software interchange.

 If distribution of object code is made by offering access to copy
from a designated place, then offering equivalent access to copy the
source code from the same place satisfies the requirement to
distribute the source code, even though third parties are not
compelled to copy the source along with the object code.

@item
A program that contains no derivative of any portion of the
Library, but is designed to work with the Library by being compiled or
linked with it, is called a ``work that uses the Library". Such a
work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

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creates an executable that is a derivative of the Library (because
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contains portions of the Library), rather than a ``work that uses the
library". The executable is therefore covered by this License.
Section 6 states terms for distribution of such executables.

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that is part of the Library, the object code for the work may be a
derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be
linked without the Library, or if the work is itself a library. The

threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise,
if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

@item
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this License. Also, you must do one
of these things:

@enumerate a
@item
Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable ``work that uses the Library'', as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

@item
Use a suitable shared library mechanism for linking with the Library. A

suitable mechanism is one that (1) uses at run time a copy of the
library already present on the user's computer system, rather than
copying library functions into the executable,
and (2) will operate
properly with a modified version of the library, if the user installs
one, as long as the modified version is interface-compatible with the
version that the work was made with.

@item
Accompany the work with a written offer, valid for at
least three years, to give the same user the materials
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@item
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@end enumerate

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@enumerate a
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@end enumerate

@subheading END OF TERMS AND CONDITIONS

@page
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@var{signature of Ty Coon}, 1 April 1990
Ty Coon, President of Vice
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lib/gssapi/mechglue/g_acquire_cred.c
lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
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lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
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lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c
lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
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lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c

lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
slave/kpropd_rpc.c
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lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c

lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c
lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c
lib/gssapi/mechglue/g_store_cred.c
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lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
kprop/kpropd_rpc.c
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src/udev/udevadm-settle.c
src/udev/udevadm-test-builtin.c
src/udev/udevadm-test.c
src/udev/udevadm-trigger.c
src/udev/udevadm-util.c
src/udev/udevadm-util.h
src/udev/udev-builtin-blkid.c
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src/udev/udev-event.h
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src/udev/udev-node.h

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1.82 gpgv 2.2.27-3ubuntu2.4

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#+STARTUP: showall

* DNS resolver (dirmngr/dns.c)

dns.c - Recursive, Reentrant DNS Resolver.

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* Regular
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1987 James A. Woods ames!jaw
1993 Christopher Seiwald seiwald@vix.com
2000, 2002 Christopher Seiwald <seiwald@perforce.com>
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END OF TERMS AND CONDITIONS

1.84 zlib1g 1:1.2.11.dfsg-2ubuntu9.2

1.84.1 Available under license :

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

/* gun.c -- simple gunzip to give an example of the use of inflateBack()
* Copyright (C) 2003, 2005, 2008, 2010, 2012 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
Version 1.7 12 August 2012 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gun.c
No license file was found, but licenses were detected in source scan.

/* gzwrite.c -- zlib functions for writing gzip files
* Copyright (C) 2004-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzwrite.c
No license file was found, but licenses were detected in source scan.

/* inffast.h -- header to use inffast.c
* Copyright (C) 1995-2003, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inffast.h
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Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zlib_how.html
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/* unzip.c -- IO for uncompress .zip files using zlib
  Version 1.1, February 14h, 2010
  part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

      Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

      Modifications of Unzip for Zip64
      Copyright (C) 2007-2008 Even Rouault

      Modifications for Zip64 support on both zip and unzip
      Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

      For more info read MiniZip_info.txt

Decryption code comes from crypt.c by Info-ZIP but has been greatly reduced in terms of
compatibility with older software. The following is from the original crypt.c.
Code woven in by Terry Thorsen 1/2003.

Copyright (c) 1990-2000 Info-ZIP. All rights reserved.

See the accompanying
file LICENSE, version 2000-Apr-09 or later
(the contents of which are also included in zip.h) for terms of use.
If, for some reason, all these files are missing, the Info-ZIP license
also may be found at: ftp://ftp.info-zip.org/pub/infozip/license.html

     crypt.c (full version) by Info-ZIP.   Last revised: [see crypt.h]

The encryption/decryption parts of this source code (as opposed to the
non-echoing password parts) were originally written in Europe. The
whole source package can be freely distributed, including from the USA.

(Prior to January 2000, re-export from the US was a violation of US law.)

This encryption code is a direct transcription of the algorithm from Roger Schlafly, described by Phil Katz in the file appnote.txt. This file (appnote.txt) is distributed with the PKZIP program (even in the version without encryption capabilities).

Changes in unzip.c

2007-2008 - Even Rouault - Addition of cpl_unzGetCurrentFileZStreamPos
2007-2008 - Even Rouault - Decoration of symbol names unz* -> cpl_unz*
2007-2008 - Even Rouault - Remove old C style function prototypes
2007-2008 - Even Rouault - Add unzip support for ZIP64

Copyright (C) 2007-2008 Even Rouault

Oct-2009 - Mathias Svensson - Removed cpl_* from symbol names (Even Rouault added them but since this is now moved to a new project (minizip64) I renamed them again).
Oct-2009 - Mathias Svensson - Fixed problem if uncompressed size was > 4G and compressed size was <4G
should only read the compressed/uncompressed size from the Zip64 format if
the size from normal header was 0xFFFFFFFF
Oct-2009 - Mathias Svensson - Applied some bug fixes from paches recived from Gilles Vollant
Oct-2009 - Mathias Svensson - Applied support to unzip files with compression mathod
BZIP2 (bzip2 lib is required)
Patch created by Daniel Borca

Jan-2010 - back to unzip and minizip 1.0 name scheme, with compatibility layer

Copyright (C) 1998 - 2010 Gilles Vollant, Even Rouault, Mathias Svensson

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/unzip.c
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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zlib.3
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Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/old/Makefile.emx
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/old/os2/Makefile.os2
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/msdos/Makefile.dj2
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/msdos/Makefile.emx
No license file was found, but licenses were detected in source scan.

/* inflate.c -- zlib decompression
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inflate.c
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/* infback.c -- inflate using a call-back interface
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/infback.c
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* For conditions of distribution and use, see copyright notice in zlib.h

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h.in
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h.cmakein
No license file was found, but licenses were detected in source scan.

/* gzlog.h
 Copyright (C) 2004, 2008, 2012 Mark Adler, all rights reserved
 version 2.2, 14 Aug 2012

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Mark Adler madler@alumni.caltech.edu
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzlog.h
No license file was found, but licenses were detected in source scan.

/* uncompr.c -- decompress a memory buffer
* Copyright (C) 1995-2003, 2010, 2014, 2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/uncompr.c
No license file was found, but licenses were detected in source scan.

/* inflate.h -- internal inflate state definition
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inflate.h
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/* zconf.h -- configuration of the zlib compression library
* Copyright (C) 1995-2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h
No license file was found, but licenses were detected in source scan.

/* zip.h -- IO on .zip files using zlib
Version 1.1, February 14h, 2010
part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

Modifications for Zip64 support

Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

For more info read MiniZip_info.txt

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Changes

See header of zip.h

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/zip.h
No license file was found, but licenses were detected in source scan.

/*
* gzlog.c
* Copyright (C) 2004, 2008, 2012, 2016 Mark Adler, all rights reserved
* For conditions of distribution and use, see copyright notice in gzlog.h
* version 2.2, 14 Aug 2012
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzlog.c
No license file was found, but licenses were detected in source scan.

/* gzjoin -- command to join gzip files into one gzip file

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version 1.2, 14 Aug 2012

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*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzjoin.c
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ZLIB DATA COMPRESSION LIBRARY

zlib 1.2.11 is a general purpose data compression library. All the code is
thread safe. The data format used by the zlib library is described by RFCs
(Request for Comments) 1950 to 1952 in the files
http://tools.ietf.org/html/rfc1950 (zlib format), rfc1951 (deflate format) and
rfc1952 (gzip format).

All functions of the compression library are documented in the file zlib.h
(volunteer to write man pages welcome, contact zlib@gzip.org). A usage example
of the library is given in the file test/example.c which also tests that
the library is working correctly. Another example is given in the file
test/minigzip.c. The compression library itself is composed of all source
files in the root directory.

To compile all files and run the test program, follow the instructions given at
the top of Makefile.in. In short "./configure; make test", and if that goes
well, "make install" should work

for most flavors of Unix. For Windows, use
one of the special makefiles in win32/ or contrib/vstudio/ . For VMS, use
make_vms.com.

Questions about zlib should be sent to <zlib@gzip.org>, or to Gilles Vollant
<info@winimage.com> for the Windows DLL version. The zlib home page is
http://zlib.net/ . Before reporting a problem, please check this site to
verify that you have the latest version of zlib; otherwise get the latest
version and check whether the problem still exists or not.

PLEASE read the zlib FAQ http://zlib.net/zlib_faq.html before asking for help.

Mark Nelson <markn@ieee.org> wrote an article about zlib for the Jan. 1997
issue of Dr. Dobb's Journal; a copy of the article is available at
http://marknelson.us/1997/01/01/zlib-engine/ .

The changes made in version 1.2.11 are documented in the file ChangeLog.

Unsupported third party contributions are provided in directory contrib/ .

zlib is available in Java using the java.util.zip package, documented at
http://java.sun.com/developer/technicalArticles/Programming/compression/
.

A Perl interface to zlib written by Paul Marquess <pmqs@cpan.org> is available
at CPAN (Comprehensive Perl Archive Network) sites, including
http://search.cpan.org/~pmqs/IO-Compress-Zlib/ .

A Python interface to zlib written by A.M. Kuchling <amk@amk.ca> is
available in Python 1.5 and later versions, see
http://docs.python.org/library/zlib.html .

zlib is built into tcl: http://wiki.tcl.tk/4610 .

An experimental package to read and write files in .zip format, written on top
of zlib by Gilles Vollant <info@winimage.com>, is available in the
contrib/minizip directory of zlib.

Notes for some targets:

- For Windows DLL versions, please see win32/DLL_FAQ.txt

- For 64-bit Irix, deflate.c must be compiled without any optimization. With
-O, one libpng test fails. The test works in 32 bit mode (with the -n32
compiler flag). The compiler bug has been reported to SGI.

- zlib doesn't work with gcc 2.6.3 on a DEC 3000/300LX under

OSF/1 2.1 it works
when compiled with cc.

- On Digital Unix 4.0D (formely OSF/1) on AlphaServer, the cc option -std1 is
necessary to get gzprintf working correctly. This is done by configure.

- zlib doesn't work on HP-UX 9.05 with some versions of /bin/cc. It works with
other compilers. Use "make test" to check your compiler.

- gzdopen is not supported on RISCOS or BEOS.

- For PalmOs, see http://palmzlib.sourceforge.net/

Acknowledgments:

The deflate format used by zlib was defined by Phil Katz. The deflate and
zlib specifications were written by L. Peter Deutsch. Thanks to all the
people who reported problems and suggested various improvements in zlib; they
are too numerous to cite here.

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Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

If you use the zlib library in a product, we would appreciate *not* receiving
lengthy legal documents to sign. The sources are provided for free but without
warranty of any kind. The library has been entirely written by Jean-loup

Gailly and Mark Adler; it does not include
third-party code.

If you redistribute modified sources, we would appreciate that you include in
the file ChangeLog history information documenting your changes. Please read
the FAQ for more information on the distribution of modified source versions.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/README
No license file was found, but licenses were detected in source scan.

/* fitblk.c: example of fitting compressed output to a specified size
Not copyrighted -- provided to the public domain
Version 1.1 25 November 2004 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/fitblk.c
No license file was found, but licenses were detected in source scan.

/* gzread.c -- zlib functions for reading gzip files
* Copyright (C) 2004, 2005, 2010, 2011, 2012, 2013, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzread.c
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/* zlib.h -- interface of the 'zlib' general purpose compression library
version 1.2.11, January 15th, 2017

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The data format used by the zlib library is described by RFCs (Request for Comments) 1950 to 1952 in the files http://tools.ietf.org/html/rfc1950 (zlib format), rfc1951 (deflate format) and rfc1952 (gzip format).
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zlib.h
No license file was found, but licenses were detected in source scan.

/* inftrees.h -- header to use inftrees.c
* Copyright (C) 1995-2005, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inftrees.h
No license file was found, but licenses were detected in source scan.

/* deflate.c -- compress data using the deflation algorithm
* Copyright (C) 1995-2017 Jean-loup Gailly and Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/deflate.c
No license file was found, but licenses were detected in source scan.

/* deflate.h -- internal compression state
* Copyright (C) 1995-2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/deflate.h
No license file was found, but licenses were detected in source scan.

/* minigzip.c -- simulate gzip using the zlib compression library
* Copyright (C) 1995-2006, 2010, 2011, 2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):

* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/minigzip.c
No license file was found, but licenses were detected in source scan.

/* gzlib.c -- zlib functions common to reading and writing gzip files
* Copyright (C) 2004-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzlib.c
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/* inftrees.c -- generate Huffman trees for efficient decoding
* Copyright (C) 1995-2017 Mark Adler
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*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inftrees.c
No license file was found, but licenses were detected in source scan.

/* infcover.c -- test zlib's inflate routines with full code coverage
* Copyright (C) 2011, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/infcover.c
No license file was found, but licenses were detected in source scan.

/* zutil.c -- target dependent utility functions for the compression library
* Copyright (C) 1995-2017 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zutil.c
No license file was found, but licenses were detected in source scan.

/* example.c -- usage example of the zlib compression library
* Copyright (C) 1995-2006, 2011, 2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/example.c
No license file was found, but licenses were detected in source scan.

/* trees.c -- output deflated data using Huffman coding
* Copyright (C) 1995-2017 Jean-loup Gailly
* detect_data_type() function provided freely by Cosmin Truta, 2006
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/trees.c
No license file was found, but licenses were detected in source scan.

MiniZip - Copyright (c) 1998-2010 - by Gilles Vollant - version 1.1 64 bits from Mathias Svensson

Introduction

MiniZip 1.1 is built from MiniZip 1.0 by Gilles Vollant (http://www.winimage.com/zLibDll/minizip.html)

When adding ZIP64 support into minizip it would result into risk of breaking compatibility with minizip 1.0.
All possible work was done for compatibility.

Background

When adding ZIP64 support Mathias Svensson found that Even Rouault have added ZIP64
support for unzip.c into minizip for a open source project called gdal (http://www.gdal.org/)

That was used as a starting point. And after that ZIP64 support was added to zip.c
some refactoring and code cleanup was also done.

Changed from MiniZip 1.0 to MiniZip 1.1
---
* Added ZIP64 support for unzip (by Even Rouault)
* Added ZIP64 support for zip (by Mathias Svensson
)
* Reverted some changed that Even Rouault did.
* Bunch of patches received from Gulles Vollant that he received for MiniZip from various users.
* Added unzip patch for BZIP Compression method (patch create by Daniel Borca)
* Added BZIP Compress method for zip
* Did some refactoring and code cleanup

Credits

Gilles Vollant - Original MiniZip author
Even Rouault - ZIP64 unzip Support
Daniel Borca - BZip Compression method support in unzip
Mathias Svensson - ZIP64 zip support
Mathias Svensson - BZip Compression method support in zip

Resources

ZipLayout http://result42.com/projects/ZipFileLayout
Command line tool for Windows that shows the layout and information of the headers in a zip archive.
Used when debugging and validating the creation of zip files using MiniZip64

ZIP App Note http://www.pkware.com/documents/casestudies/APPNOTE.TXT
Zip File specification

Notes.
* To be able to use BZip compression method in
zip64.c or unzip64.c the BZIP2 lib is needed and HAVE_BZIP2 need to be defined.

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misrepresented as being the original software.
3. This notice may
not be removed or altered from any source distribution.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/MiniZip64_info.txt
No license file was found, but licenses were detected in source scan.

```
/*
 Additional tools for Minizip
 Code: Xavier Roche '2004
 License: Same as ZLIB (www.gzip.org)
*/
```

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/mztools.c
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/mztools.h
No license file was found, but licenses were detected in source scan.

/* compress.c -- compress a memory buffer
* Copyright (C) 1995-2005, 2014, 2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/compress.c
No license file was found, but licenses were detected in source scan.

/* gzclose.c -- zlib gzclose() function
* Copyright (C) 2004, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzclose.c
No license file was found, but licenses were detected in source scan.

/* unzip.h -- IO for uncompress .zip files using zlib
  Version 1.1, February 14h, 2010
  part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

        Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

        Modifications of Unzip for Zip64
        Copyright (C) 2007-2008 Even Rouault

        Modifications for Zip64 support on both zip and unzip
        Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

        For more info read MiniZip_info.txt

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2. Altered source versions must be plainly marked as such, and must not be
   misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

      Changes

      See header of unzip64.c

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/unzip.h
No license file was found, but licenses were detected in source scan.

/* zran.c -- example of zlib/gzip stream indexing and random access
* Copyright (C) 2005, 2012 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
  Version 1.1 29 Sep 2012 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zran.c
No license file was found, but licenses were detected in source scan.

/* inffast.c -- fast decoding
* Copyright (C) 1995-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inffast.c
No license file was found, but licenses were detected in source scan.

const char *lastslash = 0;
lastslash = tmpptr;
if(lastslash != NULL)
savefilenameinzip = lastslash+1; // base filename follows last slash.

Found in path(s):

* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/minizip.c
No license file was found, but licenses were detected in source scan.

/* crc32.c -- compute the CRC-32 of a data stream
* Copyright (C) 1995-2006, 2010, 2011, 2012, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*
* Thanks to Rodney Brown <rbrown64@csc.com.au> for his contribution of faster
* CRC methods: exclusive-oring 32 bits of data at a time, and pre-computing
* tables for updating the shift register in one step with three exclusive-ors
* instead of four steps with four exclusive-ors. This results in about a
* factor of two increase in speed on a Power PC G4 (PPC7455) using gcc -O3.
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/crc32.c
No license file was found, but licenses were detected in source scan.

/* adler32.c -- compute the Adler-32 checksum of a data stream
* Copyright (C) 1995-2011, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/adler32.c
No license file was found, but licenses were detected in source scan.

/* zutil.h -- internal interface and configuration of the compression library
* Copyright (C) 1995-2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zutil.h
No license file was found, but licenses were detected in source scan.

/* gzguts.h -- zlib internal header definitions for gz* operations
* Copyright (C) 2004, 2005, 2010, 2011, 2012, 2013, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzguts.h
No license file was found, but licenses were detected in source scan.

/* zpipe.c: example of proper use of zlib's inflate() and deflate()
  Not copyrighted -- provided to the public domain
  Version 1.4 11 December 2005 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zpipe.c
No license file was found, but licenses were detected in source scan.

/* gzappend -- command to append to a gzip file

 Copyright (C) 2003, 2012 Mark Adler, all rights reserved
 version 1.2, 11 Oct 2012

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 removed or altered from any source distribution.

 Mark Adler   madler@alumni.caltech.edu
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzappend.c
No license file was found, but licenses were detected in source scan.

Frequently Asked Questions about zlib

If your question is not there, please check the zlib home page
http://zlib.net/ which may have more recent information.
The lastest zlib FAQ is at http://zlib.net/zlib_faq.html

1. Is zlib Y2K-compliant?

   Yes. zlib doesn't handle dates.

2. Where can I get a Windows DLL version?

The zlib sources can be compiled without change to produce a DLL. See the file win32/DLL_FAQ.txt in the zlib distribution. Pointers to the precompiled DLL are found in the zlib web site at http://zlib.net/ .

3. Where can I get a Visual Basic interface to zlib?

See

* http://marknelson.us/1997/01/01/zlib-engine/
* win32/DLL_FAQ.txt in the zlib distribution

4. compress() returns Z_BUF_ERROR.

Make sure that before the call of compress(), the length of the compressed buffer is equal to the available size of the compressed buffer and not zero. For Visual Basic, check that this parameter is passed by reference ("as any"), not by value ("as long").

5. deflate() or inflate() returns Z_BUF_ERROR.

Before making the call, make sure that avail_in and avail_out are not zero. When setting the parameter flush equal to Z_FINISH, also make sure that avail_out is big enough to allow processing all pending input. Note that a Z_BUF_ERROR is not fatal--another call to deflate() or inflate() can be made with more input or output space. A Z_BUF_ERROR may in fact be unavoidable depending on how the functions are used, since it is not possible to tell whether or not there is more output pending when strm.avail_out returns with zero. See http://zlib.net/zlib_how.html for a heavily annotated example.

6. Where's the zlib documentation (man pages, etc.)?

It's in zlib.h . Examples of zlib usage are in the files test/example.c and test/minigzip.c, with more in examples/ .

7. Why don't you use GNU autoconf or libtool or ...?

Because we would like to keep zlib as a very small and simple package. zlib is rather portable and doesn't need much configuration.

8. I found a bug in zlib.

Most of the time, such problems are due to an incorrect usage of zlib. Please try to reproduce the problem with a small program and send the corresponding source to us at zlib@gzip.org . Do not send multi-megabyte data files without prior agreement.

9. Why do I get "undefined reference to gzputc"?

If "make test" produces something like

example.o(.text+0x154): undefined reference to `gzputc'

check that you don't have old files libz.* in /usr/lib, /usr/local/lib or /usr/X11R6/lib. Remove any old versions, then do "make install".

10. I need a Delphi interface to zlib.

See the contrib/delphi directory in the zlib distribution.

11. Can zlib handle .zip archives?

Not by itself, no. See the directory contrib/minizip in the zlib distribution.

12.
Can zlib handle .Z files?

No, sorry. You have to spawn an uncompress or gunzip subprocess, or adapt the code of uncompress on your own.

13. How can I make a Unix shared library?

By default a shared (and a static) library is built for Unix. So:

make distclean
./configure
make

14. How do I install a shared zlib library on Unix?

After the above, then:

make install

However, many flavors of Unix come with a shared zlib already installed. Before going to the trouble of compiling a shared version of zlib and trying to install it, you may want to check if it's already there! If you can #include <zlib.h>, it's there. The -lz option will probably link to it. You can check the version at the top of zlib.h or with the ZLIB_VERSION symbol defined in zlib.h .

15. I have a question about OttoPDF.

We are not the authors of OttoPDF. The real author is on the OttoPDF web

site: Joel Hainley, jhainley@myndkryme.com.

16.
Can zlib decode Flate data in an Adobe PDF file?

Yes. See http://www.pdflib.com/ . To modify PDF forms, see http://sourceforge.net/projects/acroformtool/ .

17. Why am I getting this "register_frame_info not found" error on Solaris?

After installing zlib 1.1.4 on Solaris 2.6, running applications using zlib generates an error such as:

ld.so.1: rpm: fatal: relocation error: file /usr/local/lib/libz.so: symbol __register_frame_info: referenced symbol not found

The symbol __register_frame_info is not part of zlib, it is generated by the C compiler (cc or gcc). You must recompile applications using zlib which have this problem. This problem is specific to Solaris. See http://www.sunfreeware.com for Solaris versions of zlib and applications using zlib.

18. Why does gzip give an error on a file I make with compress/deflate?

The compress and deflate functions produce data in the zlib format, which is different and incompatible
with the gzip format. The gz* functions in
zlib on the other hand use the gzip format. Both the zlib and gzip formats use the same compressed data format internally, but have different headers and trailers around the compressed data.

19. Ok, so why are there two different formats?

The gzip format was designed to retain the directory information about a single file, such as the name and last modification date. The zlib format on the other hand was designed for in-memory and communication channel applications, and has a much more compact header and trailer and uses a faster integrity check than gzip.

20. Well that's nice, but how do I make a gzip file in memory?

You can request that deflate write the gzip format instead of the zlib format using deflateInit2(). You can also request that inflate decode the gzip format using inflateInit2(). Read zlib.h for more details.

21. Is zlib thread-safe?

Yes. However any library routines

that zlib uses and any application-
provided memory allocation routines must also be thread-safe. zlib's gz* functions use stdio library routines, and most of zlib's functions use the library memory allocation routines by default. zlib's *Init* functions allow for the application to provide custom memory allocation routines.

Of course, you should only operate on any given zlib or gzip stream from a single thread at a time.

22. Can I use zlib in my commercial application?

Yes. Please read the license in zlib.h.

23. Is zlib under the GNU license?

No. Please read the license in zlib.h.

24. The license says that altered source versions must be "plainly marked". So what exactly do I need to do to meet that requirement?

You need to change the ZLIB_VERSION and ZLIB_VERNUM #defines in zlib.h. In particular, the final version number needs to be changed to "f", and an identification string should be appended to ZLIB_VERSION. Version numbers x.x.x.f are reserved for modifications to zlib by others than the zlib maintainers. For example, if the version of the base zlib you are altering is "1.2.3.4", then in zlib.h you should change ZLIB_VERNUM to 0x123f, and ZLIB_VERSION to something like "1.2.3.f-zachary-mods-v3". You can also update the version strings in deflate.c and inftrees.c.

For altered source distributions, you should also note the origin and nature of the changes in zlib.h, as well as in ChangeLog and README, along with the dates of the alterations. The origin should include at least your name (or your company's name), and an email address to contact for help or issues with the library.

Note that distributing a compiled zlib library along with zlib.h and zconf.h is also a source distribution, and so you should change ZLIB_VERSION and ZLIB_VERNUM and note the origin and nature of the changes in zlib.h as you would for a full source distribution.

25.
Will zlib work on a big-endian or little-endian architecture, and can I exchange compressed data between them?

Yes and yes.

26. Will zlib work on a 64-bit machine?

Yes. It has been tested on 64-bit machines, and has no dependence on any data types being limited to 32-bits in length. If you have any difficulties, please provide a complete problem report to zlib@gzip.org

27. Will zlib decompress data from the PKWare Data Compression Library?

No. The PKWare DCL uses a completely different compressed data format than does PKZIP and zlib. However, you can look in zlib's contrib/blast directory for a possible solution to your problem.

28. Can I access data randomly in a compressed stream?

No, not without some preparation. If when compressing you periodically use Z_FULL_FLUSH, carefully write all the pending data at those points, and keep an index of those locations, then you can start decompression at those points. You have to be careful to not use Z_FULL_FLUSH too often, since it can significantly degrade compression. Alternatively, you can scan a deflate stream once to generate an index, and then use that index for random access. See examples/zran.c .

29. Does zlib work on MVS, OS/390, CICS, etc.?

It has in the past, but we have not heard of any recent evidence. There were working ports of zlib 1.1.4 to MVS, but those links no longer work. If you know of recent, successful applications of zlib on these operating systems, please let us know. Thanks.

30. Is there some simpler, easier to read version of inflate I can look at to understand the deflate format?

First off, you should read RFC 1951. Second, yes. Look in zlib's contrib/puff directory.

31. Does zlib infringe on any patents?

As far as we know, no. In fact, that was originally the whole point behind zlib. Look here for some more information:

http://www.gzip.org/#faq11

32. Can zlib work with greater than 4 GB of data?

Yes. inflate() and deflate() will process any amount of data correctly. Each call of inflate() or deflate() is limited to input and output chunks of the maximum value that can be stored in the compiler's "unsigned int" type, but there is no limit to the number of chunks. Note however that the

strm.total_in and strm_total_out counters may be limited to 4 GB. These counters are provided as a convenience and are not used internally by inflate() or deflate(). The application can easily set up its own counters updated after each call of inflate() or deflate() to count beyond 4 GB. compress() and uncompress() may be limited to 4 GB, since they operate in a single call. gzseek() and gztell() may be limited to 4 GB depending on how zlib is compiled. See the zlibCompileFlags() function in zlib.h.

The word "may" appears several times above since there is a 4 GB limit only if the compiler's "long" type is
32 bits. If the compiler's "long" type is
64 bits, then the limit is 16 exabytes.

33. Does zlib have any security vulnerabilities?

The only one that we are aware of is potentially in gzprintf(). If zlib is compiled to use sprintf() or vsprintf(), then there is no protection against a buffer overflow of an 8K string space (or other value as set by gzbuffer()), other than the caller of gzprintf() assuring that the output will not exceed 8K. On the other hand, if zlib is compiled to use snprintf() or vsnprintf(), which should normally be the case, then there is no vulnerability. The ./configure script will display warnings if an insecure variation of sprintf() will be used by gzprintf(). Also the zlibCompileFlags() function will return information on what variant of sprintf() is used by gzprintf().

If you don't have snprintf() or vsnprintf() and would like one, you can find a portable implementation here:

http://www.ijs.si/software/snprintf/

Note that you should be using the most recent version of zlib. Versions 1.1.3 and before were subject to a double-free vulnerability, and versions 1.2.1 and 1.2.2 were subject to an access exception when decompressing invalid compressed data.

34. Is there a Java version of zlib?

Probably what you want is to use zlib in Java. zlib is already included as part of the Java SDK in the java.util.zip package. If you really want a version of zlib written in the Java language, look on the zlib home page for links: http://zlib.net/ .

35. I get this or that compiler or source-code scanner warning when I crank it up to maximally-pedantic. Can't you guys write proper code?

Many years ago, we gave up attempting to avoid warnings on every compiler in the universe. It just got to be a waste of time, and some compilers

were downright silly as well as contradicted each other. So now, we simply make sure that the code always
works.

36. Valgrind (or some similar memory access checker) says that deflate is performing a conditional jump that depends on an uninitialized value. Isn't that a bug?

No. That is intentional for performance reasons, and the output of deflate is not affected. This only started showing up recently since zlib 1.2.x uses malloc() by default for allocations, whereas earlier versions used calloc(), which zeros out the allocated memory. Even though the code was correct, versions 1.2.4 and later was changed to not stimulate these checkers.

37. Will zlib read the (insert any ancient or arcane format here) compressed data format?

Probably not. Look in the comp.compression FAQ for pointers to various formats and associated software.

38. How can I encrypt/decrypt zip files with zlib?

zlib doesn't support encryption. The original PKZIP encryption is very weak and can be broken with freely available programs. To get strong encryption,
use GnuPG, http://www.gnupg.org/ , which already includes zlib compression. For PKZIP compatible "encryption", look at http://www.info-zip.org/

39. What's the difference between the "gzip" and "deflate" HTTP 1.1 encodings?

"gzip" is the gzip format, and "deflate" is the zlib format. They should probably have called the second one "zlib" instead to avoid confusion with the raw deflate compressed data format. While the HTTP 1.1 RFC 2616 correctly points to the zlib specification in RFC 1950 for the "deflate" transfer encoding, there have been reports of servers and browsers that incorrectly produce or expect raw deflate data per the deflate specification in RFC 1951, most notably Microsoft. So even though the "deflate" transfer encoding using the zlib format would be the more efficient approach (and in fact exactly what the zlib format was designed for), using the "gzip" transfer encoding is probably more reliable due to an
unfortunate choice of name on the part of the HTTP 1.1 authors.

Bottom line: use the gzip format for HTTP 1.1 encoding.

40. Does zlib support the new "Deflate64" format introduced by PKWare?

No. PKWare has apparently decided to keep that format proprietary, since they have not documented it as they have previous compression formats. In any case, the compression improvements are so modest compared to other more modern approaches, that it's not worth the effort to implement.

41. I'm having a problem with the zip functions in zlib, can you help?

There are no zip functions in zlib. You are probably using minizip by Giles Vollant, which is found in the contrib directory of zlib. It is not part of zlib. In fact none of the stuff in contrib is part of zlib. The files in there are not supported by the zlib authors. You need to contact the authors of the respective contribution for help.

42. The match.asm code in contrib is under the GNU General Public License.
Since it's part of zlib, doesn't that mean that all of zlib falls under the GNU GPL?

No. The files in contrib are not part of zlib. They were contributed by other authors and are provided as a convenience to the user within the zlib distribution. Each item in contrib has its own license.

43. Is zlib subject to export controls? What is its ECCN?

zlib is not subject to export controls, and so is classified as EAR99.

44. Can you please sign these lengthy legal documents and fax them back to us so that we can use your software in our product?

No. Go away. Shoo.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/FAQ

1.85 sysvinit-utils 3.01-1ubuntu1

1.85.1 Available under license :

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Version 2, June 1991

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#ifndef UTIL_LINUX_PT_BSD_H
#define UTIL_LINUX_PT_BSD_H

#define BSD_MAXPARTITIONS 16
#define BSD_FS_UNUSED  0

#ifndef BSD_DISKMAGIC
# define BSD_DISKMAGIC     ((uint32_t) 0x82564557)
#endif

#define BSD_LINUX_BOOTDIR "/usr/ucb/mdec"

#if defined (__alpha__) || defined (__powerpc__) || \
   defined (__ia64__) || defined (__hppa__)
# define BSD_LABELSECTOR   0
# define BSD_LABELOFFSET   64
#else
# define BSD_LABELSECTOR   1
# define BSD_LABELOFFSET   0
#endif

#define BSD_BBSIZE        8192  /* size of boot area, with label */
#define BSD_SBSIZE        8192  /* max size of fs superblock */

struct bsd_disklabel {
 uint32_t d_magic;  /* the magic number */
 int16_t  d_type;   /* drive type */
 int16_t  d_subtype;  /* controller/d_type specific */
 char  d_typename[16];  /* type name, e.g. "eagle" */
 char  d_packname[16];  /* pack identifier */

   /* disk geometry: */
 uint32_t d_secsize;  /* # of bytes per sector */
 uint32_t d_nsectors;  /* # of data sectors per track */
 uint32_t d_ntracks;  /*
 # of tracks per cylinder */
 uint32_t d_ncylinders;  /* # of data cylinders per unit */
```

```
uint32_t d_secpercyl;  /* # of data sectors per cylinder */
uint32_t d_secperunit;  /* # of data sectors per unit */

/*
 * Spares (bad sector replacements) below
 * are not counted in d_nsectors or d_secpercyl.
 * Spare sectors are assumed to be physical sectors
 * which occupy space at the end of each track and/or cylinder.
 */
uint16_t d_sparespertrack; /* # of spare sectors per track */
uint16_t d_sparespercyl;  /* # of spare sectors per cylinder */

/*
 * Alternate cylinders include maintenance, replacement,
 * configuration description areas, etc.
 */
uint32_t d_acylinders;  /* # of alt. cylinders per unit */

  /* hardware characteristics: */
/*
 * d_interleave, d_trackskew and d_cylskew describe perturbations
 * in the media format used to compensate for a slow controller.
 * Interleave is physical sector interleave, set up by the formatter
 * or controller
when formatting.  When interleaving is in use,
 * logically adjacent sectors are not physically contiguous,
 * but instead are separated by some number of sectors.
 * It is specified as the ratio of physical sectors traversed
 * per logical sector.  Thus an interleave of 1:1 implies contiguous
 * layout, while 2:1 implies that logical sector 0 is separated
 * by one sector from logical sector 1.
 * d_trackskew is the offset of sector 0 on track N
 * relative to sector 0 on track N-1 on the same cylinder.
 * Finally, d_cylskew is the offset of sector 0 on cylinder N
 * relative to sector 0 on cylinder N-1.
 */
uint16_t d_rpm;   /* rotational speed */
uint16_t d_interleave;  /* hardware sector interleave */
uint16_t d_trackskew;  /* sector 0 skew, per track */
uint16_t d_cylskew;  /* sector 0 skew, per cylinder */
uint32_t d_headswitch;  /* head switch time, usec */
uint32_t d_trkseek;  /* track-to-track seek, usec */
uint32_t d_flags;  /* generic flags */
uint32_t d_drivedata[5];  /*
drive-type specific information */
uint32_t d_spare[5];  /* reserved for future use */
uint32_t d_magic2;  /* the magic number (again) */
uint16_t d_checksum;  /* xor of data incl. partitions */
```

```
  /* filesystem and partition information: */
 uint16_t d_npartitions;        /* number of partitions in following */
 uint32_t d_bbsize;         /* size of boot area at sn0, bytes */
 uint32_t d_sbsize;         /* max size of fs superblock, bytes */

 struct bsd_partition  {  /* the partition table */
  uint32_t p_size;         /* number of sectors in partition */
  uint32_t p_offset;       /* starting sector */
  uint32_t p_fsize;        /* filesystem basic fragment size */
  uint8_t  p_fstype; /* filesystem type, see below */
  uint8_t  p_frag;  /* filesystem fragments per block */
  uint16_t p_cpg;         /* filesystem cylinders per group */
 } __attribute__((packed)) d_partitions[BSD_MAXPARTITIONS]; /* actually may be more */
} __attribute__((packed));



/* d_type values:
 */
#define BSD_DTYPE_SMD  1  /* SMD, XSMD; VAX hp/up */
#define BSD_DTYPE_MSCP  2  /* MSCP */
#define BSD_DTYPE_DEC  3  /* other DEC (rk, rl) */
#define BSD_DTYPE_SCSI  4  /* SCSI */
#define BSD_DTYPE_ESDI  5  /* ESDI interface */
#define BSD_DTYPE_ST506  6  /* ST506 etc. */
#define BSD_DTYPE_HPIB  7  /* CS/80 on HP-IB */
#define BSD_DTYPE_HPFL  8  /* HP Fiber-link */
#define BSD_DTYPE_FLOPPY 10  /* floppy */

/* d_subtype values: */
#define BSD_DSTYPE_INDOSPART 0x8  /* is inside dos partition */
#define BSD_DSTYPE_DOSPART(s) ((s) & 3) /* dos partition number */
#define BSD_DSTYPE_GEOMETRY 0x10  /* drive params in label */

/*
* Filesystem type and version.
* Used to interpret other filesystem-specific
* per-partition information.
*/
#define BSD_FS_UNUSED 0  /* unused */
#define BSD_FS_SWAP     1  /* swap */
#define BSD_FS_V6       2  /* Sixth Edition */
#define BSD_FS_V7       3  /* Seventh Edition */
#define BSD_FS_SYSV     4  /* System V */
#define BSD_FS_V71K     5  /* V7
 with 1K blocks (4.1, 2.9) */
#define BSD_FS_V8       6  /* Eighth Edition, 4K blocks */
#define BSD_FS_BSDFFS 7  /* 4.2BSD fast file system */
```

```
#define BSD_FS_BSDLFS 9  /* 4.4BSD log-structured file system */
#define BSD_FS_OTHER 10  /* in use, but unknown/unsupported */
#define BSD_FS_HPFS 11  /* OS/2 high-performance file system */
#define BSD_FS_ISO9660 12  /* ISO-9660 filesystem (cdrom) */
#define BSD_FS_ISOFS BSD_FS_ISO9660
#define BSD_FS_BOOT 13  /* partition contains bootstrap */
#define BSD_FS_ADOS 14  /* AmigaDOS fast file system */
#define BSD_FS_HFS 15  /* Macintosh HFS */
#define BSD_FS_ADVFS 16  /* Digital Unix AdvFS */

/* this is annoying, but it's also the way it is :-( */
#ifdef __alpha__
#define BSD_FS_EXT2 8  /* ext2 file system */
#else
#define BSD_FS_MSDOS 8  /* MS-DOS file system */
#endif

/*
* flags shared by various drives:
*/
#define BSD_D_REMOVABLE 0x01  /* removable media */
#define BSD_D_ECC       0x02  /* supports ECC */
#define BSD_D_BADSECT 0x04  /* supports
 bad sector forw. */
#define BSD_D_RAMDISK 0x08  /* disk emulator */
#define BSD_D_CHAIN     0x10  /* can do back-back transfers */
#define BSD_D_DOSPART 0x20  /* within MSDOS partition */

#endif /* UTIL_LINUX_PT_BSD_H */
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?S:libexp:
?S: This variable is the same as the lib variable, but is filename expanded
?S: at configuration time, for convenient use in your makefiles.
?S:.
: determine where public libraries go
set lib lib
eval $prefixit
case "$lib" in
")
 dflt=`./loc . "." $prefixexp/lib /usr/local/lib /usr/lib /lib`
 set dflt
 eval $prefixup
 ;;
*)  dflt="$lib";;
esac
echo " "
fn=d~
rp='Where do you want to put the public libraries?'
. ./getfile
lib="$ans"
libexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/lib.U
No license file was found, but licenses were detected in source scan.

* Feel free to modify any of this as the need arises. Note, however,

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/metaconfig.html
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Extras.U,v$
?RCS:
?RCS: Copyright (c) 2001, Jarkko Hietaniemi
?RCS:
?RCS: You may distribute under the terms of either the GNU General Public
?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?MAKE:extras: Myread Oldconfig Setvar rm
?MAKE: -pick add $@ %<
?Y:TOP
```

```
?S:extras:
?S: This variable holds a list of extra modules to install.
?S:.
: See if we want extra modules installed
echo " "
case "$extras" in
'') dflt='n';;
*) dflt='y';;
esac
cat <<EOM
Perl can be built with extra modules or bundles of modules which
will be fetched from the CPAN and installed alongside Perl.

Notice that you will need access to the CPAN; either via the Internet,
or a local copy, for example a CD-ROM or a local CPAN mirror.  (You will
be asked later to configure the CPAN.pm module which will in turn do
the installation of the rest of the extra modules or bundles.)

Notice also that if the modules require
 any external software such as
libraries and headers (the libz library and the zlib.h header for the
Compress::Zlib module, for example) you MUST have any such software
already installed, this configuration process will NOT install such
things for you.

If this doesn't make any sense to you, just accept the default '$dflt'.
EOM
rp='Install any extra modules (y or n)?'
. ./myread
case "$ans" in
y|Y)
 cat <<EOM

Please list any extra modules or bundles to be installed from CPAN,
with spaces between the names.  The names can be in any format the
'install' command of CPAN.pm will understand.  (Answer 'none',
without the quotes, to install no extra modules or bundles.)
EOM
 rp='Extras?'
 dflt="$extras"
 . ./myread
 extras="$ans"
esac
case "$extras" in
''|'none')
 val=''
 $rm -f ../extras.lst
 ;;
```

```
*) echo "(Saving the list of extras for later...)"
 echo "$extras" > ../extras.lst
 val="'$extras'"
 ;;
esac
set extras
eval $setvar
echo " "
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Extras.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Extract.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  14:58:52  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0.1.1  1994/10/29  15:51:46  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:52  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a shell script which can be doted in order to extract
?X: .SH files with variable substitutions.
?X:
?X: When running Configure from a remote directory ($src
 is not '.'),
?X: then the files will be created in that directory, so beware!
?X:
?MAKE:Extract: Mkdirp src
?MAKE: -pick add $@ %<
?F:./extract
?T:CONFIG SRC dir file
: script used to extract .SH files with variable substitutions
cat >extract <<EOS
CONFIG=true
```

```
SRC="$src"
EOS
cat >>extract <<'EOS'
echo "Doing variable substitutions on .SH files..."
if test -f "$SRC/MANIFEST"; then
 set x `awk '{print $1}' <$SRC/MANIFEST | grep '\.SH'`
else
 echo "(Looking for .SH files under the source directory.)"
 set x `(cd "$SRC"; find . -name "*.SH" -print)`
fi
shift
case $# in
0) set x `(cd "$SRC"; echo *.SH)`; shift;;
esac
if test ! -f "$SRC/$1"; then
 shift
fi
for file in $*; do
 case "$SRC" in
 ".")
  case "$file" in
  */*)
   dir=`expr X$file : 'X\(.*\)/'`
   file=`expr X$file : 'X.*/\(.*\)'`
   (cd $dir && . ./$file)
   ;;
  *)
   . ./$file
   ;;
  esac
  ;;
 *)
?X:
?X: When running Configure remotely ($src is not '.'), we cannot source
?X: the files directly, since that would wrongly cause
 the extraction
?X: where the source lie instead of withing the current directory. Therefore,
?X: we need to 'sh <file' then, which is okay since they will source the
?X: existing config.sh file. It's not possible to use:
?X:  ../src/Configure -S -O -Dsomething
?X: unfortunately since no new config.sh with the -Dsomething override
?X: will be created before running the .SH files. A minor buglet.
?X:
?X: Note that we must create the directory hierarchy ourselves if it does
?X: not exist already, and that is done through a shell emulation of the
?X: 'mkdir -p' command. We don't want to use the $installdir metaconfig
?X: symbol here since that would require too much to be configured for
?X: this simple extraction task that may happen quickly with 'Configure -S'.
```

```
?X:  -- RAM, 18/03/96
?X:
  case "$file" in
  */*)
   dir=`expr X$file : 'X\(.*\)/'`
   file=`expr X$file : 'X.*/\(.*\)'`
   ./mkdirp $dir
   sh <"$SRC/$dir/$file"
   ;;
  *)
   sh <"$SRC/$file"
   ;;
  esac
  ;;
 esac
done
if
 test -f "$SRC/config_h.SH"; then
 if test ! -f config.h; then
?X: oops, they left it out of MANIFEST, probably, so do it anyway.
  sh <"$SRC/config_h.SH"
 fi
fi
EOS

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Extract.U
No license file was found, but licenses were detected in source scan.

# $Id: makedir.sh,v 3.0.1.1 1994/01/24 14:00:08 ram Exp ram $
#
#  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
#
#  You may redistribute only under the terms of the Artistic Licence,
#  as specified in the README file that comes with the distribution.
#  You may reuse parts of this distribution only within the terms of
#  that same Artistic Licence; a copy of which may be found at the root
#  of the source tree for dist 4.0.
#
# Original Author: Larry Wall <lwall@netlabs.com>
#
# $Log: makedir.sh,v $
# Revision 3.0.1.1  1994/01/24  14:00:08  ram
# patch16: changed top ln-style config.sh lookup into test-style one
#
# Revision 3.0  1993/08/18  12:04:38  ram
# Baseline for dist 3.0 netwide release.
#
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/makedir.SH
No license file was found, but licenses were detected in source scan.

?RCS: $Id: mansrc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: mansrc.U,v $
?RCS: Revision 3.0.1.9 1997/02/28 16:12:03 ram
?RCS: patch61: don't ask for AFS when they choose to not install pages
?RCS:
?RCS: Revision 3.0.1.8 1995/09/25 09:16:58 ram
?RCS: patch59: unit is now forced to the top of Configure, if possible
?RCS:
?RCS: Revision 3.0.1.7 1995/02/15 14:15:31 ram
?RCS: patch51: was mistakenly duplicating /usr/local/man/man1 (ADO)
?RCS: patch51: added /opt/man/man1 to the lookpath (ADO)
?RCS:
?RCS: Revision
 3.0.1.6 1995/01/30 14:39:34 ram
?RCS: patch49: can now handle installation prefix changes (from WED)
?RCS:
?RCS: Revision 3.0.1.5 1995/01/11 15:32:25 ram
?RCS: patch45: can now use Loc variables since path stripping is deferred
?RCS:
?RCS: Revision 3.0.1.4 1994/08/29 16:30:38 ram
?RCS: patch32: now uses installation prefix for default setting
?RCS:
?RCS: Revision 3.0.1.3 1994/05/06 15:11:10 ram
?RCS: patch23: added lint hint, assuring that nroff is used
?RCS:
?RCS: Revision 3.0.1.2 1994/01/24 14:14:39 ram
?RCS: patch16: now uses _nroff in case user asked for portability
?RCS:
?RCS: Revision 3.0.1.1 1993/09/13 16:09:31 ram
?RCS: patch10: allows for L1 man page extension (WAD)
?RCS:
?RCS: Revision 3.0 1993/08/18 12:09:14 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:

```
?MAKE:mansrc mansrcexp manext installmansrc: afs cat nroff Loc Oldconfig \
 sysman spackage test Getfile Prefixit prefixexp Prefixup
?MAKE: -pick add $@ %<
?Y:TOP
?S:mansrc:
?S: This variable
 contains the name of the directory in which manual
?S: source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S:.
?S:mansrcexp:
?S: This variable is the same as the mansrc variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?S:installmansrc:
?S: This variable is really the same as mansrcexp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: mansrcexp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?S:manext:
?S: This variable contains the extension that the manual page should
?S: have: one of 'n', 'l', or '1'.  The Makefile must supply the '.'.
?S: See mansrc.
?S:.
?T:lookpath
: determine where manual pages go
set mansrc mansrc none
eval $prefixit
$cat <<EOM

$spackage has manual
 pages available in source form.
EOM
case "$nroff" in
nroff)
 echo "However, you don't have nroff, so they're probably useless to you."
 case "$mansrc" in
 ") mansrc="none";;
 esac;;
esac
echo "If you don't want the manual sources installed, answer 'none'."
case "$mansrc" in
")
 lookpath="$prefixexp/share/man/man1 $prefixexp/man/man1"
 lookpath="$lookpath $prefixexp/man/u_man/man1 $prefixexp/man/l_man/man1"
 lookpath="$lookpath /usr/local/man/man1 /opt/man/man1 /usr/man/manl"
```

```
 lookpath="$lookpath /usr/share/man/man1 /usr/local/share/man/man1"
 lookpath="$lookpath /usr/man/local/man1 /usr/man/l_man/man1"
 lookpath="$lookpath /usr/local/man/u_man/man1 /usr/local/man/l_man/man1"
 lookpath="$lookpath /usr/man/man.L"
 mansrc=`./loc . $prefixexp/man/man1 $lookpath`
 if $test -d "$mansrc"; then
  dflt="$mansrc"
 else
  dflt="$sysman"
 fi
 set dflt
 eval $prefixup
 ;;
' ') dflt=none;;
*)  dflt="$mansrc"
 ;;
esac
echo " "
fn=dn~
rp='Where do the manual pages (source) go?'
. ./getfile
if test
 "X$mansrcexp" != "X$ansexp"; then
 installmansrc="
fi
mansrc="$ans"
mansrcexp="$ansexp"
case "$mansrc" in
") mansrc=' '
 installmansrc=";;
esac
if $afs && $test "$mansrc"; then
 $cat <<EOM

Since you are running AFS, I need to distinguish the directory in which
manual pages reside from the directory in which they are installed (and from
which they are presumably copied to the former directory by occult means).

EOM
 case "$installmansrc" in
 ") dflt=`echo $mansrcexp | sed 's#^/afs/#/afs/.#'`;;
 *) dflt="$installmansrc";;
 esac
 fn=de~
 rp='Where will man pages be installed?'
 . ./getfile
 installmansrc="$ans"
else
```

```
 installmansrc="$mansrcexp"
fi

case "$mansrc" in
' ') manext='0';;
*l) manext=l;;
*n) manext=n;;
*o) manext=l;;
*p) manext=n;;
*C) manext=C;;
*L) manext=L;;
*L1) manext=L1;;
*) manext=1;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/mansrc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: contains.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: contains.U,v $
?RCS: Revision 3.0  1993/08/18  12:05:35  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:contains: Nothing
?MAKE: -pick add $@ %<
?S:contains:
?S: This variable holds the command to do a grep with a proper return
?S: status.  On most sane systems it is simply "grep".  On insane systems
?S: it is a grep followed by a cat followed by a test.  This variable
?S: is primarily for the use of other Configure units.
?S:.
: Some
 greps do not return status, grrr.
echo "grimblepritz" >grimble
if grep blurfldyick grimble >/dev/null 2>&1 ; then
 contains=contains
elif grep grimblepritz grimble >/dev/null 2>&1 ; then
 contains=grep
```

```
else
 contains=contains
fi
rm -f grimble
: the following should work in any shell
case "$contains" in
contains*)
 echo " "
 echo "AGH!  Grep doesn't return a status.  Attempting remedial action."
 cat >contains <<'EOSS'
grep "$1" "$2" >.greptmp && cat .greptmp && test -s .greptmp
EOSS
chmod +x contains
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/contains.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1996, Andy Dougherty
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: man1dir.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:10:29  ram
?RCS: patch61: created
?RCS:
?X:
?X: This was originally specific to perl5.  Since perl5 has man pages that
?X: go in both man1/ and man3/ directories, we need both man1dir
?X: and man3dir.  This unit is basically dist's mansrc.U with
?X: man1 used instead of man everywhere.
?X:
?MAKE:man1dir man1direxp man1ext installman1dir: afs cat nroff Loc Oldconfig \
 spackage test Getfile Prefixit prefixexp
 Prefixup sysman Myread
?MAKE: -pick add $@ %<
?Y:TOP
?S:man1dir:
?S: This variable contains the name of the directory in which manual
?S: source pages are to be put.  It is the responsibility of the
```

```
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S:.
?S:man1direxp:
?S: This variable is the same as the man1dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?S:installman1dir:
?S: This variable is really the same as man1direxp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: man1direxp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?S:man1ext:
?S: This variable contains the extension that the manual page should
?S: have: one of 'n', 'l', or '1'.  The Makefile must supply the '.'.
?S: See man1dir.
?S:.
?T:lookpath
: determine
 where manual pages go
set man1dir man1dir none
eval $prefixit
$cat <<EOM

$spackage has manual pages available in source form.
EOM
case "$nroff" in
nroff)
 echo "However, you don't have nroff, so they're probably useless to you."
 case "$man1dir" in
 ") man1dir="none";;
 esac;;
esac
echo "If you don't want the manual sources installed, answer 'none'."
case "$man1dir" in
' ') dflt=none
 ;;
")
 lookpath="$prefixexp/man/man1 $prefixexp/man/l_man/man1"
 lookpath="$lookpath $prefixexp/man/p_man/man1"
 lookpath="$lookpath $prefixexp/man/u_man/man1"
 lookpath="$lookpath $prefixexp/man/man.1"
?X: Experience has shown people expect man1dir to be under prefix,
?X: so we now always put it there.  Users who want other behavior
?X: can answer interactively or use a command line option.
?X: Does user have System V-style man paths.
 case "$sysman" in
```

```
 */?_man*) dflt=`./loc . $prefixexp/l_man/man1 $lookpath` ;;
 *) dflt=`./loc . $prefixexp/man/man1 $lookpath` ;;
 esac
 set dflt
 eval $prefixup
 ;;
*)
  dflt="$man1dir"
 ;;
esac
echo " "
fn=dn+~
rp="Where do the main $spackage manual pages (source) go?"
. ./getfile
if $test "X$man1direxp" != "X$ansexp"; then
 installman1dir="
fi
man1dir="$ans"
man1direxp="$ansexp"
case "$man1dir" in
") man1dir=' '
 installman1dir="";;
esac
if $afs; then
 $cat <<EOM

Since you are running AFS, I need to distinguish the directory in which
manual pages reside from the directory in which they are installed (and from
which they are presumably copied to the former directory by occult means).

EOM
 case "$installman1dir" in
 ") dflt=`echo $man1direxp | sed 's#^/afs/#/afs/.#'`;;
 *) dflt="$installman1dir";;
 esac
 fn=de~
 rp='Where will man pages be installed?'
 . ./getfile
 installman1dir="$ans"
else
 installman1dir="$man1direxp"
fi

: What suffix to use on installed man pages

case "$man1dir" in
' ')
 man1ext='0'
```

```
 ;;
*)
 rp="What suffix should be used for the main $spackage man pages?"
 case "$man1ext" in
 '') case "$man1dir" in
  *1)  dflt=1 ;;
  *1p)
 dflt=1p ;;
  *1pm) dflt=1pm ;;
  *l) dflt=l;;
  *n) dflt=n;;
  *o) dflt=o;;
  *p) dflt=p;;
  *C) dflt=C;;
  *L) dflt=L;;
  *L1) dflt=L1;;
  *) dflt=1;;
  esac
  ;;
 *) dflt="$man1ext";;
 esac
 . ./myread
 man1ext="$ans"
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/man1dir.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: libnlist.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libnlist.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:08:02  ram
?RCS: patch61: added usrinc and mips on the dependency line
?RCS: patch61: make sure we call ./mips
?RCS: patch61: added a ?LINT: hint
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:00  ram
?RCS: Baseline for dist 3.0 netwide release.
```

```
?RCS:
?MAKE:libnlist: Loc libpth Guess usrinc _a
?MAKE: -pick add $@ %<
?S:libnlist (libmld):
?S: This variable contains the name of the library required to
 get the
?S: definition of the nlist() function.  On a MIPS RISC/OS box, it is -lmld.
?S: Under Sys Vr4, it is -lelf.  Otherwise, its value is empty.
?S:.
?T:xxx
?LINT:use usrinc
: see if we need a special library for 'nlist()'
echo " "
: How about doing this if nlist is not in libc...
if ./mips ; then
 libnlist='-lmld'
else
 xxx=`./loc libelf$_a x $libpth`
 case "$xxx" in
 x)  ;;
 *)
  libnlist="$xxx"
  ;;
 esac
fi
case "$libnlist" in
'') echo "No special library for nlist() seems necessary." >&4
 ;;
*)  echo "nlist() can be found in $libnlist." >&4
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libnlist.U
No license file was found, but licenses were detected in source scan.

```
?RCS: You may redistribute only under the terms of the Artistic Licence,
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_select.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_locconv.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sigsetmk.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_chown.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_unistd.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_locale.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_getopt.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_getprior.U
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* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_scandir.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_link.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_fgetpos.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_inetd.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_msgget.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/mkdep.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/i_termio.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_systimeb.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_gethid.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sighold.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_nice.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_inetaton.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/orgname.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_setpgrp2.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/ilp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_getppid.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_preadv.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_strcspn.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sigvec.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_strstr.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_regex.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_perror.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_msync.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sjis2jis.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_stat.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_memset.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_mkostemp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_setlnbuf.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_bcmp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_semctl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/defeditor.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_whoami.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_niin.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_setruid.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_limits.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_sysdir.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_memmove.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_newsadm.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_wctomb.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/i_stdlib.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_tminsys.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_munmap.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_pathconf.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_mkdir.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_fchown.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_setlocale.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_bzero.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_mblen.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_memccpy.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_normsig.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_strccmp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_dbl_dig.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_dlfcn.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_pwritev.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/registers.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_chroot.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_stddef.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_float.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_itimer.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_seteuid.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_speedopt.U
No license file was found, but licenses were detected in source scan.

```
# $Id: errnolist.sh,v 3.0.1.1 1994/01/24 14:00:00 ram Exp ram $
#
#  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
#
#  You may redistribute only under the terms of the Artistic Licence,
#  as specified in the README file that comes with the distribution.
#  You may reuse parts of this distribution only within the terms of
#  that same Artistic Licence; a copy of which may be found at the root
#  of the source tree for dist 4.0.
#
# Original Author: Harlan Stenn <harlan@mumps.pfcs.com>
#
# $Log: errnolist.sh,v $
# Revision 3.0.1.1  1994/01/24  14:00:00  ram
# patch16: changed top ln-style config.sh lookup into test-style one
#
# Revision 3.0  1993/08/18  12:04:36  ram
# Baseline for dist 3.0 netwide release.
#
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/errnolist.SH
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: usenm.U,v 3.0.1.1 1997/02/28 16:26:40 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
```

```
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: usenm.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:26:40  ram
?RCS: patch61: don't use nm with the GNU C library
?RCS: patch61: added support for Linux shared libs
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:57  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:usenm runnm nm_opt nm_so_opt: cat test Myread Oldconfig myuname grep \
 nm d_gnulibc osname egrep rsrc
?MAKE: -pick add $@ %<
?S:usenm:
?S: This variable contains 'true' or 'false' depending
 whether the
?S: nm extraction is wanted or not.
?S:.
?S:runnm:
?S: This variable contains 'true' or 'false' depending whether the
?S: nm extraction should be performed or not, according to the value
?S: of usenm and the flags on the Configure command line.
?S:.
?S:nm_opt:
?S: This variable holds the options that may be necessary for nm.
?S:.
?S:nm_so_opt:
?S: This variable holds the options that may be necessary for nm
?S: to work on a shared library but that can not be used on an
?S: archive library.  Currently, this is only used by Linux, where
?S: nm --dynamic is *required* to get symbols from an ELF library which
?S: has been stripped, but nm --dynamic is *fatal* on an archive library.
?S: Maybe Linux should just always set usenm=false.
?S:.
: see if nm is to be used to determine whether a symbol is defined or not
?X: If there is enough inquiries, it might be worth to wait for the nm
?X: extraction. Otherwise, the C compilations might be a better deal.
?X:
?X: Don't bother if we're
 using GNU libc -- skimo
?LINT:extern PASE
case "$usenm" in
")
 dflt="
 case "$d_gnulibc" in
 "$define")
  echo " "
```

```
 echo "nm probably won't work on the GNU C Library." >&4
 dflt=n
 ;;
esac
case "$dflt" in
")
 if $test "$osname" = aix -a "X$PASE" != "Xdefine" -a ! -f /lib/syscalls.exp; then
  echo " "
  echo "Whoops!  This is an AIX system without /lib/syscalls.exp!" >&4
  echo "'nm' won't be sufficient on this system." >&4
  dflt=n
 fi
 ;;
esac
case "$dflt" in
") dflt=`$egrep 'inlibc|csym' $rsrc/Configure | wc -l 2>/dev/null`
 if $test $dflt -gt 20; then
  dflt=y
 else
  dflt=n
 fi
 ;;
esac
;;
*)
 case "$usenm" in
 true|$define) dflt=y;;
 *) dflt=n;;
 esac
 ;;
esac
$cat <<EOM

I can use $nm to extract the symbols from your C libraries. This
is a time consuming task which may generate huge output on the disk (up
to 3 megabytes) but that should make the symbols extraction faster. The
alternative is to skip the 'nm' extraction part and to compile a small
test
 program instead to determine whether each symbol is present. If
you have a fast C compiler and/or if your 'nm' output cannot be parsed,
this may be the best solution.

You probably shouldn't let me use 'nm' if you are using the GNU C Library.

EOM
rp="Shall I use $nm to extract C symbols from the libraries?"
. ./myread
case "$ans" in
```

```
[Nn]*) usenm=false;;
*) usenm=true;;
esac

?X: Name extraction is to be run if 'nm' usage is wanted and if no -r flag
?X: was provided to configure (in which case we simply re-use the previous
?X: values).
runnm=$usenm
case "$reuseval" in
true) runnm=false;;
esac

: nm options which may be necessary
case "$nm_opt" in
'') if $test -f /mach_boot; then
  nm_opt='' # Mach
 elif $test -d /usr/ccs/lib; then
  nm_opt='-p' # Solaris (and SunOS?)
 elif $test -f /dgux; then
  nm_opt='-p' # DG-UX
 elif $test -f /lib64/rld; then
  nm_opt='-p' # 64-bit Irix
 else
  nm_opt=''
 fi;;
esac

: nm options which may be necessary for shared libraries but illegal
: for archive
 libraries.  Thank you, Linux.
case "$nm_so_opt" in
'') case "$myuname" in
 *linux*|gnu*)
  if $nm --help | $grep 'dynamic' > /dev/null 2>&1; then
   nm_so_opt='--dynamic'
  fi
  ;;
 esac
 ;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/usenm.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1996, Andy Dougherty
```

```
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: man3dir.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:10:34  ram
?RCS: patch61: created
?RCS:
?X:
?X: This was originally specific to perl5.  Since perl5 has man pages that
?X: go in both man1/ and man3/ directories, we need both man1dir
?X: and man3dir.  This unit is basically dist's mansrc.U with
?X: man3 used instead of man everywhere.
?X: I then added various tests because perl5 has *lots* of man3
?X: pages with long file names. -- ADO
?X:
?MAKE:man3dir
 man3direxp man3ext installman3dir: afs cat nroff Loc Oldconfig \
 sed man1dir spackage package Getfile prefix Prefixit Prefixup \
 d_flexfnam privlib Myread
?MAKE: -pick add $@ %<
?Y:TOP
?S:man3dir:
?S: This variable contains the name of the directory in which manual
?S: source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S:.
?S:man3direxp:
?S: This variable is the same as the man3dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?S:installman3dir:
?S: This variable is really the same as man3direxp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: man3direxp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?S:man3ext:
?S: This variable contains the extension that the manual
 page should
?S: have: one of 'n', 'l', or '3'.  The Makefile must supply the '.'.
?S: See man3dir.
?S:.
```

```
: determine where library module manual pages go
set man3dir man3dir none
eval $prefixit
$cat <<EOM

$spackage has manual pages for many of the library modules.
EOM

case "$nroff" in
nroff)
 $cat <<'EOM'
However, you don't have nroff, so they're probably useless to you.
EOM
 case "$man3dir" in
 '') man3dir="none";;
 esac;;
esac

case "$d_flexfnam" in
undef)
 $cat <<'EOM'
However, your system can't handle the long file names like File::Basename.3.
EOM
 case "$man3dir" in
 '') man3dir="none";;
 esac;;
esac

echo "If you don't want the manual sources installed, answer 'none'."
?X: We dont use /usr/local/man/man3 because some man programs will
?X: only show the /usr/local/man/man3 contents, and not the system ones,
?X: thus man less will show the perl module less.pm, but not the system
?X: less command.  We might also conflict with TCL man pages.
?X: However, something like /opt/perl/man/man3
 is fine.
case "$man3dir" in
'') case "$prefix" in
 *$package*) dflt=`echo $man1dir |
   $sed -e 's/man1/man3/g' -e 's/man\.1/man\.3/g'` ;;
 *) dflt="$privlib/man/man3" ;;
 esac
 ;;
' ') dflt=none;;
*) dflt="$man3dir" ;;
esac
echo " "

fn=dn+~
```

```
rp="Where do the $package library man pages (source) go?"
. ./getfile
if test "X$man3direxp" != "X$ansexp"; then
 installman3dir="
fi

man3dir="$ans"
man3direxp="$ansexp"
case "$man3dir" in
") man3dir=' '
 installman3dir=";;
esac
if $afs; then
 $cat <<EOM

Since you are running AFS, I need to distinguish the directory in which
manual pages reside from the directory in which they are installed (and from
which they are presumably copied to the former directory by occult means).

EOM
 case "$installman3dir" in
 ") dflt=`echo $man3direxp | sed 's#^/afs/#/afs/.#'`;;
 *) dflt="$installman3dir";;
 esac
 fn=de~
 rp='Where will man pages be installed?'
 . ./getfile
 installman3dir="$ans"
else
 installman3dir="$man3direxp"
fi

: What suffix
 to use on installed man pages

case "$man3dir" in
' ')
 man3ext='0'
 ;;
*)
 rp="What suffix should be used for the $package library man pages?"
 case "$man3ext" in
 ") case "$man3dir" in
  *3)  dflt=3 ;;
  *3p) dflt=3p ;;
  *3pm) dflt=3pm ;;
  *l) dflt=l;;
  *n) dflt=n;;
```

```
  *o) dflt=o;;
  *p) dflt=p;;
  *C) dflt=C;;
  *L) dflt=L;;
  *L3) dflt=L3;;
  *) dflt=3;;
  esac
  ;;
 *) dflt="$man3ext";;
 esac
 . ./myread
 man3ext="$ans"
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/man3dir.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Inhdr.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Inhdr.U,v $
?RCS: Revision 3.0.1.2  1995/05/12  12:01:31  ram
?RCS: patch54: deleted tabs that caused some /bin/sh to core dump (ADO)
?RCS:
?RCS: Revision 3.0.1.1  1994/10/29  15:55:01  ram
?RCS: patch36: call ./whoa explicitly instead of relying on PATH
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:01  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit checks wether a set of header files exists or not.
?X: If the first header is not
 found, the function tries to locate
?X: the next header, and so on, until one is found or there is no
?X: more header in the list.
?X:
?X: To use it, say:
?X: set header i_header [ header2 i_header2 ... ]
```

```
?X: eval $inhdr
?X:
?MAKE:Inhdr: test Findhdr Whoa
?MAKE: -pick add $@ %<
?LINT:define inhdr
?V:inhdr
?S:inhdr:
?S: This shell variable is used internally by Configure to check
?S: wether a set of headers exist or not. A typical use is:
?S:  set header i_header [ header2 i_header2 ... ]
?S:  eval $inhdr
?S: That will print a message, saying wether header was found or not
?S: and set i_header* accordingly. If the first header is not found,
?S: we try the next one, until the list is empty or one is found.
?S:.
?T:xxx xxf var td xxnf tu yyy instead was cont
: define an alternate in-header-list? function
inhdr='echo " "; td=$define; tu=$undef; yyy=$@;
cont=true; xxf="echo \"<\$1> found.\" >&4";
case $# in 2) xxnf="echo \"<\$1> NOT found.\" >&4";;
*) xxnf="echo \"<\$1> NOT found, ...\" >&4";;
esac;
case
 $# in 4) instead=instead;; *) instead="at last";; esac;
while $test "$cont"; do
 xxx=`./findhdr $1`
 var=$2; eval "was=\$$2";
 if $test "$xxx" && $test -r "$xxx";
 then eval $xxf;
?X: Next line shifted left 1 tabstop to avoid sh core dump on MachTen 2.1.1.
 eval "case \"\$$var\" in $undef) . ./whoa; esac"; eval "$var=\$td";
  cont="";
 else eval $xxnf;
?X: Likewise, the next line has been shifted left 1 tabstop -- ADO, 08/03/95
 eval "case \"\$$var\" in $define) . ./whoa; esac"; eval "$var=\$tu"; fi;
 set $yyy; shift; shift; yyy=$@;
 case $# in 0) cont="";;
 2) xxf="echo \"but I found <\$1> $instead.\" >&4";
  xxnf="echo \"and I did not find <\$1> either.\" >&4";;
 *) xxf="echo \"but I found <\$1\> instead.\" >&4";
  xxnf="echo \"there is no <\$1>, ...\" >&4";;
 esac;
done;
?X: Remaining values are set to 'undef'
while $test "$yyy";
do set $yyy; var=$2; eval "was=\$$2";
 eval "case \"\$$var\" in $define) . ./whoa; esac"; eval "$var=\$tu";
 set $yyy; shift; shift; yyy=$@;
```

```
done'

Found
 in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Inhdr.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Myinit.U,v 3.0 1993/08/18 12:05:07 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: This file is included with or a derivative work of a file included
?RCS: with the metaconfig program of Raphael Manfredi's "dist" distribution.
?RCS: In accordance with clause 7 of dist's modified Artistic License:
?RCS:
?RCS:     You may distribute under the terms of either the GNU General Public
?RCS:     License or the Artistic License, as specified in the README file.
?RCS:
?RCS: $Log: Myinit.U,v $
?RCS: Revision 3.0  1993/08/18  12:05:07  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: If you want to initialize any default values, copy this unit to your
?X: personal U directory and add the assignments to the end.  This file
?X: is included after variables are initialized but before any old
?X: config.sh file is read in and before any Configure switch processing.
?X:
?MAKE:Myinit
 libswanted: Init
?MAKE: -pick add $@ %<
?S:libswanted:
?S: This variable holds a list of all the libraries we want to
?S: search.  The order is chosen to pick up the c library
?S: ahead of ucb or bsd libraries for SVR4.
?S:.
?LINT:extern usevfork glibpth
?LINT:change usevfork glibpth
: List of libraries we want.
?X: Put crypt here, even though I should really fix d_crypt.U to look
?X: for it correctly, including possible shared library versions.
: If anyone needs extra -lxxx, put those in a hint file.
libswanted="cl pthread socket bind inet nsl ndbm gdbm dbm db malloc dl ld"
libswanted="$libswanted sun m crypt sec util c cposix posix ucb bsd BSD"
: We probably want to search /usr/shlib before most other libraries.
: This is only used by the lib/ExtUtils/MakeMaker.pm routine extliblist.
glibpth=`echo " $glibpth " | sed -e 's! /usr/shlib ! !'`
glibpth="/usr/shlib $glibpth"
```

: Do not use vfork unless overridden by a hint file.
usevfork=false

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Myinit.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Options.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Options.U,v $
?RCS: Revision 3.0.1.7 1997/02/28 15:08:15 ram
?RCS: patch61: optdef.sh now starts with a "startsh"
?RCS: patch61: moved some code from Head.U
?RCS:
?RCS: Revision 3.0.1.6 1995/09/25 09:14:46 ram
?RCS: patch59: protected option parsing code against 'echo -*' option failure
?RCS:
?RCS: Revision 3.0.1.5 1995/05/12 12:04:52 ram
?RCS: patch54: added -K option for experts
?RCS:
?RCS: Revision 3.0.1.4 1995/01/30 14:27:52 ram
?RCS:
 patch49: this unit now exports file optdef.sh, not a variable
?RCS:
?RCS: Revision 3.0.1.3 1995/01/11 15:19:00 ram
?RCS: patch45: new -O option allowing -D and -U to override config.sh settings
?RCS: patch45: file optdef.sh is no longer removed after sourcing
?RCS:
?RCS: Revision 3.0.1.2 1994/10/29 15:58:06 ram
?RCS: patch36: ensure option definition file is removed before appending
?RCS: patch36: protect variable definitions with spaces in them
?RCS:
?RCS: Revision 3.0.1.1 1994/06/20 06:55:44 ram
?RCS: patch30: now uses new me symbol to tag error messages
?RCS: patch30: new -D and -U options to define/undef symbols (JHI)
?RCS:
?RCS: Revision 3.0 1993/08/18 12:05:14 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:

```
?X: Command line parsing. It is really important that the variables used here
?X: be not listed in the MAKE line, or they will be saved in config.sh and
?X: loading this file to fetch default answers would clobber the values set
?X: herein.
?X:
?MAKE:Options:
 startsh
?MAKE: -pick wipe $@ %<
?V:reuseval alldone error realsilent silent extractsh fastread \
 knowitall: config_sh
?T:arg argn symbol config_arg0 config_args config_argc xxx yyy zzz uuu
?T:args_exp args_sep arg_exp ccflags
?F:!Configure
?F:./optdef.sh ./cmdline.opt ./posthint.sh ./cmdl.opt
: Save command line options in file UU/cmdline.opt for later use in
: generating config.sh.
?X: This temporary file will be read by Oldsym.U.  I used a temporary
?X: file to preserve all sorts of potential command line quotes and
?X: also because we don't know in advance how many variables we'll
?X: need, so I can't actually declare them on the MAKE line.
?X: The config_args variable won't be quite correct if Configure is
?X: fed something like    ./Configure -Dcc="gcc -B/usr/ccs/bin/"
?X: since the quotes are gone by the time we see them.  You'd have to
?X: reconstruct the command line from the config_arg? lines, but since
?X: I don't imagine anyone actually having to do that, I'm not going
?X:
 to worry too much.
cat > cmdline.opt <<EOSH
: Configure command line arguments.
config_arg0='$0'
config_args='$*'
config_argc=$#
EOSH
argn=1
args_exp="
args_sep="
for arg in "$@"; do
 cat >>cmdline.opt <<EOSH
config_arg$argn='$arg'
EOSH
?X: Extreme backslashitis: replace each ' by """"
 cat <<EOC | sed -e "s/'/""""""""""""""/g" > cmdl.opt
$arg
EOC
 arg_exp=`cat cmdl.opt`
 args_exp="$args_exp$args_sep'$arg_exp'"
 argn=`expr $argn + 1`
 args_sep=' '
```

```
done
?X: args_exp is good for restarting self: eval "set X $args_exp"; shift; $0 "$@"
?X: used by hints/os2.sh in Perl, for instance
rm -f cmdl.opt

: produce awk script to parse command line options
cat >options.awk <<'EOF'
BEGIN {
 optstr = "A:dD:eEf:hKOrsSU:V"; # getopt-style specification

 len = length(optstr);
 for (i = 1; i <= len; i++) {
  c = substr(optstr, i, 1);
?X: some older awk's do not have the C ?: construct
  if (i < len) a = substr(optstr, i + 1, 1); else a = "";
  if (a == ":") {
   arg[c] = 1;
   i++;
  }
  opt[c]
 = 1;
 }
}
{
 expect = 0;
 str = $0;
 if (substr(str, 1, 1) != "-") {
  printf("'%s'\n", str);
  next;
 }
 len = length($0);
 for (i = 2; i <= len; i++) {
  c = substr(str, i, 1);
  if (!opt[c]) {
   printf("-%s\n", substr(str, i));
   next;
  }
  printf("-%s\n", c);
  if (arg[c]) {
   if (i < len)
    printf("'%s'\n", substr(str, i + 1));
   else
    expect = 1;
   next;
  }
 }
}
END {
```

```
 if (expect)
  print "?";
}
EOF

: process the command line options
?X: Use "$@" to keep arguments with spaces in them from being split apart.
?X: For the same reason, awk will output quoted arguments and the final eval
?X: removes them and sets a proper $* array. An 'X' is prepended to each
?X: argument before being fed to echo to guard against 'echo -x', where -x
?X: would be understood as an echo option! It is removed before feeding awk.
set X `for arg in "$@"; do echo "X$arg"; done |
 sed -e s/X// | awk -f options.awk`
eval "set $*"
shift
rm -f options.awk

: set up default values
fastread=''
reuseval=false
config_sh=''
alldone=''
error=''
silent=''
extractsh=''
knowitall=''
rm
 -f optdef.sh posthint.sh
cat >optdef.sh <<EOS
$startsh
EOS

?X:
?X: Given that we now have the possibility to execute Configure remotely
?X: thanks to the new src.U support, we have to face the possibility
?X: of having to ask where the source lie, which means we need the Myread.U
?X: stuff and possibly other things that might echo something on the
?X: screen...
?X:
?X: That's not pretty, and might be confusing in 99% of the time. So...
?X: We introduce a new realsilent variable which is set when -s is given,
?X: and we force silent=true if -S is supplied. The Extractall.U unit
?X: will then undo the >&4 redirection based on the value of the
?X: realsilent variable... -- RAM, 18/93/96
?X:

: option parsing
while test $# -gt 0; do
```

```
case "$1" in
-d) shift; fastread=yes;;
-e) shift; alldone=cont;;
-f)
 shift
 cd ..
 if test -r "$1"; then
  config_sh="$1"
 else
  echo "$me: cannot read config file $1."
>&2
  error=true
 fi
 cd UU
 shift;;
--help|\
-h) shift; error=true;;
-r) shift; reuseval=true;;
-s) shift; silent=true; realsilent=true;;
-E) shift; alldone=exit;;
-K) shift; knowitall=true;;
-O) shift;;
-S) shift; silent=true; extractsh=true;;
-D)
 shift
 case "$1" in
 *=)
  echo "$me: use '-U symbol=', not '-D symbol='." >&2
  echo "$me: ignoring -D $1" >&2
  ;;
 *=*) echo "$1" | \
   sed -e "s/'/'\"'\"'/g" -e "s/=\(.*\)/='\1'/" >> optdef.sh;;
 *) echo "$1='define'" >> optdef.sh;;
 esac
 shift
 ;;
-U)
 shift
 case "$1" in
 *=) echo "$1" >> optdef.sh;;
 *=*)
  echo "$me: use '-D symbol=val', not '-U symbol=val'." >&2
  echo "$me: ignoring -U $1" >&2
  ;;
 *) echo "$1='undef'" >> optdef.sh;;
 esac
 shift
 ;;
```

```
-A)
   shift
   xxx="
   yyy="$1"
   zzz="
   uuu=undef
   case "$yyy" in
        *=*) zzz=`echo "$yyy"|sed 's!=.*!!'`
             case "$zzz" in
             *:*) zzz=" ;;
             *)   xxx=append

             zzz=" "`echo "$yyy"|sed 's!^[^=]*=!!'`
                  yyy=`echo "$yyy"|sed 's!=.*!!'` ;;
             esac
             ;;
        esac
        case "$xxx" in
        ")  case "$yyy" in
             *:*) xxx=`echo "$yyy"|sed 's!:.*!!'`
                  yyy=`echo "$yyy"|sed 's!^[^:]*:!!'`
                  zzz=`echo "$yyy"|sed 's!^[^=]*=!!'`
                  yyy=`echo "$yyy"|sed 's!=.*!!'` ;;
             *)   xxx=`echo "$yyy"|sed 's!:.*!!'`
                  yyy=`echo "$yyy"|sed 's!^[^:]*:!!'` ;;
             esac
             ;;
        esac
   case "$xxx" in
   append)
 echo "$yyy=\"\${$yyy}$zzz\"" >> posthint.sh ;;
   clear)
 echo "$yyy=""   >> posthint.sh ;;
   define)
      case "$zzz" in
 ") zzz=define ;;
 esac
 echo "$yyy='$zzz'"  >> posthint.sh ;;
   eval)
 echo "eval \"$yyy=$zzz\"" >> posthint.sh ;;
   prepend)
 echo "$yyy=\"$zzz\${$yyy}\"" >> posthint.sh ;;
   undef)

    case "$zzz" in
 ") zzz="$uuu" ;;
 esac
 echo "$yyy=$zzz"  >> posthint.sh ;;
```

```
        *)  echo "$me: unknown -A command '$xxx', ignoring -A $1" >&2 ;;
    esac
    shift
    ;;
 -V) echo "$me generated by metaconfig <VERSION> PL<PATCHLEVEL>." >&2
    exit 0;;
 --) break;;
 -*) echo "$me: unknown option $1" >&2; shift; error=true;;
 *) break;;
 esac
done

case "$error" in
true)
 cat >&2 <<EOM
Usage: $me [-dehrsEKOSV] [-f config.sh] [-D symbol] [-D symbol=value]
            [-U symbol] [-U symbol=] [-A command:symbol...]
 -d : use defaults for all answers.
 -e : go on without questioning past the production of config.sh.
 -f : specify an alternate default configuration file.
 -h : print this help message and exit (with an error status).
 -r : reuse C symbols value if possible (skips costly nm extraction).
 -s : silent mode, only echoes questions and essential information.
 -D : define symbol to have some value:
      -D symbol               symbol gets the
 value 'define'
      -D symbol='some value'   symbol is set to 'some value'
     common used examples (see INSTALL for more info):
      -Duse64bitint           use 64bit integers
      -Duse64bitall           use 64bit integers and pointers
      -Dusethreads            use thread support
      -Dinc_version_list=none  do not include older perl trees in @INC
      -DEBUGGING=none         DEBUGGING options
      -Dcc=gcc                choose your compiler
      -Dprefix=/opt/perl5      choose your destination
 -E : stop at the end of questions, after having produced config.sh.
 -K : do not use unless you know what you are doing.
 -O : ignored for backward compatibility
 -S : perform variable substitutions on all .SH files (can mix with -f)
 -U : undefine symbol:
      -U symbol    symbol gets the value 'undef'
      -U symbol=   symbol gets completely empty
     e.g.:  -Uversiononly
 -A : manipulate symbol after the platform specific hints
 have been applied:
      -A append:symbol=value   append value to symbol
      -A symbol=value         like append:, but with a separating space
      -A define:symbol=value   define symbol to have value
```

```
        -A clear:symbol          define symbol to be ''
        -A define:symbol         define symbol to be 'define'
        -A eval:symbol=value     define symbol to be eval of value
        -A prepend:symbol=value  prepend value to symbol
        -A undef:symbol          define symbol to be 'undef'
        -A undef:symbol=         define symbol to be ''
      e.g.:  -A prepend:libswanted='cl pthread '
             -A ccflags=-DSOME_MACRO
 -V : print version number and exit (with a zero status).
EOM
 exit 1
 ;;
esac

?X:
?X: Unless they specified either -S or both -d and -e/E, make sure we're
?X: running interactively, i.e. attached to a terminal. Moved from Head.U to
?X: be able to handle batch configurations...
?X:
?X: We have to hardwire the Configure name and
 cannot use $me, since if they
?X: said 'sh <Configure', then $me is 'sh'...
?X:
: Sanity checks
case "$fastread$alldone" in
yescont|yesexit) ;;
*)
 case "$extractsh" in
 true) ;;
 *)
  if test ! -t 0; then
   echo "Say 'sh Configure', not 'sh <Configure'"
   exit 1
  fi
  ;;
 esac
 ;;
esac

?X: In silent mode, the standard output is closed. Questions are asked by
?X: outputing on file descriptor #4, which is the original stdout descriptor.
?X: This filters out all the "junk", since all the needed information is written
?X: on #4. Note that ksh will not let us redirect output if the file descriptor
?X: has not be defined yet, unlike sh, hence the following line...--RAM.
exec 4>&1
case "$silent" in
true) exec 1>/dev/null;;
esac
```

```
: run the defines and the undefines, if any, but leave the file out there...
touch optdef.sh
?X: -q is POSIX
?X: It does not work in SysV (solaris) or old BSD greps.
grep '\\' optdef.sh >/dev/null 2>&1
if test $? = 0; then
   echo "Configure does not support \\
 in -D arguments"
   exit 1
fi
. ./optdef.sh
: create the posthint manipulation script and leave the file out there...
?X: this file will be perused by Oldconfig.U
touch posthint.sh
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Options.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: vendorman1dir.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1999, Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: vendorman1dir.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
?RCS:
?MAKE:vendorman1dir vendorman1direxp installvendorman1dir: man1dir Getfile \
 Oldconfig Setprefixvar Prefixit test vendorprefix prefix sed
?MAKE: -pick add $@ %<
?Y:TOP
?S:vendorman1dir:
?S: This variable contains the name of the directory for man1
?S: pages.  It may have a ~ on the front.
?S: The standard distribution will put nothing in this directory.
?S: Vendors
 who distribute perl may wish to place their own
?S: man1 pages in this directory with
?S:  MakeMaker Makefile.PL INSTALLDIRS=vendor
?S: or equivalent.  See INSTALL for details.
?S:.
```

```
?S:vendorman1direxp:
?S: This variable is the ~name expanded version of vendorman1dir, so that you
?S: may use it directly in Makefiles or shell scripts.
?S:.
?D:installvendorman1dir="
?S:installvendorman1dir:
?S: This variable is really the same as vendorman1direxp but may differ on
?S: those systems using AFS. For extra portability, only this variable
?S: should be used in makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installvendorman1dir
: Set the vendorman1dir variables
case "$vendorprefix" in
") vendorman1dir="
 vendorman1direxp="
 ;;
*) : determine where vendor-supplied manual pages go.
 case "$vendorman1dir" in
 ") dflt=`echo "$man1dir" | $sed "s#^$prefix#$vendorprefix#"` ;;
 *) dflt=$vendorman1dir ;;
 esac
 case "$dflt" in
 "|' ') dflt=none ;;
 esac
 fn=nd~+
 rp='Pathname for
 the vendor-supplied manual section 1 pages?'
 . ./getfile
 vendorman1dir="$ans"
 vendorman1direxp="$ansexp"
 ;;
esac
: Use ' ' for none so value is preserved next time through Configure
$test X"$vendorman1dir" = "X" && vendorman1dir=' '
prefixvar=vendorman1dir
. ./installprefix
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorman1dir.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: shm_for.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
```

```
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: shm_for.U,v $
?RCS: Revision 3.0.1.1  1994/10/29  16:28:37  ram
?RCS: patch36: call ./Cppsym explicitly instead of relying on PATH
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:46  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:shm_for shm_att shm_lim: Cppsym Myread ipc uname
?MAKE: -pick add $@ %<
?S:shm_for:
?S: This variable tells us the type of machine we're expecting the
?S: shared memory code to run on.  The value is available to C
 programs
?S: in the C_SHM_FOR manifest.
?S:.
?S:shm_att:
?S: This variable tells us where a shared memory segment should be
?S: attached.  Good values are HIGH, LOW, and ZERO.
?S:.
?S:shm_lim:
?S: This variable tells us if shared memory attached HIGH should
?S: have an upper limit.
?S:.
?X: ------------------------------------------------------------
?X: It's a potential lose to define anything beginning with SHM...
?X: At least we can think that S_ stands for "String version of ..." -- HMS
?X: ------------------------------------------------------------
?C:S_SHM_FOR ~ %<:
?C: This symbol identifies what we chose for the target system's
?C: default shared memory configuration parameters.
?C:.
?C:S_SHM_ATT ~ %<:
?C: This symbol holds the default "place" to attach shared memory.
?C: Values are "HIGH", "ZERO", and "LOW".
?C:.
?C:S_SHM_LIM ~ %<:
?C: This symbol holds the default upper bound address limit if shared
?C: memory is attached HIGH.  If zero, there is no upper limit.
?C:.
?H:?%<:#ifdef
 SERVE_SHM
?H:?%<:#define S_SHM_FOR "$shm_for"
?H:?%<:#define S_SHM_ATT "$shm_att"
?H:?%<:#define S_SHM_LIM "$shm_lim"
```

```
?H:?%<:#endif
?H:.
?W:%<:S_SHM_FOR S_SHM_ATT S_SHM_LIM
: see how to attach shared memory
echo " "
echo "Deciding how to attach shared memory..." >&4

case "$ipc" in
shm)
 shm_for='Default case'
 shm_att='HIGH'
 shm_lim='0x0'
 if ./Cppsym tower32 tower32_600; then
  echo "NCR Towers are usually normal..."
  : echo "Oh, an NCR Tower."
  : This works for the 600
  shm_for='NCR Tower 32'
  shm_att='LOW'
 else
  case "$uname" in
  */uname)
   case "`uname -m`" in
   ACS??68*)
    echo "Oh, an Altos 3068."
    shm_for='Altos 3068:'
    shm_lim='0x800000'
    ;;
    esac
    ;;
  *)
   echo "Looks normal to me..."
   ;;
  esac
 fi

 dflt="$shm_for"
 rp='Description of shared memory configuration?'
 . ./myread
 shm_for="$ans"

 dflt="$shm_att"
 rp='Where should shared memory be attached?'
 . ./myread
 shm_att="$ans"

 case "$shm_att" in
 HIGH)
  dflt="$shm_lim"
```

```
 rp='What is
 the upper address limit for shared memory?'
 . ./myread
 shm_lim="$ans"
 ;;
*)
 shm_lim="
 ;;
 esac
 ;;

*)
 echo "but you aren't using shared memory so I won't bother." >&4
 shm_for='NOT CONFIGURED'
 shm_att='NONE'
 shm_lim='-1'
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/shm_for.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: html1dir.U,v $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: html1dir.U,v $
?RCS:
?MAKE:html1dir html1direxp installhtml1dir: cat Loc Myread \
 spackage test Getfile Setprefixvar Prefixit Prefixup
?MAKE: -pick add $@ %<
?Y:TOP
?D:html1dir="
?S:html1dir:
?S: This variable contains the name of the directory in which html
?S: source pages are to be put.  This directory is for pages
?S: that describe whole programs, not libraries or modules.  It
?S: is intended to correspond roughly to section 1 of the Unix
?S: manuals.
?S:.
?D:html1direxp="
```

```
?S:html1direxp:
?S: This
 variable is the same as the html1dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installhtml1dir="
?S:installhtml1dir:
?S: This variable is really the same as html1direxp, unless you are
?S: using a different installprefix.  For extra portability, you
?S: should only use this variable within your makefiles.
?S:.
?LINT:change prefixvar
?LINT:set html1direxp
?LINT:set installhtml1dir
: determine where html pages for programs go
set html1dir html1dir none
eval $prefixit
$cat <<EOM

If you wish to install html files for programs in $spackage, indicate
the appropriate directory here.  To skip installing html files,
answer "none".
EOM
case "$html1dir" in
"|none|$undef|' ') dflt=none ;;
*) dflt=$html1dir ;;
esac
fn=dn+~
rp="Directory for the main $spackage html pages?"
. ./getfile
prefixvar=html1dir
. ./setprefixvar
: Use ' ' for none so value is preserved next time through Configure
$test X"$html1dir" = "X" && html1dir=' '

Found
 in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/html1dir.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Configdir.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
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```

?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Configdir.U,v $
?RCS: Revision 3.0.1.1 1997/02/28 14:58:36 ram
?RCS: patch61: have README explicitly mention the package name
?RCS:
?RCS: Revision 3.0 1993/08/18 12:04:49 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:Configdir: package
?MAKE: -pick add $@ %<
: create .config dir to save info across Configure sessions
test -d ../.config || mkdir ../.config
cat >../.config/README <<EOF
This directory created by Configure to save
 information that should
persist across sessions for $package.

You may safely delete it if you wish.
EOF

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Configdir.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: libdbm.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
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?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
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?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libdbm.U,v $
?RCS: Revision 3.0.1.1 1997/02/28 15:56:57 ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS:
?RCS: Revision 3.0 1993/08/18 12:08:58 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libdbm: test Loc libpth _a
?MAKE: -pick add $@ %<
?S:libdbm:
?S: This variable contains the argument to pass to the loader in order
?S: to get the dbm library routines. If there is no dbm or ndbm
?S: library, it is null.

```
?S:.
?T:xxx
:
 see if we should include -ldbm
echo " "
if $test -r /usr/lib/libndbm$_a || $test -r /usr/local/lib/libndbm$_a ; then
 echo "-lndbm found." >&4
 libdbm='-lndbm'
elif $test -r /usr/lib/libdbm$_a || $test -r /usr/local/lib/libdbm$_a ; then
 echo "-ldbm found." >&4
 libdbm='-ldbm'
else
 xxx=`./loc libdbm$_a x $libpth`
 case "$xxx" in
 x)
  echo "No dbm library found." >&4
  libdbm=''
  ;;
 *)
  echo "DBM library found in $xxx." >&4
  libdbm="$xxx"
  ;;
 esac
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libdbm.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Copyright (c) 1998 Andy Dougherty
?RCS:
?RCS: Original author Jarkko Hietaniemi <jhi@iki.fi>
?RCS: Merged into dist by Andy Dougherty  July 13, 1998
?RCS:
?MAKE:trnl: Nothing
?MAKE: -pick add $@ %<
?S:trnl:
?S: This variable contains the value to be passed to the tr(1)
```

```
?S: command to transliterate a newline.  Typical values are
?S: '\012' and '\n'.  This is needed for EBCDIC systems where
?S: newline is not necessarily '\012'.
?S:.
?T: DJGPP
: Find the appropriate value for a newline for tr
?X: We can't
 use $tr since that would cause a circular dependency via Myread
?X: dos djgpp uses '\015\012', but reportedly is happy with '\012' in the
?X: tr command.  I don't know why it passes the '\n' test but later
?X: refuses to work correctly with it.  --AD  6/14/98
if test -n "$DJGPP"; then
     trnl='\012'
fi
if test X"$trnl" = X; then
 case "`echo foo | tr '\n' x 2>/dev/null`" in
 foox) trnl='\n' ;;
 esac
fi
if test X"$trnl" = X; then
 case "`echo foo | tr '\012' x 2>/dev/null`" in
 foox) trnl='\012' ;;
 esac
fi
if test X"$trnl" = X; then
     case "`echo foo | tr '\r\n' xy 2>/dev/null`" in
     fooxy) trnl='\n\r' ;;
     esac
fi
if test X"$trnl" = X; then
 cat <<EOM >&2

$me: Fatal Error: cannot figure out how to translate newlines with 'tr'.

EOM
 exit 1
fi

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/trnl.U
No license file was found, but licenses were detected in source scan.

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?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?MAKE:perladmin: cf_email Oldconfig Myread cat
```

```
?MAKE: -pick add $@ %<
?Y:TOP
?S:perladmin:
?S: Electronic mail address of the perl5 administrator.
?S:.
: Ask e-mail of administrator
$cat <<EOM

If you or somebody else will be maintaining perl at your site, please
fill in the correct e-mail address here so that they may be contacted
if necessary. Currently, the "perlbug" program included with perl
will send mail to this address in addition to perlbug@perl.org. You may
enter "none" for no administrator.

EOM
case "$perladmin" in
'') dflt="$cf_email";;
*) dflt="$perladmin";;
esac
rp='Perl administrator e-mail address'
. ./myread
perladmin="$ans"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/perladmin.U
No license file was found, but licenses were detected in source scan.

```
# Yes, you may rip this off to use in other distribution packages. This
# script belongs to the public domain and cannot be copyrighted.
#
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Head.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Head.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: contains.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: contains.U,v $
?RCS: Revision 3.0  1993/08/18  12:05:35  ram
```

```
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:contains: Nothing
?MAKE: -pick add $@ %<
?S:contains:
?S: This variable holds the command to do a grep with a proper return
?S: status.  On most sane systems it is simply "grep".  On insane systems
?S: it is a grep followed by a cat followed by a test.  This variable
?S: is primarily for the use of other Configure units.
?S:.
: Some
 greps do not return status, grrr.
echo "grimblepritz" >grimble
if grep blurfldyick grimble >/dev/null 2>&1 ; then
 contains=contains
elif grep grimblepritz grimble >/dev/null 2>&1 ; then
 contains=grep
else
 contains=contains
fi
rm -f grimble
: the following should work in any shell
case "$contains" in
contains*)
 echo " " >&4
 echo "AGH!  Grep doesn't return a status.  Attempting remedial action." >&4
 cat >contains <<'EOSS'
grep "$1" "$2" >.greptmp && cat .greptmp && test -s .greptmp
EOSS
contains=./contains
chmod +x $contains
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/contains.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Csym.U,v 3.0.1.4 1995/07/25 13:36:29 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Csym.U,v $
```

?RCS: Revision 3.0.1.4 1995/07/25 13:36:29 ram
?RCS: patch56: re-arranged compile line to include ldflags before objects
?RCS: patch56: added quotes for OS/2 support
?RCS:
?RCS: Revision 3.0.1.3 1995/05/12 12:00:33 ram
?RCS: patch54: fixed C test program to bypass gcc builtin type checks (ADO)
?RCS:
?RCS: Revision 3.0.1.2 1994/10/31 09:34:13 ram
?RCS: patch44: added Options to the MAKE line since it's no longer in Init.U
?RCS:
?RCS: Revision
 3.0.1.1 1993/08/25 14:00:05 ram
?RCS: patch6: added ldflags as a conditional dependency and to compile line
?RCS: patch6: a final double quote was missing in csym variable after eval
?RCS:
?RCS: Revision 3.0 1993/08/18 12:04:50 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:Csym mistrustnm extern_C: Options contains libc libs runnm test \
 +cc +optimize +ccflags +ldflags run rm_try _exe d_cplusplus
?MAKE: -pick add $@ %<
?LINT:define csym
?LINT:use libc
?LINT:extern mistrustnm
?LINT:set mistrustnm
?S:csym:
?S: This shell variable is used internally by Configure to check
?S: whether a given C symbol is defined or not. A typical use is:
?S: set symbol result [-fva] [previous]
?S: eval $csym
?S: That will set result to 'true' if the function [-f], variable [-v]
?S: or array [-a] is defined, 'false' otherwise. If a previous value is
?S: given and the -r flag was provided on the command line, that value
?S: is reused without questioning.
?S:.
?S:extern_C:
?S: ANSI C
 requires 'extern' where C++ requires 'extern "C"'. This
?S: variable can be used in Configure to do the right thing.
?S:.
?S:mistrustnm:
?S: This variable can be used to establish a fallthrough for the cases
?S: where nm fails to find a symbol. If usenm is false or usenm is true
?S: and mistrustnm is false, this variable has no effect. If usenm is true
?S: and mistrustnm is "compile", a test program will be compiled to try to
?S: find any symbol that can't be located via nm lookup. If mistrustnm is
?S: "run", the test program will be run as well as being compiled.
?S:.

```
?V:csym
?T:tval tx tlook tf tdc
?F:!try
: is a C symbol defined?
csym='tlook=$1;
case "$3" in
-v) tf=libc.tmp; tdc="";;
-a) tf=libc.tmp; tdc="[]";;
*) tlook="^$1\$"; tf=libc.list; tdc="()";;
esac;
case "$d_cplusplus" in
  $define) extern_C="extern \"C\"" ;;
  *)  extern_C="extern" ;;
esac;
tx=yes;
case "$reuseval-$4" in
true-) ;;
true-*) tx=no; eval "tval=\$$4"; case "$tval" in "") tx=yes;; esac;;
esac;
case "$tx"
 in
yes)
?X:
?X: Put symbol inside a printf to fool optimizing compilers...
?X:
?X: We use 'short' instead of 'int' to try to circumvent overzealous
?X: optimizing compilers using built-in prototypes for commonly used
?X: routines to complain when seeing a different external declaration. For
?X: instance, gcc 2.6.3 fails if we use 'int' and we attempt a test against
?X: memcpy() on machines where sizeof(int) == sizeof(char *) (the usual return
?X: type), the compiler assuming it's a built-in declaration given that the
?X: returned size matches. At least with 'short' we are safe! -- RAM, for ADO
?X:
?X: Let's thank GNU cc for making our lives so easy! :-)
?X: (An alternative for the future would be to use our knowledge about gcc
?X: to force a -fno-builtin option in the compile test, in case the 'short'
?X: trick is obsoleted by future gcc releases). -- RAM
?X:
 tval=false;
 if $test "$runnm" = true; then
  if $contains $tlook $tf >/dev/null 2>&1; then
   tval=true;
  elif $test "$mistrustnm"
 = compile -o "$mistrustnm" = run; then
   echo "$extern_C void *$1$tdc; void *(*(p()))$tdc { return &$1; } int main(int argc, char **argv) { if(p() && p() !=
(void *)argv[0]) return(0); else return(1); }"> try.c;
   $cc -o try $optimize $ccflags $ldflags try.c >/dev/null 2>&1 $libs && tval=true;
   $test "$mistrustnm" = run -a -x try && { $run ./try$_exe >/dev/null 2>&1 || tval=false; };
```

```
  $rm_try;
 fi;
else
 echo "$extern_C void *$1$tdc; void *(*(p()))$tdc { return &$1; } int main(int argc, char **argv) { if(p() && p() !=
(void *)argv[0]) return(0); else return(1); }"> try.c;
 $cc -o try $optimize $ccflags $ldflags try.c $libs >/dev/null 2>&1 && tval=true;
 $rm_try;
fi;
;;
*)
case "$tval" in
$define) tval=true;;
*) tval=false;;
esac;
;;
esac;
eval "$2=$tval"'
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/Csym.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: afs.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: afs.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  15:23:06  ram
?RCS: patch61: can now explicitly tell Configure whether AFS is running
?RCS:
?RCS: Revision 3.0.1.1  1993/08/24  12:24:43  ram
?RCS: patch3: created
?RCS:
?MAKE:afs afsroot: test
?MAKE: -pick add $@ %<
?S:afs:
?S: This variable is set to 'true' if AFS (Andrew File System) is used
?S: on the system, 'false' otherwise.  It is possible to override this
?S: with a hint value or command line option,
 but you'd better know
?S: what you are doing.
?S:.
```

```
?S:afsroot:
?S: This variable is by default set to '/afs'. In the unlikely case
?S: this is not the correct root, it is possible to override this with
?S: a hint value or command line option.  This will be used in subsequent
?S: tests for AFSness in the configure and test process.
?S:.
: allow them to override the AFS root
case "$afsroot" in
") afsroot=/afs ;;
*) afsroot=$afsroot ;;
esac

: is AFS running?
echo " "
case "$afs" in
$define|true) afs=true ;;
$undef|false) afs=false ;;
*) if $test -d $afsroot; then
  afs=true
 else
  afs=false
 fi
 ;;
esac
if $afs; then
 echo "AFS may be running... I'll be extra cautious then..." >&4
else
 echo "AFS does not seem to be running..." >&4
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/afs.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: etc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: etc.U,v $
?RCS: Revision 3.0  1993/08/18  12:08:07  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
```

```
?MAKE:etc etcexp: Getfile Loc Oldconfig
?MAKE: -pick add $@ %<
?S:etc:
?S: This variable holds the name of the directory in which the user wants
?S: to put "administrative" executable images for the package in question.
?S: It is most often a local directory such as /usr/local/etc. Programs
?S: relying on this variable must be prepared to deal with
 ~name
?S: substitutions.
?S:.
?S:etcexp:
?S: This is the same as the etc variable, but is filename expanded at
?S: configuration time, for convenient use in makefiles.
?S:.
: determine where administrative executables go
case "$etc" in
")
 dflt=`./loc . /local/etc /usr/local/etc /local/etc /usr/etc /etc`
 ;;
*)
 dflt="$etc"
 ;;
esac
fn=d~
rp='Where should the administrative executables go?'
. ./getfile
etc="$ans"
etcexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/etc.U
No license file was found, but licenses were detected in source scan.

```
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```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/files/fixcpp
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/errnolist.mk
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/makegloss
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/bindex
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
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```

```
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Thomas Neumann <tom@smart.bo.open.de>
?RCS:
?RCS: $Log: Findhdr.U,v $
?RCS: Revision 3.0.1.2  1994/10/29  15:53:08  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0.1.1  1994/05/06  14:03:56  ram
?RCS: patch23: cppminus must be after other cppflags, not before
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:54  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a findhdr script which is used to locate the header
?X: files
 in $usrinc or other stranger places using cpp capabilities. The
?X: script is given an include file base name, like 'stdio.h' or 'sys/file.h'
?X: and it returns the full path of the include file and a zero status or an
?X: empty string with an error status if the file could not be located.
?X:
?MAKE:Findhdr: grep test tr rm +usrinc awk cat startsh \
 cppstdin cppminus +cppflags eunicefix osname
?MAKE: -pick add $@ %<
?LINT:define fieldn
?S:fieldn:
?S: This variable is used internally by Configure. It contains the position
?S: of the included file name in cpp output. That is to say, when cpp
?S: pre-processes a #include <file> line, it replaces it by a # line which
?S: contains the original position in the input file and the full name of
?S: included file, between "quotes".
?S:.
?V:fieldn
?F:./findhdr !fieldn
?T:cline pos wanted name awkprg cppfilter testaccess status usrincdir
: determine filename position in cpp output
echo " "
echo "Computing filename position in cpp output for #include
 directives..." >&4
echo '#include <stdio.h>' > foo.c
case "$osname" in
vos)
 testaccess=-e
?X: VOS: path component separator is >
 cppfilter="tr '\\\>' '/' |"
```

```
 ;;
*)
 testaccess=-r
 cppfilter="
 ;;
esac
$cat >fieldn <<EOF
$startsh
$cppstdin $cppflags $cppminus <foo.c 2>/dev/null | \
$grep '^[  ]*#.*stdio\.h' | \
while read cline; do
 pos=1
 set \$cline
 while $test \$# -gt 0; do
  if $test $testaccess \`echo \$1 | $tr -d ""\`; then
   echo "\$pos"
   exit 0
  fi
  shift
  pos=\`expr \$pos + 1\`
 done
done
EOF
chmod +x fieldn
fieldn=`./fieldn`
$rm -f foo.c fieldn
case $fieldn in
") pos='???';;
1) pos=first;;
2) pos=second;;
3) pos=third;;
*) pos="${fieldn}th";;
esac
echo "Your cpp writes the filename in the $pos field of the line."

?X: To locate a header file, we cannot simply check for $usrinc/file.h, since
?X: some machine have the headers in weird places and our only hope is that
?X: the C pre-processor will know how to find those headers. Thank you NexT!
: locate header file
$cat
 >findhdr <<EOF
$startsh
wanted=\$1
name="
for usrincdir in $usrinc; do
 if test -f \$usrincdir/\$wanted; then
  echo "\$usrincdir/\$wanted"
  exit 0
```

```
 fi
done
awkprg='{ print \$$fieldn }'
echo "#include <\$wanted>" > foo\$\$.c
$cppstdin $cppminus $cppflags < foo\$\$.c 2>/dev/null | \
$cppfilter $grep "^[  ]*#.*\$wanted" | \
while read cline; do
 name=\`echo \$cline | $awk "\$awkprg" | $tr -d '"'\`
 case "\$name" in
 *[/\\\\]\$wanted) echo "\$name"; exit 1;;
 *[\\\\/]\$wanted) echo "\$name"; exit 1;;
 *) exit 2;;
 esac
done
?X: status = 0: grep returned 0 lines, case statement not executed
?X: status = 1: headerfile found
?X: status = 2: while loop executed, no headerfile found
status=\$?
$rm -f foo\$\$.c
if test \$status -eq 1; then
 exit 0
fi
exit 1
EOF
chmod +x findhdr
$eunicefix findhdr
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Findhdr.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
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?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: yacc.U,v $
?RCS: Revision 3.0.1.1  1994/05/13  15:28:48  ram
?RCS: patch27: added byacc as another alternative (ADO)
?RCS:
?RCS: Revision 3.0  1993/08/18  12:10:03  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
```

```
?MAKE:yacc yaccflags: Guess Myread Loc Oldconfig byacc bison cat test
?MAKE: -pick add $@ %<
?S:yacc:
?S: This variable holds the name of the compiler compiler we
?S: want to use in the Makefile. It can be yacc, byacc, or bison -y.
?S:.
?S:yaccflags:
?S: This variable contains any
 additional yacc flags desired by the
?S: user.  It is up to the Makefile to use this.
?S:.
?T:comp
: determine compiler compiler
echo " "
comp='yacc'
if $test -f "$byacc$_exe"; then
 comp="byacc or $comp"
fi
if $test -f "$bison$_exe"; then
 comp="$comp or bison -y"
fi
case "$yacc" in
")
 yacc=`./loc yacc yacc $pth`
 if $test -f "$yacc$_exe"; then
  dflt='yacc'
 elif $test -f "$byacc$_exe"; then
  dflt='byacc'
 elif $test -f "$bison$_exe"; then
  dflt='bison'
 else
  dflt="
 fi
 ;;
*) dflt="$yacc";;
esac
rp="Which compiler compiler ($comp) shall I use?"
. ./myread
yacc="$ans"
case "$yacc" in
*bis*)
 case "$yacc" in
 *-y*) ;;
 *)
  yacc="$yacc -y"
  echo "(Adding -y option to bison to get yacc-compatible behaviour.)"
  ;;
 esac
```

```
 ;;
esac

@if yaccflags
: see if we need extra yacc flags
dflt="$yaccflags"
case "$dflt" in
") dflt=none;;
esac
$cat <<EOH

Your yacc program may need extra flags to normally process the parser sources.
Do NOT specify any -d or -v flags here, since those are
 explicitly known
by the various Makefiles. However, if your machine has strange/undocumented
options (like -Sr# on SCO to specify the maximum number of grammar rules), then
please add them here.  To use no flags, specify the word "none".

EOH
rp="Any additional yacc flags?"
. ./myread
case "$ans" in
none) yaccflags=";;
*) yaccflags="$ans";;
esac

@end

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/yacc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Warn_v7ND.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Warn_v7ND.U,v $
?RCS: Revision 3.0.1.1  1994/10/29  16:01:46  ram
?RCS: patch36: call ./v7 explicitly instead of relying on PATH
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:18  ram
?RCS: Baseline for dist 3.0 netwide release.
```

```
?RCS:
?X:
?X: This unit warns V7 sites that they may not have a non-blocking read.
?X: This unit needs to be mentioned in End.U to get included.
?X:
?MAKE:Warn_v7ND: package Guess
?MAKE: -pick add $@ %<
: Warnings
if ./v7; then
 cat
 <<EOM

NOTE: many V7 systems do not have a way to do a non-blocking read.  If you
don't have any of FIONREAD, O_NDELAY, or rdchk(), the $package package
may not work as well as it might.  It might not work at all.
EOM
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Warn_v7ND.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: libnm.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
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?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libnm.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:08:26  ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:01  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libnm: test Loc libpth _a
?MAKE: -pick add $@ %<
?S:libnm:
?S: This variable contains the argument to pass to the loader in order
?S: to get the new math library routines.  If there is no new math
?S: library, it is null.
?S:.
?T:ans
?O:
```

```
 use libswanted='-lnm' instead (see libs.U).
: see if we should include -lnm
echo " "
if $test -r /usr/lib/libnm$_a || $test -r /usr/local/lib/libnm$_a ; then
 echo "New math library found." >&4
 libnm='-lnm'
else
 ans=`./loc libnm$_a x $libpth`
 case "$ans" in
 x)
  echo "No nm library found--the normal math library will have to do." >&4
  libnm=''
  ;;
 *)
  echo "New math library found in $ans." >&4
  libnm="$ans"
  ;;
 esac
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libnm.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Copyright (c) 2000, Jarkko Hietaniemi
?RCS:
?X:
?X: This unit allows the duplication of the source tree to the current
?X: directory via symbolic links.  This must be requested explicitly
?X: by them issuing a -Dmksymlinks on the command line.
?X:
?MAKE:Mksymlinks: Mkdirp lns issymlink src rsrc pkgsrc
?MAKE: -pick add $@ %<
?F:!UU
?T: dir filename tmppwd filelist
?LINT:extern mksymlinks
@if {test -f ../MANIFEST}
: Duplicate the tree with symbolic links if -Dmksymlinks was supplied
```

```
case "$mksymlinks"
 in
$define|true|[yY]*)
 echo " "
 case "$src" in
 "|'.') echo "Cannot create symlinks in the original directory." >&4
  exit 1
  ;;
 *) case "$lns:$issymlink" in
  *"ln"*" -s:"*"test -"?)
   echo "Creating the symbolic links..." >&4
   echo "(First creating the subdirectories...)" >&4
   cd ..
   awk '{print $1}' $src/MANIFEST | grep / | sed 's:/[^/]*$::' | \
    sort -u | while true
   do
    read dir
    test -z "$dir" && break
    ./UU/mkdirp $dir 2>/dev/null
    if test -d $dir; then
     : ok
    else
     echo "Failed to create '$dir'.  Aborting." >&4
     exit 1
    fi
   done
   echo "(Now creating the symlinks...)" >&4
   awk '{print $1}' $src/MANIFEST | while true; do
    read filename
    test -z "$filename" && break
    if test -f $filename; then
     if $issymlink $filename; then
      rm -f $filename
     fi
    fi
    if test -f $filename; then
     echo "$filename already exists, not symlinking."
    else
?X: Note that the following works because "$pkgsrc" is absolute
      ln
 -s $pkgsrc/$filename $filename
    fi
   done
?X: Check that everything was correctly copied
   echo "(Checking current directory...)" >&4
   cd UU
   awk '$1 !~ /PACK[A-Z]+/ {print $1}' "$rsrc/MANIFEST" | \
    (split -l 50 2>/dev/null || split -50)
```

```
  rm -f missing
  tmppwd=`pwd`
  for filelist in x??; do
   (cd ..; ls `cat "$tmppwd/$filelist"` \
    >/dev/null 2>>"$tmppwd/missing")
  done
  if test -s missing; then
   echo "Failed duplication of source tree.  Aborting." >&4
   exit 1
  fi
  ;;
 *) echo "(I cannot figure out how to do symbolic links, ignoring!)" >&4
  ;;
 esac
 ;;
esac

@end
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Mksymlinks.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: d_group.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Andy Dougherty <doughera@lafcol.lafayette.edu>
?RCS:
?RCS: $Log: d_group.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  15:34:52  ram
?RCS: patch61: useless unit dropped.
?RCS:
?RCS: Revision 3.0.1.1  1994/08/29  16:07:48  ram
?RCS: patch32: created by ADO
?RCS:
?X:
?X: Useless unit dropped.
?X:
?LINT:empty
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_group.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: h_fcntl.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: h_fcntl.U,v $
?RCS: Revision 3.0 1993/08/18 12:08:12 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:h_fcntl: Nothing
?MAKE: -pick add $@ %<
?S:h_fcntl:
?S: This is variable gets set in various places to tell i_fcntl that
?S: <fcntl.h> should be included.
?S:.
: Initialize h_fcntl
h_fcntl=false

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/h_fcntl.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Null.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Null.U,v $
?RCS: Revision 3.0 1993/08/18 12:05:10 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit ends up producing shell code to set all variables to ". This

?X: probably isn't necessary, but I'm paranoid. About certain things.
?X:
?MAKE:Null: Head
?MAKE: -pick add.Null $@ %<

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Null.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: libs.U,v 3.0.1.6 1997/02/28 16:09:11 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: libs.U,v $
?RCS: Revision 3.0.1.6 1997/02/28 16:09:11 ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS:
?RCS: Revision 3.0.1.5 1995/07/25 14:12:05 ram
?RCS: patch56: now knows about OS/2 platforms
?RCS:
?RCS: Revision 3.0.1.4 1994/10/29 16:24:22 ram
?RCS: patch36: removed old broken thislib/thatlib processing (ADO)
?RCS:
?RCS: Revision 3.0.1.3 1994/06/20 07:05:44 ram
?RCS: patch30: code cleanup with if/elif by ADO and RAM
?RCS: patch30:
 undone patch23 for libswanted default setting
?RCS:
?RCS: Revision 3.0.1.2 1994/05/06 15:08:45 ram
?RCS: patch23: now includes ordered default libswanted variable (ADO)
?RCS: patch23: major cleanup for library lookups (ADO)
?RCS:
?RCS: Revision 3.0.1.1 1993/08/25 14:02:31 ram
?RCS: patch6: added default for libs
?RCS:
?RCS: Revision 3.0 1993/08/18 12:09:03 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libs ignore_versioned_solibs libsfound libsfiles libsdirs libspath: \
 test cat Myread Oldconfig Loc libpth package xlibpth so _a \
 usesocks sed uselongdouble usequadmath
?MAKE: -pick add $@ %<

```
?S:libs:
?S: This variable holds the additional libraries we want to use.
?S: It is up to the Makefile to deal with it.  The list can be empty.
?S:.
?S:libsfound:
?S: This variable holds the full pathnames of the libraries
?S: we found and accepted.
?S:.
?S:libsfiles:
?S: This variable holds the filenames aka basenames of the libraries
?S: we found and accepted.
?S:.
?S:libsdirs:
?S: This
 variable holds the directory names aka dirnames of the libraries
?S: we found and accepted, duplicates are removed.
?S:.
?S:libspath:
?S: This variable holds the directory names probed for libraries.
?S:.
?S:ignore_versioned_solibs:
?S: This variable should be non-empty if non-versioned shared
?S: libraries (libfoo.so.x.y) are to be ignored (because they
?S: cannot be linked against).
?S:.
?T:xxx yyy thislib thisdir libswanted libstyle
?D:libs="
?X:
?X: This order is chosen so that libraries  -lndir, -ldir, -lucb, -lbsd,
?X: -lBSD, -lPW, and -lx only get used if there are unresolved
?X: routines at link time.  Usually, these are backwards compatibility
?X: libraries, and may not be as reliable as the standard c library.
?X:
?X: The -lsocket -linet -lnsl order has been reported to be necessary
?X: for at least one SVR4 implementation.
?X: -lc must proceed -lucb or -lbsd for most Solaris applications.
?X: -lc_s proceeds -lc so we pick up the shared library version,
 if
?X: it is available.
?X:
?X: The ordering of c, posix, and cposix is a guess and almost
?X: certainly wrong on about half of all systems.
?X:
?X: Set proper libswanted in your private Myinit.U if needed.
?X:
?X:: default ordered library list
?X:libswanted='net socket inet bind nsl nm sdbm gdbm ndbm dbm malloc dl'
?X:libswanted="$libswanted dld sun m c_s c posix cposix ndir dir ucb"
```

```
?X:libswanted="$libswanted bsd BSD PW x"
?X:
?INIT:: default library list
?INIT:libswanted="
?INIT:: some systems want to use only the non-versioned libso:s
?INIT:ignore_versioned_solibs="
?LINT:extern usecbacktrace
?LINT:extern libscheck
?LINT:extern p
?LINT:use uselongdouble
: Looking for optional libraries
echo " "
echo "Checking for optional libraries..." >&4
case "$libs" in
' '|'') dflt='';;
*) dflt="$libs";;
esac
case "$libswanted" in
'') libswanted='c_s';;
esac
?X: libsocks has nasty naming scheme.
?X: This does not work if somebody wants SOCKS 4.
case "$usesocks" in
"$define") libswanted="$libswanted
 socks5 socks5_sh" ;;
esac
case "$usecbacktrace" in
"$define") libswanted="$libswanted bfd" ;;
esac
case "$usequadmath" in
"$define") libswanted="$libswanted quadmath" ;;
esac
libsfound="
libsfiles="
libsdirs="
libspath="
for thisdir in $libpth $xlibpth; do
 test -d $thisdir && libspath="$libspath $thisdir"
done
for thislib in $libswanted; do
 for thisdir in $libspath; do
    xxx="
    if $test ! -f "$xxx" -a "X$ignore_versioned_solibs" = "X"; then
  xxx=`ls $thisdir/lib$thislib.$so.[0-9] 2>/dev/null|sed -n '$p'`
        $test -f "$xxx" && eval $libscheck
  $test -f "$xxx" && libstyle=shared
  xxx=`ls $thisdir/lib$thislib.[0-9].$so 2>/dev/null|sed -n '$p'`
        $test -f "$xxx" && eval $libscheck
```

```
 $test -f "$xxx" && libstyle=shared
   fi
   if test ! -f "$xxx"; then
 xxx=$thisdir/lib$thislib.$so
       $test -f "$xxx" && eval $libscheck
 $test -f "$xxx" && libstyle=shared
   fi
   if test ! -f "$xxx"; then
 xxx=$thisdir/lib$thislib$_a
       $test -f "$xxx"
&& eval $libscheck
 $test -f "$xxx" && libstyle=static
   fi
   if test ! -f "$xxx"; then
 xxx=$thisdir/$thislib$_a
       $test -f "$xxx" && eval $libscheck
 $test -f "$xxx" && libstyle=static
   fi
   if test ! -f "$xxx"; then
 xxx=$thisdir/lib${thislib}_s$_a
       $test -f "$xxx" && eval $libscheck
 $test -f "$xxx" && libstyle=static
 $test -f "$xxx" && thislib=${thislib}_s
   fi
   if test ! -f "$xxx"; then
 xxx=$thisdir/Slib$thislib$_a
       $test -f "$xxx" && eval $libscheck
 $test -f "$xxx" && libstyle=static
   fi
   if $test -f "$xxx"; then
 case "$libstyle" in
 shared) echo "Found -l$thislib (shared)." ;;
 static) echo "Found -l$thislib." ;;
 *)      echo "Found -l$thislib ($libstyle)." ;;
 esac
 case " $dflt " in
 *"-l$thislib "*);;
 *) dflt="$dflt -l$thislib"
               libsfound="$libsfound $xxx"
               yyy=`basename $xxx`
               libsfiles="$libsfiles $yyy"
               yyy=`echo $xxx|$sed -e
"s%/$yyy\\$%%"`
               case " $libsdirs " in
               *" $yyy "*) ;;
               *) libsdirs="$libsdirs $yyy" ;;
               esac
   ;;
```

```
 esac
 break
    fi
done
if $test ! -f "$xxx"; then
    echo "No -l$thislib."
fi
done
set X $dflt
shift
dflt="$*"
case "$libs" in
'') dflt="$dflt";;
*) dflt="$libs";;
esac
case "$dflt" in
' '|'') dflt='none';;
esac

$cat <<EOM

In order to compile $package on your machine, a number of libraries
are usually needed.  Include any other special libraries here as well.
Say "none" for none.  The default list is almost always right.
EOM

echo " "
rp="What libraries to use?"
. ./myread
case "$ans" in
none) libs=' ';;
*) libs="$ans";;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/libs.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: dlsrc.U,v$
?RCS:
?RCS: Copyright (c) 1996-1998, Andy Dougherty
?RCS:
?RCS: You may distribute under the terms of either the GNU General Public
?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?RCS: $Log: dlext.U,v $
?RCS:
?X:  hpux support thanks to Jeff Okamoto <okamoto@hpcc101.corp.hp.com>
```

```
?X:
?X:  To create a shared library, you must compile ALL source files in the
?X:  library with +z (or possibly +Z if the library is whopping huge),
?X:  then link the library with -b.  Example:
?X:   cc -c +z module_a.c
?X:   cc -c +z module_b.c
?X:   ld -b module_a.o module_b.o -o module.sl
?X:
?MAKE:dlext: \
 Getfile Myread cat usedl so
?MAKE: -pick add $@ %<
?Y:BOTTOM
?S:dlext:
?S: This variable contains the extension that is to be used for the
?S: dynamically loaded modules that perl generates.
?S:.
: Check what extension to use for shared libs
case "$usedl" in
$define|y|true)
 $cat <<
 EOM

On a few systems, the dynamically loaded modules that perl generates and uses
will need a different extension than shared libs. The default will probably
be appropriate.

EOM
 case "$dlext" in
 '') dflt="$so" ;;
 *) dflt="$dlext" ;;
 esac
 rp='What is the extension of dynamically loaded modules'
 . ./myread
 dlext="$ans"
 ;;
*)
 dlext="none"
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/dlext.U
No license file was found, but licenses were detected in source scan.

?RCS: You may distribute under the terms of either the GNU General Public

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_mkstemp.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getpwnam_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Cross.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_langinfo.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_finitel.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_ieeefp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_getfsstat.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getprotoent_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/usequadmath.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_strtoull.U
*
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* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_crypt_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/acl/d_eaccess.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_strtoq.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_endservent_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/i_sysuio.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fcntl_can_lock.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_copysignl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_ctime_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_setpwent_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_getmntent.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_stdbool.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_log2.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_gethostbyname_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_nl_langinfo_l.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_isnormal.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_towupper.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_timegm.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/ebcdic/ebcdic.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_strtold_l.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fs_data_s.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_j0.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_frexpl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_poll.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_nexttoward.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_unordered.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/uidf.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_pthread_atfork.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_remainder.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/atolf.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/libperl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_strtold.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_strnlen.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/defaultincdot.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_setvbuf.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_sendmsg.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_acosh.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Extensions.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_finite.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_futimes.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_sysstatfs.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getgrgid_r.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getprotobyname_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_rint.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fpos64_t.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_copysign.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_tgamma.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_lrint.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_inetpton.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fstatfs.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fegetround.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_getcwd.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_unsetenv.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_hasmntopt.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_modfl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_sysstatvfs.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_getprotby.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_random_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_strtod_l.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getlogin_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fdim.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_writev.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_getaddrinfo.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/dlsrc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_crypt.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_towlower.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_cplusplus.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/protos/netdbtype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_srandom_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_setprotoent_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getservbyport_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_strlcpy.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_endnetent_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_hypot.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fpclassify.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getpwent_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Sysroot.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/usefaststdio.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_trunc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_fseeko.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_llrint.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_getnetbyname_r.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/usesocks.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_siginfo_si.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/useperlio.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_nan.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: AAAAA.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: AAAAA.U,v $
?RCS: Revision 3.0.1.4 1994/06/20 06:50:26 ram
?RCS: patch30: changes from Jarkko Hietaniemi are tagged with JHI
?RCS:
?RCS: Revision 3.0.1.3 1994/05/06 14:01:39 ram
?RCS: patch23: initials for Wayne Davison are now WED
?RCS: patch23: added initials for new unit contributor Andy Dougherty
?RCS:
?RCS: Revision 3.0.1.2 1994/01/24 14:01:09 ram
?RCS: patch16: make metalint shut up on special unit definition for All target
?RCS:
?RCS: Revision
 3.0.1.1 1993/09/13 15:43:57 ram
?RCS: patch10: documents initials used for Wayne Davison's contributions
?RCS:
?RCS: Revision 3.0 1993/08/18 12:04:44 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: The purpose of this file is to supply the head of the Makefile created
?X: by metaconfig. For this reason it must be first in alphabetical order.
?X: The leading '+' in front of the unit name is a hint for metalint, since
?X: the use of that special unit name as a "made" unit is legitimate here.
?X:
?MAKE:+All: Finish
?X:
?X: Throughout the units, the following initials are used to identify comments:
?X:
?X: HMS: Harlan Stenn
?X: RAM: Raphael Manfredi
?X: WED: Wayne Davison (was WAD by mistake--RAM)
?X: ADO: Andy Dougherty
?X: JHI: Jarkko Hietaniemi

?X:
?X: Agreed, this is a weird place to document it, but I couldn't find a better
?X: place to do so. I've bet on the curiosity of users, who would probably
?X: want to know what's in this strangely-named file--RAM.

Found
 in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/AAAAA.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Unix.U,v 3.0.1.1 1997/02/28 15:20:06 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Unix.U,v $
?RCS: Revision 3.0.1.1 1997/02/28 15:20:06 ram
?RCS: patch61: created
?RCS:
?X:
?X: The purpose of this unit is to define things that are common across all
?X: known UNIX platforms. If Configure is ported/used on a non-UNIX
?X: environment, then some of the following variables can be redefined in hint
?X: files.
?X:
?MAKE:Unix _exe _a _o exe_ext lib_ext obj_ext path_sep \
 firstmakefile archobjs rm_try: Oldconfig rm
?MAKE: -pick add $@ %<
?S:_exe:
?S: This
 variable defines the extension used for executable files.
?S: DJGPP, Cygwin and OS/2 use '.exe'. Stratus VOS uses '.pm'.
?S: On operating systems which do not require a specific extension
?S: for executable files, this variable is empty.
?S:.
?S:_a:
?S: This variable defines the extension used for ordinary library files.
?S: For unix, it is '.a'. The '.' is included. Other possible
?S: values include '.lib'.
?S:.
?S:_o:
?S: This variable defines the extension used for object files.
?S: For unix, it is '.o'. The '.' is included. Other possible

?S: values include '.obj'.
?S:.
?S:firstmakefile:
?S: This variable defines the first file searched by make. On unix,
?S: it is makefile (then Makefile). On case-insensitive systems,
?S: it might be something else. This is only used to deal with
?S: convoluted make depend tricks.
?S:.
?S:archobjs:
?S: This variable defines any additional objects that must be linked
?S: in with the program on this architecture. On unix, it is usually
?S: empty.
 It is typically used to include emulations of unix calls
?S: or other facilities. For perl on OS/2, for example, this would
?S: include os2/os2.obj.
?S:.
?X: Metaconfig's Obsolete symbol stuff is too over-eager. In the
?X: perl sources, it picks up things like "P" and "FLOCK" that are
?X: not used in the way Metaconfig thinks they are. Thus I can't
?X: just declare these obsolete and then run metaconfig -o.
?X: Instead, I'll just handle them here.
?X: Sadly, history has conspired to give us a web of definitions;
?X: this could have been much simpler.
?S:lib_ext:
?S: This is an old synonym for _a.
?S:.
?S:exe_ext:
?S: This is an old synonym for _exe.
?S:.
?S:obj_ext:
?S: This is an old synonym for _o.
?S:.
?S:path_sep:
?S: This is an old synonym for p_ in Head.U, the character
?S: used to separate elements in the command shell search PATH.
?S:.
?S:rm_try:
?S: This is a cleanup variable for try test programs.
?S: Internal Configure use only.
?S:.
?LINT: change p_
?INIT::
 Trailing extension. Override this in a hint file, if needed.
?INIT:: Extra object files, if any, needed on this platform.
?INIT:archobjs="
: Define several unixisms.
: Hints files or command line option can be used to override them.
: The convoluted testing is in case hints files set either the old

```
: or the new name.
case "$_exe" in
") case "$exe_ext" in
 ") ;;
 *) _exe="$exe_ext" ;;
 esac
 ;;
esac
case "$_a" in
") case "$lib_ext" in
   ") _a='.a';;
 *) _a="$lib_ext" ;;
 esac
 ;;
esac
case "$_o" in
") case "$obj_ext" in
 ") _o='.o';;
 *) _o="$obj_ext";;
 esac
 ;;
esac
case "$p_" in
") case "$path_sep" in
 ") p_=':';;
 *) p_="$path_sep";;
 esac
 ;;
esac
exe_ext=$_exe
lib_ext=$_a
obj_ext=$_o
path_sep=$p_

rm_try="$rm -f try try$_exe a.out .out try.[cho] try.$_o core core.try* try.core*"

@if firstmakefile
: Which makefile gets called first.  This is used by make depend.
case "$firstmakefile" in
") firstmakefile='makefile';;
esac

@end
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Unix.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: End.U,v $
?RCS: Revision 3.0  1993/08/18  12:04:51  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit serves as the goal which forces make to choose all the units that
?X: ask questions.  The $W on the ?MAKE: line is the list of all symbols wanted.
?X: To force any unit to be included, copy this unit to your private U directory
?X: and add the name of the unit desired to the ?MAKE: dependency line.
?X:
?MAKE:End: $W
?MAKE: -pick add $@ %<
?LINT:use $W
: end of configuration
 questions
echo " "
echo "End of configuration questions."
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/End.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: perl5.U,v $
?RCS:
?RCS: Copyright (c) 2000 Andrew Dougherty
?RCS:
?RCS:     You may distribute under the terms of either the GNU General Public
?RCS:     License or the Artistic License, as specified in the README file.
?RCS:
?RCS: $Log: perl5.U,v $
?RCS:
?X:
?X: The purpose of this unit is to locate a previously installed
?X: version of perl5 suitable for running inc_version_list.U.
?X: We check for 5.005 and later because inc_version_list is
?X: irrelevant for earlier versions.
?X:
?MAKE:perl5: path_sep binexp test sed exe_ext
```

```
?MAKE: -pick add $@ %<
?Y:TOP
?S:perl5:
?S: This variable contains the full path (if any) to a previously
?S: installed perl5.005 or later suitable for running the script
?S: to determine inc_version_list.
?S:.
?T: tdir
: Find perl5.005 or later.
echo "Looking for a previously installed perl5.005 or later... "
case "$perl5" in
'') for tdir in `echo "$binexp$path_sep$PATH" | $sed "s/$path_sep/
 /g"`; do
  : Check if this perl is recent and can load a simple module
  if $test -x $tdir/perl$exe_ext && $tdir/perl -Mless -e 'use 5.005;' >/dev/null 2>&1; then
   perl5=$tdir/perl
   break;
  elif $test -x $tdir/perl5$exe_ext && $tdir/perl5 -Mless -e 'use 5.005;' >/dev/null 2>&1; then
   perl5=$tdir/perl5
   break;
  fi
 done
 ;;
*) perl5="$perl5"
 ;;
esac
case "$perl5" in
'') echo "None found.  That's ok.";;
*) echo "Using $perl5." ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/perl5.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Copyright (c) 1998 Andy Dougherty
?RCS:
?RCS: You may distribute under the terms of either the GNU General Public
```

```
?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?RCS:
?X:
?X: This unit is just a quick shorthand for the compile command
?X: to be used in all the other metaconfig units.
?X:
?MAKE:Compile: +cc +optimize +ccflags +ldflags +libs
?MAKE: -pick add $@ %<
?LINT:define compile compile_ok
?V:compile compile_ok mc_file
?S:compile:
?S: This shell variable is used internally
 by Configure to provide
?S: a convenient shorthand for the typical compile command, namely
?S: $cc $optimize $ccflags $ldflags -o $1 $1.c $libs > /dev/null 2>&1
?S: Note that the output filename does _not_ include the _exe
?S: extension.  Instead we assume that the linker will be
?S: "helpful" and automatically appending the correct suffix.
?S: OS/2 users will apparently need to supply the -Zexe flag to
?S: get this behavior.
?S:
?S: To use this variable, say something like:
?S:  echo 'int main() { exit(0); }' > try.c
?S:  set try
?S:  if eval $compile; then
?S:   echo "success"   # and do whatever . . .
?S:  else
?S:   echo "failure"   # and do whatever . . .
?S:  fi
?S: To add extra flags cc flags (e.g. -DWHATEVER) just put them
?S: in $*, e.g.
?S:  set try -DTRY_THIS_FLAG
?S:.
?S:compile_ok:
?S: This shell variable is used internally by Configure to provide
?S: a convenient shorthand for the typical compile command that you
?S: expect to work ok.  It is the same as $compile,
 except we
?S: deliberately let the user see any error messages.
?S:.
: define a shorthand compile call
compile='
mc_file=$1;
shift;
$cc -o ${mc_file} $optimize $ccflags $ldflags $* ${mc_file}.c $libs > /dev/null 2>&1;'
: define a shorthand compile call for compilations that should be ok.
compile_ok='
```

```
mc_file=$1;
shift;
$cc -o ${mc_file} $optimize $ccflags $ldflags $* ${mc_file}.c $libs;'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Compile.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: mailer.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: mailer.U,v $
?RCS: Revision 3.0.1.3  1995/01/11  15:32:11  ram
?RCS: patch45: can now use Loc variables since path stripping is deferred
?RCS:
?RCS: Revision 3.0.1.2  1994/05/06  15:10:04  ram
?RCS: patch23: ensure full path value is used for rmail also
?RCS:
?RCS: Revision 3.0.1.1  1994/01/24  14:14:18  ram
?RCS: patch16: now use _sendmail vars and friends for portability issues
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:10  ram
?RCS: Baseline for dist
 3.0 netwide release.
?RCS:
?MAKE:mailer: test cat rmail mail smail sendmail Getfile Oldconfig
?MAKE: -pick add $@ %<
?S:mailer:
?S: This variable contains the full pathname of a reasonable mailer.
?S: By reasonable, we mean some program which can understand internet
?S: addresses or at least forward them to some internet router. This
?S: mailer should be invoked as "mailer [options] recipients <mail".
?S:.
: determine the name of a reasonable mailer
case "$mailer" in
")
 if $test -f "$sendmail"; then
  dflt="$sendmail"
 elif $test -f "$smail"; then
  dflt="$smail"
 elif $test -f "$rmail"; then
```

```
 dflt="$rmail"
elif $test -f /bin/mail; then
 dflt=/bin/mail
else
 dflt=$mail
fi
;;
*)  dflt="$mailer";;
esac
$cat <<EOM

I need the full pathname of the program used to deliver mail on your system.
A typical answer would be /usr/lib/sendmail or /bin/rmail, but you may choose
any other program, as long as it can be fed from standard input and will
honour any user-supplied headers.

EOM
fn=f
rp='Mail
 transport agent to be used?'
. ./getfile
mailer="$ans"

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/mailer.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: vendorman3dir.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1999-2000, Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: vendorman3dir.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
?RCS:
?MAKE:vendorman3dir vendorman3direxp installvendorman3dir: man3dir Getfile \
 Oldconfig Setprefixvar Prefixit test vendorprefix prefix sed
?MAKE: -pick add $@ %<
?Y:TOP
?S:vendorman3dir:
?S: This variable contains the name of the directory for man3
?S: pages.  It may have a ~ on the front.
```

```
?S: The standard distribution will put nothing in this directory.
?S: Vendors
 who distribute perl may wish to place their own
?S: man3 pages in this directory with
?S:  MakeMaker Makefile.PL INSTALLDIRS=vendor
?S: or equivalent.  See INSTALL for details.
?S:.
?S:vendorman3direxp:
?S: This variable is the ~name expanded version of vendorman3dir, so that you
?S: may use it directly in Makefiles or shell scripts.
?S:.
?D:installvendorman3dir="
?S:installvendorman3dir:
?S: This variable is really the same as vendorman3direxp but may differ on
?S: those systems using AFS. For extra portability, only this variable
?S: should be used in makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installvendorman3dir
: Set the vendorman3dir variables
case "$vendorprefix" in
") vendorman3dir="
 vendorman3direxp="
 ;;
*) : determine where vendor-supplied module manual pages go.
 case "$vendorman3dir" in
 ") dflt=`echo "$man3dir" | $sed "s#^$prefix#$vendorprefix#"` ;;
 *) dflt=$vendorman3dir ;;
 esac
 case "$dflt" in
 "|' ') dflt=none ;;
 esac
 fn=nd~+
 rp='Pathname
 for the vendor-supplied manual section 3 pages?'
 . ./getfile
 vendorman3dir="$ans"
 vendorman3direxp="$ansexp"
 ;;
esac
: Use ' ' for none so value is preserved next time through Configure
$test X"$vendorman3dir" = "X" && vendorman3dir=' '
prefixvar=vendorman3dir
. ./installprefix
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorman3dir.U

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

```
?RCS: $Id: Compile.U,v $
?RCS:
?RCS: Copyright (c) 1998 Andy Dougherty
?RCS:
?RCS: You may distribute under the terms of either the GNU General Public
?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?RCS:
?X:
?X: This unit is just a quick shorthand for the compile command
?X: to be used in all the other metaconfig units.
?X:
?MAKE:Compile: +cc +optimize +ccflags +ldflags +libs test
?MAKE: -pick wipe $@ %<
?LINT:extern usedevel maintloc
?LINT:define compile compile_ok
?V:compile compile_ok mc_file
?S:compile:
?S: This shell variable is used internally by Configure to provide
?S: a convenient shorthand for the typical compile command, namely
?S: $cc $optimize $ccflags $ldflags -o $1 $1.c $libs > /dev/null 2>&1
?S: Note that the output filename does _not_ include the _exe
?S: extension.  Instead we assume that the linker will be
?S: "helpful" and automatically appending the correct suffix.
?S: OS/2
 users will apparently need to supply the -Zexe flag to
?S: get this behavior.
?S:
?S: To use this variable, say something like:
?S:  echo 'int main() { exit(0); }' > try.c
?S:  set try
?S:  if eval $compile; then
?S:   echo "success"   # and do whatever . . .
?S:  else
?S:   echo "failure"   # and do whatever . . .
?S:  fi
?S: To add extra flags cc flags (e.g. -DWHATEVER) just put them
?S: in $*, e.g.
?S:  set try -DTRY_THIS_FLAG
?S:.
?S:compile_ok:
?S: This shell variable is used internally by Configure to provide
?S: a convenient shorthand for the typical compile command that you
?S: expect to work ok.  It is the same as $compile, except we
?S: deliberately let the user see any error messages.
?S:.
```

```
: define a shorthand compile call
compile='
mc_file=$1;
shift;
case "$usedevel" in $define|true|[yY]*) if $test ! -f "${mc_file}.c"; then
echo "Internal Configure script bug - compiler test file ${mc_file}.c is missing. Please report this to <$maintloc>"
>&4;
exit 1;
fi;
esac;
$cc
 -o ${mc_file} $optimize $ccflags $ldflags $* ${mc_file}.c $libs > /dev/null 2>&1;'
: define a shorthand compile call for compilations that should be ok.
compile_ok='
mc_file=$1;
shift;
$cc -o ${mc_file} $optimize $ccflags $ldflags $* ${mc_file}.c $libs > /dev/null 2>&1;'
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/Compile.U
No license file was found, but licenses were detected in source scan.

```
/*
* $Id: getopt.C,v 3.0.1.1 1994/01/24 13:58:40 ram Exp ram $
*
*  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
*
*  You may redistribute only under the terms of the Artistic Licence,
*  as specified in the README file that comes with the distribution.
*  You may reuse parts of this distribution only within the terms of
*  that same Artistic Licence; a copy of which may be found at the root
*  of the source tree for dist 4.0.
*
* Original Author: unknown, got this off net.sources
*
* $Log: getopt.C,v $
* Revision 3.0.1.1  1994/01/24  13:58:40  ram
* patch16: created
*
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/C/fake/getopt.C
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Warn_v7EXT.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
```

```
?RCS:
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?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Warn_v7EXT.U,v $
?RCS: Revision 3.0.1.1  1994/10/29  16:01:42  ram
?RCS: patch36: call ./v7 explicitly instead of relying on PATH
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:17  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit issues warnings to V7 sites that they are living dangerously.
?X: This unit needs to get mentioned in End.U to get included.
?X:
?MAKE:Warn_v7EXT: package Guess
?MAKE: -pick add $@ %<
: Warnings
if ./v7;
 then
 cat <<EOM

NOTE: the V7 compiler may ignore some #undefs that $package uses.  If so,
you may get messages about redefining EXT.  Some V7 compilers also have
difficulties with #defines near buffer boundaries, so beware.  You may have
to play with the spacing in some .h files, believe it or not.
EOM
fi

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Warn_v7EXT.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: orderlib.U,v $
?RCS: Revision 3.0.1.4  1997/02/28  16:18:18  ram
```

```
?RCS: patch61: replaced .a with $_a all over the place
?RCS: patch61: likewise for .o replaced by $_o
?RCS: patch61: now uses the ar located by Loc.U
?RCS:
?RCS: Revision 3.0.1.3  1995/01/11  15:33:04  ram
?RCS: patch45: allows hint files to specify their own value for 'ranlib'
?RCS:
?RCS: Revision 3.0.1.2  1994/10/29  16:26:48  ram
?RCS: patch36: now performs a real small compile for accurate checks (ADO)
?RCS:
?RCS: Revision 3.0.1.1
  1994/08/29  16:31:17  ram
?RCS: patch32: use cc variable instead of hardwired 'cc' in 1st compile
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:26  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:orderlib ranlib: Loc ar cat test rm +cc +ccflags +ldflags +libs _a _o
?MAKE: -pick add $@ %<
?S:orderlib:
?S: This variable is "true" if the components of libraries must be ordered
?S: (with `lorder $* | tsort`) before placing them in an archive.  Set to
?S: "false" if ranlib or ar can generate random libraries.
?S:.
?S:ranlib:
?S: This variable is set to the pathname of the ranlib program, if it is
?S: needed to generate random libraries.  Set to ":" if ar can generate
?S: random libraries or if random libraries are not supported
?S:.
?F:!foobar
: see if ar generates random libraries by itself
echo " "
echo "Checking how to generate random libraries on your machine..." >&4
?X: Some systems (like MIPS) complain when running ar... Others like Ultrix
?X: need an explicit 'ar ts'
 to add the table of contents.
?X: Still others like Linux run ar ts successfully, but still need ranlib.
?X: This set of tests seems the minimum necessary to check out Linux.
?X: We need to explicitly put the entries in out-of-order so that Sun's ld
?X: will fail.  (Otherwise it complains, but gives an exit status of 0.)
echo 'int bar1() { return bar2(); }' > bar1.c
echo 'int bar2() { return 2; }' > bar2.c
$cat > foo.c <<'EOP'
int main() { printf("%d\n", bar1()); exit(0); }
EOP
$cc $ccflags -c bar1.c >/dev/null 2>&1
$cc $ccflags -c bar2.c >/dev/null 2>&1
$cc $ccflags -c foo.c >/dev/null 2>&1
```

```
$ar rc bar$_a bar2$_o bar1$_o >/dev/null 2>&1
if $cc $ccflags $ldflags -o foobar foo$_o bar$_a $libs > /dev/null 2>&1 &&
 ./foobar >/dev/null 2>&1; then
 echo "ar appears to generate random libraries itself."
 orderlib=false
 ranlib=":"
elif $ar ts bar$_a >/dev/null 2>&1 &&
 $cc $ccflags $ldflags -o foobar foo$_o bar$_a $libs > /dev/null 2>&1 &&
 ./foobar >/dev/null 2>&1; then
  echo "a table of contents
 needs to be added with 'ar ts'."
  orderlib=false
  ranlib="$ar ts"
else
?X: Allow hints to specify their own ranlib "script". For instance, on
?X: some NeXT machines, the timestamp put by ranlib is not correct, and this
?X: may raise tedious recompiles for nothing. Therefore, NeXT may add the
?X: ranlib='sleep 5; /bin/ranlib' line in their hints to "fix" that.
?X: (reported by Andreas Koenig <k@franz.ww.tu-berlin.de>)
 case "$ranlib" in
 :) ranlib='';;
 '')
  ranlib=`./loc ranlib X /usr/bin /bin /usr/local/bin`
  $test -f $ranlib || ranlib=''
  ;;
 esac
 if $test -n "$ranlib"; then
  echo "your system has '$ranlib'; we'll use that."
  orderlib=false
 else
  echo "your system doesn't seem to support random libraries"
  echo "so we'll use lorder and tsort to order the libraries."
  orderlib=true
  ranlib=":"
 fi
fi
$rm -f foo* bar*

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/orderlib.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: n.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
```

```
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: n.U,v $
?RCS: Revision 3.0  1993/08/18  12:09:19  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:n c: contains
?MAKE: -pick add $@ %<
?S:n:
?S: This variable contains the -n flag if that is what causes the echo
?S: command to suppress newline.  Otherwise it is null.  Correct usage is
?S:     $echo $n "prompt for a question: $c".
?S:.
?S:c:
?S: This variable contains the \c string if that is what causes the echo
?S: command to suppress newline.
  Otherwise it is null.  Correct usage is
?S:     $echo $n "prompt for a question: $c".
?S:.
: first determine how to suppress newline on echo command
echo " "
echo "Checking echo to see how to suppress newlines..."
(echo "hi there\c" ; echo " ") >.echotmp
if $contains c .echotmp >/dev/null 2>&1 ; then
 echo "...using -n."
 n='-n'
 c=''
else
 cat <<'EOM'
...using \c
EOM
 n=''
 c='\c'
fi
echo $n "The star should be here-->$c"
echo '*'
rm -f .echotmp

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/n.U
No license file was found, but licenses were detected in source scan.

?RCS: You may redistribute only under the terms of the Artistic License,

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_gnulibc.U
```

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_netinettcp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_keepsig.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_dirfd.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/archname.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_isascii.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_sresuproto.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_scannl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/intsize.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_vfork.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/instubperl.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_safebcpy.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_endnent.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_backtrace.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_vfork.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/myhostname.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/mallocsrc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_ustat.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_shmat.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/stdio_streams.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_sresgproto.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/abortsig.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/d_times.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_scannl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_gai_strerror.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_access.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/i_time.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_closedir.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_statblks.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorarch.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_strctcpy.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_mbrlen.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_strftime.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_bitfield.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/nblock_io.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_mallocmalloc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/cppstdin.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sem.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_mprotect.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/protos/d_getnetprotos.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/gccvers.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_setpent.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/fpu.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/voidflags.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_gethbynm.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_dirent.U

*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/sig_name.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Oldconfig.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_dosuid.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/ptrsize.U
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 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/sitelib.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Cross.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_closedir.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_flexfnam.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/sitearch.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/cpp_stuff.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/i_varhdr.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_setsent.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/d_time.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_isblank.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/abortsig.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_sigaction.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/uidtype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_builtin.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/selecttype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_safemcpy.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/gidtype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_sockatmarkproto.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/uidtype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/cpp_stuff.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/sizetype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_casti32.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/usrinc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/byteorder.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_safebcpy.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/scriptdir.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/prefix.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorscript.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_sysmman.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_endsent.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Devel.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/ebcdic.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/charorder.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_strtoul.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_htonl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_shm.U
*
 /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/ssizetype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_flexfnam.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/issymlink.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/modetype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/orderlib.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/i_machcthr.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/gidtype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_varhdr.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/uidsign.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_pwd.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_times.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_fd_set.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/floatsize.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_socket.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_csh.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_sigprocmask.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_db.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/selectminbits.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_NOFILE.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_vprintf.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/archlib.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_poll.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_grp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Tr.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_db.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sigaction.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/randfunc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_msg.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/otherlibdirs.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_setnent.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_wchar.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_volatile.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Guess.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/ccflags.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_eofpipe.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/scriptdir.U
*
/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_gconvert.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d__fwalk.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/alignbytes.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/sbrksmart.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/i_malloc.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/alignbytes.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_getpgrp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_sbrkproto.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/d_snprintf_l.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sgndchr.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/bitpbyte.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/d_attribut.U
*

/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/protos/d_getservprotos.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/bin.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/threads/i_pthread.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/uidsize.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/charorder.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_attribut.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_shmat.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/i_inttypes.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/errnolist.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/i_neterrno.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/modetype.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_getpwent.U
No license file was found, but licenses were detected in source scan.

?RCS: Id
?RCS:
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?RCS:
?X:
?X: This unit produces a bit of shell code that must be dotted in order
?X: to make quick check on whether the current C compiler is working.
?X:
?MAKE:Checkcc ccname ccversion: Myread Warn startsh cat contains test
?MAKE: -pick add $@ %<
?S:ccname:
?S: This can set either by hints files or by Configure. If using
?S: gcc, this is gcc, and if not, usually equal to cc, unimpressive, no?
?S: Some platforms, however, make good use of this by storing the
?S: flavor
 of the C compiler being used here. For example if using
?S: the Sun WorkShop suite, ccname will be 'workshop'.
?S:.
?S:ccversion:
?S: This can set either by hints files or by Configure. If using
?S: a (non-gcc) vendor cc, this variable may contain a version for
?S: the compiler.
?S:.
?F:./checkcc ./trygcc !checktmp
?V:despair
?T:trygcc

```
?LINT:extern cc rm ccflags ldflags
?LINT:change cc ccflags
?LINT:usefile checktmp
?INIT:ccname=''
?INIT:ccversion=''
: generate the trygcc script for later perusal
cat <<EOS >trygcc
$startsh
EOS
cat <<'EOSC' >>trygcc
case "$cc" in
'') ;;
*)  $rm -f try try.*
  $cat >try.c <<EOM
int main(int argc, char *argv[]) {
 (void) argc;
 (void) argv;
 return 0;
}
EOM
  if $cc -o try $ccflags $ldflags try.c; then
    :
  else
     echo "Uh-oh, the C compiler '$cc' doesn't seem to be working." >&4
     despair=yes
     trygcc=yes
     case "$cc" in
     *gcc*) trygcc=no ;;
     esac
     case "`$cc -v -c try.c 2>&1`" in

    *gcc*) trygcc=no ;;
     esac
     if $test X"$trygcc" = Xyes; then
        if gcc -o try -c try.c; then
           echo " "
           echo "You seem to have a working gcc, though." >&4
           rp="Would you like to use it?"
           dflt=y
           if $test -f myread; then
              . ./myread
           else
              if $test -f UU/myread; then
                 . ./UU/myread
              else
                 echo "Cannot find myread, sorry.  Aborting." >&2
                 exit 1
              fi
```

```
            fi
            case "$ans" in
            [yY]*) cc=gcc; ccname=gcc; ccflags=''; despair=no;
?X: Look whether we have 'call-back units' generated by hints that would
?X: seemingly affect the compiling environment.
                    $cat *.cbu >checktmp 2>/dev/null
                    if $contains ccflags checktmp >/dev/null; then

      ./warn <<EOM
Any previous setting of the C compiler flags has been lost.
It may be necessary to pass -Dcc=gcc to Configure right away.
EOM
                    fi;;
            esac
          fi
      fi
  fi
  $rm -f try try.*
  ;;
esac
EOSC

: generate the checkcc script for later perusal
cat <<EOS >checkcc
$startsh
EOS
cat <<'EOSC' >>checkcc
case "$cc" in
'') ;;
*)  $rm -f try try.*
  $cat >try.c <<EOM
int main(int argc, char *argv[]) {
 (void) argc;
 (void) argv;
 return 0;
}
EOM
  if $cc -o try $ccflags $ldflags try.c; then
     :
  else
     if $test X"$despair" = Xyes; then
        echo "Uh-oh, the C compiler '$cc' doesn't seem to be working." >&4
     fi
     $cat >&4 <<EOM
You need to find a working C compiler.
Either (purchase and) install the C compiler supplied by your OS vendor,
or for a free C compiler try http://gcc.gnu.org/
I cannot continue any further, aborting.
```

```
EOM
	exit 1
  fi

 $rm -f try try.*
  ;;
esac
EOSC
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Checkcc.U
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```
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?RCS: of the source tree for dist 3.0.
?RCS:
?MAKE:siteman3dir siteman3direxp installsiteman3dir: Getfile \
 Setprefixvar prefix siteprefix man3dir sed
?MAKE: -pick add $@ %<
?Y:TOP
?D:siteman3dir="
?S:siteman3dir:
?S: This variable contains the name of the directory in which site-specific
?S: library man source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S: The standard distribution will put nothing in this directory.
?S: After
 perl has been installed, users may install their own local
?S: man3 pages in this directory with
?S:  MakeMaker Makefile.PL
?S: or equivalent.  See INSTALL for details.
?S:.
?D:siteman3direxp="
?S:siteman3direxp:
?S: This variable is the same as the siteman3dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installsiteman3dir="
?S:installsiteman3dir:
?S: This variable is really the same as siteman3direxp, unless you are using
```

```
?S: AFS in which case it points to the read/write location whereas
?S: man3direxp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installsiteman3dir
?LINT:set siteman3dir
?LINT:set siteman3direxp
: determine where add-on library man pages go
case "$siteman3dir" in
'') dflt=`echo $man3dir | $sed "s#^$prefix#$siteprefix#"` ;;
*) dflt=$siteman3dir ;;
esac
case "$dflt" in
'|' ') dflt=none ;;
esac
fn=dn+~
rp='Pathname
 where the site-specific library manual pages should be installed?'
. ./getfile
prefixvar=siteman3dir
. ./setprefixvar
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/siteman3dir.U
No license file was found, but licenses were detected in source scan.

```
# $Id: makedepend.sh,v 3.0.1.1 1994/01/24 14:00:05 ram Exp ram $
#
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#
#  You may redistribute only under the terms of the Artistic Licence,
#  as specified in the README file that comes with the distribution.
#  You may reuse parts of this distribution only within the terms of
#  that same Artistic Licence; a copy of which may be found at the root
#  of the source tree for dist 4.0.
#
# Original Author: Larry Wall <lwall@netlabs.com>
#
# $Log: makedepend.sh,v $
# Revision 3.0.1.1  1994/01/24  14:00:05  ram
# patch16: changed top ln-style config.sh lookup into test-style one
#
# Revision 3.0  1993/08/18  12:04:37  ram
# Baseline for dist 3.0 netwide release.
#
```

Found in path(s):

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/makedepend.SH
No license file was found, but licenses were detected in source scan.

```
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: nis.U,v $
?RCS: Revision 3.0.1.3  1997/02/28  16:17:38  ram
?RCS: patch61: ensure suitable defaults for hostcat and friends
?RCS:
?RCS: Revision 3.0.1.2  1995/03/21  08:48:34  ram
?RCS: patch52: continued fix for NeXT NIS/NetInfo handling
?RCS:
?RCS: Revision 3.0.1.1  1995/02/15  14:16:23  ram
?RCS: patch51: now correctly handles NeXT using NIS rather than NetInfo
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:24  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:passcat groupcat hostcat:
 Myread Oldconfig test contains
?MAKE: -pick add $@ %<
?S:passcat:
?S: This variable contains a command that produces the text of the
?S: /etc/passwd file.  This is normally "cat /etc/passwd", but can be
?S: "ypcat passwd" when NIS is used.
?S:.
?S:groupcat:
?S: This variable contains a command that produces the text of the
?S: /etc/group file.  This is normally "cat /etc/group", but can be
?S: "ypcat group" when NIS is used.
?S:.
?S:hostcat:
?S: This variable contains a command that produces the text of the
?S: /etc/hosts file.  This is normally "cat /etc/hosts", but can be
?S: "ypcat hosts" when NIS is used.
?S:.
: see if we have to deal with yellow pages, now NIS.
?X: NeXT gives us some fun here, as always, by having both NIS (former YP)
?X: and NetInfo. But since it has both, it's ok to put the test inside the if.
?X: Contributed by Thomas Neumann <tom@smart.bo.open.de>.
```

```
if $test -d /usr/etc/yp || $test -d /etc/yp || $test -d /usr/lib/yp; then
 if $test -f /usr/etc/nibindd; then
  echo
 " "
  echo "I'm fairly confident you're on a NeXT."
@if passcat || groupcat
  echo " "
  rp='Do you get the passwd file via NetInfo?'
  dflt=y
  case "$passcat" in
  nidump*) ;;
  ") ;;
  *) dflt=n;;
  esac
  . ./myread
  case "$ans" in
  y*) passcat='nidump passwd .'
@if groupcat
   echo "(Assuming /etc/group is also distributed.)"
   groupcat='nidump group .'
@end
   ;;
  *) echo "You told me, so don't blame me."
   case "$passcat" in
   nidump*) passcat="
@if groupcat
     groupcat=";;
@end
   esac
@if groupcat
   echo "(Assuming /etc/group is handled the same way.)"
@end
   ;;
  esac
@end
@if hostcat
  echo " "
  rp='Do you get the hosts file via NetInfo?'
  dflt=y
  case "$hostcat" in
  nidump*) ;;
  ") ;;
  *) dflt=n;;
  esac
  . ./myread
  case "$ans" in
  y*) hostcat='nidump hosts .';;
  *) case "$hostcat" in
```

```
  nidump*) hostcat='';;
  esac
  ;;
 esac
@end
 fi
@if passcat || groupcat
 case "$passcat" in
 nidump*) ;;
 *)
  case "$passcat" in
  *ypcat*) dflt=y;;
  ')
 if $contains '^\+' /etc/passwd >/dev/null 2>&1; then
    dflt=y
  else
    dflt=n
  fi;;
 *) dflt=n;;
 esac
 echo " "
 rp='Are you getting the passwd file via yellow pages?'
 . ./myread
 case "$ans" in
 y*) passcat='ypcat passwd'
@if groupcat
   echo "(Assuming /etc/group is also distributed.)"
   groupcat='ypcat group'
@end
   ;;
  *) passcat='cat /etc/passwd'
@if groupcat
   echo "(Assuming /etc/group is also local.)"
   groupcat='cat /etc/group'
@end
   ;;
 esac
 ;;
esac
@end
@if hostcat
 case "$hostcat" in
 nidump*) ;;
 *)
  case "$hostcat" in
  *ypcat*) dflt=y;;
  ') if $contains '^\+' /etc/passwd >/dev/null 2>&1; then
    dflt=y
```

```
  else
   dflt=n
  fi;;
 *) dflt=n;;
 esac
 echo " "
 rp='Are you getting the hosts file via yellow pages?'
 . ./myread
 case "$ans" in
 y*) hostcat='ypcat hosts';;
 *) hostcat='cat /etc/hosts';;
 esac
 ;;
esac
@end
fi
?X: Ensure suitable default -- Manoj Srivastava
case "$hostcat" in
'') hostcat=':'
 $test -f /etc/hosts && hostcat='cat
 /etc/hosts';;
esac
case "$groupcat" in
'') groupcat=':'
 $test -f /etc/group && groupcat='cat /etc/group';;
esac
case "$passcat" in
'') passcat=':'
 $test -f /etc/passwd && passcat='cat /etc/passwd';;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/nis.U
No license file was found, but licenses were detected in source scan.

```
/* This file was produced by running the config_h.SH script, which
* gets its values from $CONFIG_SH, which is generally produced by
* running Configure.
*
* Feel free to modify any of this as the need arises.  Note, however,
* that running config_h.SH again will wipe out any changes you've made.
* For a more permanent change edit $CONFIG_SH and rerun config_h.SH.
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Config_h.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1996, Andy Dougherty
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?RCS:
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Unix.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  15:20:06  ram
?RCS: patch61: created
?RCS:
?X:
?X: The purpose of this unit is to define things that are common across all
?X: known UNIX platforms. If Configure is ported/used on a non-UNIX
?X: environment, then some of the following variables can be redefined in hint
?X: files.
?X:
?MAKE:Unix _a _o firstmakefile archobjs: Oldconfig
?MAKE: -pick add $@ %<
?S:_a (lib_ext):
?S: This variable defines the extension
 used for ordinary libraries.
?S: For unix, it is '.a'.  The '.' is included.  Other possible
?S: values include '.lib'.
?S:.
?S:_o (obj_ext):
?S: This variable defines the extension used for object files.
?S: For unix, it is '.o'.  The '.' is included.  Other possible
?S: values include '.obj'.
?S:.
?S:firstmakefile:
?S: This variable defines the first file searched by make.  On unix,
?S: it is makefile (then Makefile).  On case-insensitive systems,
?S: it might be something else.  This is only used to deal with
?S: convoluted make depend tricks.
?S:.
?S:archobjs:
?S: This variable defines any additional objects that must be linked
?S: in with the program on this architecture.  On unix, it is usually
?S: empty.  It is typically used to include emulations of unix calls
?S: or other facilities.  For perl on OS/2, for example, this would
?S: include os2/os2.obj.
?S:.
?INIT:: Extra object files, if any, needed on this platform.
```

```
?INIT:archobjs="
: Define several unixisms.
: Hints files
 or command line option can be used to override them.
case "$_a" in
") _a='.a';;
esac
case "$_o" in
") _o='.o';;
esac

@if firstmakefile
: Which makefile gets called first.  This is used by make depend.
case "$firstmakefile" in
") firstmakefile='makefile';;
esac

@end
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Unix.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: d_passwd.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Andy Dougherty <doughera@lafcol.lafayette.edu>
?RCS:
?RCS: $Log: d_passwd.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  15:37:21  ram
?RCS: patch61: useless unit dropped.
?RCS:
?RCS: Revision 3.0.1.1  1994/08/29  16:09:51  ram
?RCS: patch32: created by ADO
?RCS:
?X:
?X: Useless unit dropped.
?X:
?LINT:empty
```

Found in path(s):

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_passwd.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
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?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Oldsym.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  15:06:58  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:13  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit follows the creation of the config.sh file. It adds some
?X: special symbols: defines from patchlevel.h file if any and CONFIG,
?X: which is set to true. Then, we try to keep all the new symbols that
?X: may come from a hint file or a previous config.sh file.
?X:
?MAKE:Oldsym:
 Config_sh Options test hint src sed sort uniq
?MAKE: -pick add $@ %<
?T:CONFIG sym tmp
?F:!UU
: add special variables
$test -f $src/patchlevel.h && \
awk '/^#define/ {printf "%s=%s\n",$2,$3}' $src/patchlevel.h >>config.sh
echo "CONFIG=true" >>config.sh

: propagate old symbols
if $test -f UU/config.sh; then
?X: Make sure each symbol is unique in oldconfig.sh
 <UU/config.sh $sort | $uniq >UU/oldconfig.sh
?X:
?X: All the symbols that appear twice come only from config.sh (hence the
?X: two config.sh in the command line). These symbols will be removed by
?X: the uniq -u command. The oldsyms file thus contains all the symbols
?X: that did not appear in the produced config.sh (Larry Wall).
?X:
?X: Do not touch the -u flag of uniq.  This means you too, Jarkko.
?X:
```

```
 $sed -n 's/^\([a-zA-Z_0-9]*\)=.*/\1/p' \
  config.sh config.sh UU/oldconfig.sh |\
  $sort | $uniq -u >UU/oldsyms
 set X `cat UU/oldsyms`
 shift
 case $# in
 0) ;;
 *)
  cat <<EOM
Hmm...You had some extra variables I don't know about...I'll
 try to keep 'em...
EOM
  echo ": Variables propagated from previous config.sh file." >>config.sh
  for sym in `cat UU/oldsyms`; do
   echo "    Propagating $hint variable '"'$sym'"'..."
   eval 'tmp="'"${sym}"'"'
   echo "$tmp" | \
    sed -e "s/'/'\"'\"'/g" -e "s/^/$sym='/" -e "s/$/'/" >>config.sh
  done
  ;;
 esac
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Oldsym.U
No license file was found, but licenses were detected in source scan.

```
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```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/files/Jmake.tmpl
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: cf_who.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  15:28:50  ram
?RCS: patch61: new computation method avoiding use of temporary file
?RCS:
?RCS: Revision 3.0.1.1  1994/05/06  14:42:34  ram
```

```
?RCS: patch23: login name now computed the hard way
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:32  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: Oldconfig dependency is there to ensure computation occurs after old values
?X: from config.sh have been loaded, so that we can supersede them.
?X:
?MAKE:cf_time
 cf_by: date Oldconfig
?MAKE: -pick add $@ %<
?S:cf_time:
?S: Holds the output of the "date" command when the configuration file was
?S: produced. This is used to tag both config.sh and config_h.SH.
?S:.
?S:cf_by:
?S: Login name of the person who ran the Configure script and answered the
?S: questions. This is used to tag both config.sh and config_h.SH.
?S:.
?LINT:change LC_ALL LANGUAGE
: who configured the system
?X: Ensure English date -- Jarkko Hietaniemi
cf_time=`LC_ALL=C; LANGUAGE=C; export LC_ALL; export LANGUAGE; $date 2>&1`
?X:
?X: Leave a white space between first two '(' for ksh. The sub-shell is needed
?X: on some machines to avoid the error message when logname is not found; e.g.
?X: on SUN-OS 3.2, (logname || whoami) would not execute whoami if logname was
?X: not found. Sigh!
?X:
?X: Convex had a broken logname executable which returned a non-zero status,
?X: and that broke the previous:
?X:   cf_by=`( (logname) 2>/dev/null || whoami) 2>&1`
?X: Switch to emergency
 mode... -- RAM, 19/04/94
?X:
?X: Parentheses needed to avoid error message if the program does not exist.
?X: Uses case instead of $test so it can be put before $test is defined.
?X: Don't redirect to a file because on Ultrix (under script?) logname
?X: outputs a blank line first.  This method will apparently work.
case "$cf_by" in
"")
 cf_by=`(logname) 2>/dev/null`
 case "$cf_by" in
 "")
  cf_by=`(whoami) 2>/dev/null`
  case "$cf_by" in
  "") cf_by=unknown ;;
```

```
  esac ;;
 esac ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/cf_who.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: baserev.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: baserev.U,v $
?RCS: Revision 3.0  1993/08/18  12:05:24  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:baserev: Null
?MAKE: -pick wipe $@ %<
?S:baserev:
?S: The base revision level of this package, from the .package file.
?S:.
: set the base revision
baserev=<BASEREV>
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/baserev.U
No license file was found, but licenses were detected in source scan.

```
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: You may distribute under the terms of either the GNU General Public
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_sigsetjmp.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/d_sigsetjmp.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: d_byacc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1996, Andy Dougherty
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
```

?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: d_byacc.U,v $
?RCS: Revision 3.0.1.1 1997/02/28 15:31:14 ram
?RCS: patch61: created
?RCS:
?MAKE:d_byacc: byacc Setvar
?MAKE: -pick add $@ %<
?S:d_byacc:
?S: This variable indicates whether byacc is available.
?S: If the user has specified 'portability', then Makefile.SH
?S: sees $byacc='byacc' whether or not the user actually has
?S: byacc. This variable allows us to determine in a makefile
?S: if we really
 have byacc.
?S:.
?LINT:set d_byacc
: Check if we really have byacc
case "$byacc" in
"|'byacc') val="$undef" ;;
*) val="$define" ;;
esac
set d_byacc
eval $setvar

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/d_byacc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: make.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1996, Andy Dougherty
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?RCS:
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?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: make.U,v $
?RCS: Revision 3.0.1.1 1997/02/28 16:09:40 ram
?RCS: patch61: created
?RCS:
?MAKE:make_set_make : Loc rm sed make

```
?MAKE: -pick add $@ %<
?S:make_set_make:
?S: Some versions of 'make' set the variable MAKE.  Others do not.
?S: This variable contains the string to be included in Makefile.SH
?S: so that MAKE is set if needed, and not if not needed.
?S: Possible values are:
?S:
?S: make_set_make='#'  #
 If your make program handles this for you,
?S:
?S: make_set_make="MAKE=$make" # if it doesn't.
?S:
?S: This uses a comment character so that we can distinguish a
?S: 'set' value (from a previous config.sh or Configure -D option)
?S: from an uncomputed value.
?S:.
?LINT: extern MAKE
?LINT: change MAKE
?X: This test is based on one from an autoconf-generated configure
?X: script. Autoconf stole a lot from Configure, but now it's our
?X: turn to do so... ;-) -- RAM, 21/02/97
: check whether make sets MAKE
echo " "
echo "Checking if your $make program sets \$(MAKE)..." >&4
case "$make_set_make" in
")
?X: Use sed so we don't have a line begining with @echo.  Metaconfig
?X: will think that's a command like @if or @end.
 $sed 's/^X //' > testmake.mak << 'EOF'
Xall:
X  @echo 'maketemp="$(MAKE)"'
EOF
?X: GNU make sometimes prints "make[1]: Entering...", which would confuse us
 case "`$make -f testmake.mak 2>/dev/null`" in
 *maketemp=*) make_set_make='#' ;;
 *) make_set_make="MAKE=$make" ;;
 esac
 $rm
 -f testmake.mak
 ;;
esac
case "$make_set_make" in
'#') echo "Yup, it does.";;
*) echo "Nope, it doesn't.";;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/make.U

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

```
?RCS: $Id: Myread.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
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?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Myread.U,v $
?RCS: Revision 3.0.1.6  1997/02/28  15:05:39  ram
?RCS: patch61: myread script now starts with a "startsh"
?RCS: patch61: miscellaneous fixes
?RCS:
?RCS: Revision 3.0.1.5  1995/01/11  15:14:22  ram
?RCS: patch45: added & escape allowing user to turn on -d from the prompt
?RCS:
?RCS: Revision 3.0.1.4  1994/10/31  09:48:04  ram
?RCS: patch44: added Options to the MAKE line since it's no longer in Init.U
?RCS:
?RCS: Revision 3.0.1.3  1994/10/29
  15:56:20  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0.1.2  1993/08/30  08:57:59  ram
?RCS: patch8: added new visible 'nostick' symbol, mainly for Finish.U
?RCS:
?RCS: Revision 3.0.1.1  1993/08/27  14:39:20  ram
?RCS: patch7: now sticks to the question when no default and empty answer
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:08  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a bit of shell code that must be dotted in in order
?X: to do a read.  It allows for shell escapes, default assignment and
?X: parameter evaluation.
?X:
?X: To use this unit, $rp and $dflt must hold the question and the
?X: default answer. The question will be printed by the script itself.
?X: Neither $rp nor $dflt is altered by the script.
?X:
?X: The myread script will stick to the question if no default is proposed
?X: and the user answer is empty, which prevents mistakes. However, at the
?X: end of Configure, there is an exception
```

```
 to this rule (Finish.U) where we
?X: set nostick to a non-empty value to allow the Return key to play its role!
?X:
?MAKE:Myread: Options startsh n c trnl
?MAKE: -pick add $@ %<
?V:ans:dflt rp nostick
?F:./myread
?T:COLUMNS xxxm rp dflt answ aok myecho
?LINT:change fastread
?X: Some shells (Ultrix) do not understand ${COLUMNS:-80}, sigh!
: compute the number of columns on the terminal for proper question formatting
case "$COLUMNS" in
") COLUMNS='80';;
esac

: set up the echo used in my read
?X:
?X: This variable is intended to be eval'ed. It will echo the two
?X: variables $rp and $dflt (provided this latter has a non null value).
?X: It is mainly used by the myread script to echo the questions.
?X:
?X: The $n and $c below are substituted before Loc does its silly echo check
?X: so don't put a $ on the echo below so we get builtin, even if $echo is
?X: pointing to /bin/echo.
?X:
myecho="case \"\$xxxm\" in
") echo $n \"\$rp $c\" >&4;;
*) case \"\$rp\" in
 ") echo $n \"[\$xxxm] $c\";;
 *)
  if
 test \`echo \"\$rp [\$xxxm]  \" | wc -c\` -ge $COLUMNS; then
   echo \"\$rp\" >&4
   echo $n \"[\$xxxm] $c\" >&4
  else
   echo $n \"\$rp [\$xxxm] $c\" >&4
  fi
  ;;
 esac;;
esac"

: now set up to do reads with possible shell escape and default assignment
cat <<EOSC >myread
$startsh
?X:
?X: Save value of default -- do not alter original in case of eval
?X:
xxxm=\$dflt
```

```
$myecho
?X:
?X: If there is no default, then stop, regardless of the value in fastread.
?X: In silent mode, no new-line is to be echoed if the question is empty,
?X: since this is used to wait for the "return" key.
?X:
ans='!'
case "\$fastread" in
yes) case "\$dflt" in
 '') ;;
 *) ans='';
  case "\$silent-\$rp" in
  true-) ;;
  *) echo " " >&4;;
  esac;;
 esac;;
*) case "\$silent" in
 true) case "\$rp" in
  '') ans='';;
  esac;;
 esac;;
esac
while expr "X\$ans" : "X!" >/dev/null; do
 read answ
?X:
?X: Run 'eval' on the answer, in order to do variable substitution, in case
?X: the user types $HOME or $WHATEVER.
 Variables must be evaluated now.
?X: Typing '\$HOME' won't currently prevent from substitution -- use '\\$HOME'
?X: The $1 .. $9 and $*, as well as $@, are available to refer to the
?X: default value.
?X:
 set x \$xxxm
 shift
 aok=''; eval "ans=\\"\$answ\\"" && aok=y
 case  "\$answ" in
?X:
?X: Use "!" and not a plain ! because of a bug in BSD 4.4 shell
?X: (reported by Wayne Davison)
?X: We must handle the shell escapes before dealing with possible variable
?X: substitution, since the shell we're launching in that case will be able
?X: to do it as well as we can -- RAM, 15/03/96
?X
 "!")
  sh 1>&4
  echo " "
  $myecho
  ;;
```

```
!*)
 set x \`expr "X\$ans" : "X!\(.*\)\$"\`
 shift
 sh 1>&4 -c "\$*"
 echo " "
 $myecho
 ;;
"\$ans")
 case "\$ans" in
?X:
?X: Answers starting with & are hooks allowing to dynamically turn on/off
?X: some Configure options. That's for the future. -- RAM, 09/01/95
?X: Today, we only recognize '& -d' to mean 'go on as if Configure -d, which
?X: is a hardwired
 behaviour compatible with our general scheme.
?X:
 \\&*)
  set x \`expr "X\$ans" : "X&\(.*\)\$"\`
  shift
  case "\$1" in
  -d)
   fastread=yes
   echo "(OK, I'll run with -d after this question.)" >&4
   ;;
  -*)
   echo "*** Sorry, \$1 not supported yet." >&4
   ;;
  esac
  $myecho
  ans=!
  ;;
 esac;;
*)
 case "\$aok" in
 y)
  echo "*** Substitution done -- please confirm."
  xxxm="\$ans"
  ans=\`echo $n "\$ans$c" | tr '$trnl' ' '\`
  xxxm="\$ans"
  ans=!
  ;;
 *)
  echo "*** Error -- try again."
  ans=!
  ;;
 esac
 $myecho
 ;;
```

```
 esac
?X: Stick in myread if no default answer and nothing was answered
 case "\$ans\$xxxm\$nostick" in
 ")
  ans=!
  $myecho
  ;;
 esac
done
case "\$ans" in
") ans="\$xxxm";;
esac
EOSC

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Myread.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: packadmin.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1996, Andy Dougherty
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?MAKE:packadmin: cf_email Oldconfig Myread cat spackage package
?MAKE: -pick add $@ %<
?Y:TOP
?S:packadmin:
?S: Electronic mail address of the package administrator.
?S:.
: check wehther they will act as local admin for the package
$cat <<EOM

If you or somebody else will be maintaining $package at your site, please
fill in the correct e-mail address here so that they may be contacted
if necessary.  You may enter "none"
 for no administrator.

EOM
case "$packadmin" in
") dflt="$cf_email";;
*) dflt="$packadmin";;
esac
```

```
rp="$spackage administrator e-mail address"
. ./myread
packadmin="$ans"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/packadmin.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libc.U,v $
?RCS: Revision 3.0.1.10  1997/02/28  15:56:48  ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS: patch61: added support for HPUX-10 nm output
?RCS:
?RCS: Revision 3.0.1.9  1995/07/25  14:11:56  ram
?RCS: patch56: now knows about OS/2 platforms
?RCS:
?RCS: Revision 3.0.1.8  1995/05/12  12:20:47  ram
?RCS: patch54: made sure only most recent version of shared lib is picked
?RCS: patch54: final "nm -p" check now uses xscan and xrun like everybody
?RCS: patch54: can now grok
 linux nm output with lead __IO (ADO)
?RCS: patch54: added support for linux ELF output, using 'W' for alias (ADO)
?RCS:
?RCS: Revision 3.0.1.7  1994/10/29  16:23:40  ram
?RCS: patch36: now looks for shared libraries before anything else (ADO)
?RCS: patch36: added new nm output format (ADO)
?RCS:
?RCS: Revision 3.0.1.6  1994/08/29  16:28:10  ram
?RCS: patch32: added I-type symbols for nm output parsing on Linux
?RCS:
?RCS: Revision 3.0.1.5  1994/06/20  07:03:24  ram
?RCS: patch30: checks are now presented by succession of if/elif
?RCS: patch30: uniformized checks for shared objects with new so symbol
?RCS:
?RCS: Revision 3.0.1.4  1994/05/06  15:06:33  ram
?RCS: patch23: added shared library knowledge (ADO and WED)
?RCS:
?RCS: Revision 3.0.1.3  1994/01/24  14:12:17  ram
```

```
?RCS: patch16: can now export nm_extract as an internal-use only variable
?RCS:
?RCS: Revision 3.0.1.2  1993/09/13  16:09:03  ram
?RCS: patch10: added special handling for Apollo systems (WAD)
?RCS:
?RCS: Revision 3.0.1.1
  1993/08/27  14:40:03  ram
?RCS: patch7: added entry for /usr/shlib/libc.so (OSF/1 machines)
?RCS:
?RCS: Revision 3.0  1993/08/18  12:08:57  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libc libnames +nm_extract: echo n c rm test grep Getfile Myread \
 Oldconfig Loc sed libs incpath libpth ar runnm nm nm_opt nm_so_opt \
 contains xlibpth so osname trnl tr sort uniq _o _a
?MAKE: -pick add $@ %<
?S:libc:
?S: This variable contains the location of the C library.
?S:.
?S:libnames:
?S: The constructed list of library names.  Normally empty, but hint files
?S: may set this for later perusal by Configure.
?S:.
?S:nm_extract:
?S: This variable holds the name of the extraction command used to process
?S: the output of nm and yield the list of defined symbols. It is used
?S: internally by Configure.
?S:.
?T:thislib try libnames xxx xscan xrun thisname com tans file
?F:!libnames !libc.tmp !tmp.imp
?LINT:change nm_opt runnm
?INIT:libnames="
: Figure out where the libc is located
case
 "$runnm" in
true)
?X: indentation is wrong on purpose--RAM
: get list of predefined functions in a handy place
echo " "
case "$libc" in
") libc=unknown
 case "$libs" in
 *-lc_s*) libc=`./loc libc_s$_a $libc $libpth`
 esac
 ;;
esac
case "$libs" in
") ;;
```

```
*)  for thislib in $libs; do
 case "$thislib" in
 -lc|-lc_s)
  : Handle C library specially below.
  ;;
 -l*)
  thislib=`echo $thislib | $sed -e 's/^-l//'`
  if try=`./loc lib$thislib.$so.'*' X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc lib$thislib.$so X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc lib$thislib$_a X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc $thislib$_a X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc lib$thislib X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc $thislib X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc Slib$thislib$_a X $xlibpth`; $test -f "$try"; then
   :
  else
   try=''
  fi
  libnames="$libnames $try"
  ;;
 *) libnames="$libnames $thislib"
 ;;
 esac
 done
 ;;
esac
?X:
?X: Some systems (e.g. DG/UX) use "environmental" links, which make the test
?X: -f fail. Ditto for symbolic links. So in order to reliably check the
?X: existence of a file, we use test -r. It will still fail with DG/UX links
?X: though, but at least it will detect symbolic links. At some strategic
?X: points, we make use of (test -h), using a sub-shell in case builtin test
?X: does not implement the -h check for symbolic links. This makes it
?X: possible to preset libc in a hint file for instance and have it show up
?X: as-is in the question.
?X:
xxx=normal
case "$libc" in
unknown)
?X:
?X: The sed below transforms .so.9 .so.12 into something like .so.0009 .so.0012,
?X: then sorts on it to allow keeping .so.12 instead of .so.9 as the latest
```

```
?X: up-to-date library. The initial filename (before sed munging, saved in hold
?X: space via 'h') is appended via 'G' before sorting, then the leading munged
?X: part is removed after sorting. Nice efficient work
 from Tye McQueen.
?X: The initial blurfl is here to prevent the trailing pipe from producing an
?X: empty string, causing Configure to output all its set variables!
?X:
 set /lib/libc.$so
 for xxx in $libpth; do
  $test -r $1 || set $xxx/libc.$so
  : The messy sed command sorts on library version numbers.
  $test -r $1 || \
   set `echo blurfl; echo $xxx/libc.$so.[0-9]* | \
   tr ' ' $trnl | egrep -v '\.[A-Za-z]*$' | $sed -e '
    h
    s/[0-9][0-9]*/0000&/g
    s/0*\([0-9][0-9][0-9][0-9][0-9]\)/\1/g
    G
    s/\n/ /' | \
    $sort | $sed -e 's/^.* //'`
  eval set \$$#
 done
 $test -r $1 || set /usr/ccs/lib/libc.$so
 $test -r $1 || set /lib/libsys_s$_a
 ;;
*)
?X: ensure the test below for the (shared) C library will fail
 set blurfl
 ;;
esac
if $test -r "$1"; then
 echo "Your (shared) C library seems to be in $1."
 libc="$1"
elif $test -r /lib/libc && $test -r /lib/clib; then
?X:
?X: Apollo has its C library in /lib/clib AND /lib/libc
?X: not to mention its math library in /lib/syslib...
?X:
 echo
 "Your C library seems to be in both /lib/clib and /lib/libc."
 xxx=apollo
 libc='/lib/clib /lib/libc'
 if $test -r /lib/syslib; then
  echo "(Your math library is in /lib/syslib.)"
?X: Put syslib in libc -- not quite right, but won't hurt
  libc="$libc /lib/syslib"
 fi
elif $test -r "$libc" || (test -h "$libc") >/dev/null 2>&1; then
```

```
 echo "Your C library seems to be in $libc, as you said before."
?X: For mips, and...
elif $test -r $incpath/usr/lib/libc$_a; then
 libc=$incpath/usr/lib/libc$_a;
 echo "Your C library seems to be in $libc.  That's fine."
elif $test -r /lib/libc$_a; then
 libc=/lib/libc$_a;
 echo "Your C library seems to be in $libc.  You're normal."
else
 if tans=`./loc libc$_a blurfl/dyick $libpth`; $test -r "$tans"; then
  :
 elif tans=`./loc libc blurfl/dyick $libpth`; $test -r "$tans"; then
  libnames="$libnames "`./loc clib blurfl/dyick $libpth`
 elif tans=`./loc clib blurfl/dyick $libpth`; $test -r "$tans"; then
  :
 elif tans=`./loc Slibc$_a blurfl/dyick
 $xlibpth`; $test -r "$tans"; then
  :
 elif tans=`./loc Mlibc$_a blurfl/dyick $xlibpth`; $test -r "$tans"; then
  :
 else
  tans=`./loc Llibc$_a blurfl/dyick $xlibpth`
 fi
 if $test -r "$tans"; then
  echo "Your C library seems to be in $tans, of all places."
  libc=$tans
 else
  libc='blurfl'
 fi
fi
if $test $xxx = apollo -o -r "$libc" || (test -h "$libc") >/dev/null 2>&1; then
 dflt="$libc"
 cat <<EOM

If the guess above is wrong (which it might be if you're using a strange
compiler, or your machine supports multiple models), you can override it here.

EOM
else
 dflt="
 echo $libpth | $tr ' ' $trnl | $sort | $uniq > libpath
 cat >&4 <<EOM
I can't seem to find your C library.  I've looked in the following places:

EOM
 $sed 's/^/ /' libpath
 cat <<EOM
```

```
None of these seems to contain your C library. I need to get its name...

EOM
fi
fn=f
rp='Where is your C library?'
. ./getfile
libc="$ans"

echo " "
echo $libc $libnames | $tr ' ' $trnl | $sort | $uniq > libnames
set X `cat libnames`
shift
xxx=files
case
 $# in 1) xxx=file; esac
echo "Extracting names from the following $xxx for later perusal:" >&4
echo " "
$sed 's/^/ /' libnames >&4
echo " "
$echo $n "This may take a while...$c" >&4

?X:
?X: Linux may need the special Dynamic option to nm for shared libraries.
?X: In general, this is stored in the nm_so_opt variable.
?X: Unfortunately, that option may be fatal on non-shared libraries.
?X:
for file in $*; do
 case $file in
 *$so*) $nm $nm_so_opt $nm_opt $file 2>/dev/null;;
 *) $nm $nm_opt $file 2>/dev/null;;
 esac
done >libc.tmp

$echo $n ".$c"
?X:
?X: To accelerate processing, we look at the correct 'sed' command
?X: by using a small subset of libc.tmp, i.e. fprintf function.
?X: When we know which sed command to use, do the name extraction
?X:
$grep fprintf libc.tmp > libc.ptf
?X:
?X: In order to enhance readability and save some space, we define
?X: some variables that will be "eval"ed.
?X:
xscan='eval "<libc.ptf $com >libc.list"; $echo $n ".$c" >&4'
xrun='eval
```

```
 "<libc.tmp $com >libc.list"; echo "done." >&4'
?X: BSD-like output, I and W types added for Linux
?X: Some versions of Linux include a leading __IO in the symbol name.
?X: HPUX10 reportedly has trailing spaces, though I'm surprised it has
?X: BSD-like output.  (AD).
xxx='[ADTSIW]'
if com="$sed -n -e 's/__IO//' -e 's/^.* $xxx  *_[_.]*//p' -e 's/^.* $xxx  *//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: SYSV-like output
elif com="$sed -n -e 's/^__*//' -e 's/^\([a-zA-Z_0-9$]*\).*xtern.*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e '/|UNDEF/d' -e '/FUNC..GL/s/^.*|__*//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.* D __*//p' -e 's/^.* D //p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^_//' -e 's/^\([a-zA-Z_0-9]*\).*xtern.*text.*/\1/p'";\
 eval
 $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.*|FUNC |GLOB .*|//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$grep '|' | $sed -n -e '/|COMMON/d' -e '/|DATA/d' \
    -e '/ file/d' -e 's/^\([^  ]*\).*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.*|FUNC |GLOB .*|//p' -e 's/^.*|FUNC |WEAK .*|//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: mips nm output (sysV)
elif com="$sed -n -e 's/^__//' -e '/|Undef/d' -e '/|Proc/s/ .*//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.*|Proc .*|Text *| *//p'";\
 eval $xscan;\
```

```
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e '/Def. Text/s/.* \([^ ]*\)\$/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null
 2>&1; then
  eval $xrun
?X: OS/2 nm output
elif com="$sed -n -e 's/^[-0-9a-f ]*_\(.*\)=.*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/.*\.text n\ \ \ \.//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: AIX nm output
elif com="sed -n -e 's/^__.*//' -e 's/[       ]*D[    ]*[0-9]*.*//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
else
 $nm -p $* 2>/dev/null >libc.tmp
 $grep fprintf libc.tmp > libc.ptf
 if com="$sed -n -e 's/^.* [ADTSIW]  *_[_.]*//p' -e 's/^.* [ADTSIW] //p'";\
  eval $xscan; $contains '^fprintf$' libc.list >/dev/null 2>&1
 then
  nm_opt='-p'
  eval $xrun
 else
  echo " "
  echo "$nm didn't seem to work right. Trying $ar instead..." >&4
  com="
  if $ar t $libc > libc.tmp && \
   $contains '^fprintf$' libc.tmp >/dev/null 2>&1
  then
   for thisname in $libnames $libc; do
    $ar t $thisname >>libc.tmp
   done
   $sed
 -e "s/\\$_o\$//" < libc.tmp > libc.list
   echo "Ok." >&4
  elif test "X$osname" = "Xos2" && $ar tv $libc > libc.tmp; then
?X: Repeat libc to extract forwarders to DLL entries too
   for thisname in $libnames $libc; do
    $ar tv $thisname >>libc.tmp
?X: Revision 50 of EMX has bug in ar: it will not extract forwarders
?X: to DLL entries.  Use emximp which will extract exactly them.
```

```
   emximp -o tmp.imp $thisname \
       2>/dev/null && \
       $sed -e 's/^\([_a-zA-Z0-9]*\) .*$/\1/p' \
       < tmp.imp >>libc.tmp
   $rm -f tmp.imp
  done
  $sed -e "s/\\$_o\$//" -e 's/^ \+//' < libc.tmp > libc.list
  echo "Ok." >&4
 else
  echo "$ar didn't seem to work right." >&4
  echo "Maybe this is a Cray...trying bld instead..." >&4
  if
   bld t $libc | \
    $sed -e 's/.*\///' -e "s/\\$_o:.*\$//" > libc.list &&
   $test -s libc.list
  then
   for thisname in $libnames; do
    bld t $libnames | \
    $sed -e 's/.*\///' -e "s/\\$_o:.*\$//" >>libc.list
    $ar t $thisname >>libc.tmp
   done
   echo
"Ok." >&4
  else
   echo "That didn't work either." >&4
   echo "No problem, I'll be compiling test programs then..." >&4
   runnm=false
  fi
 fi
fi
nm_extract="$com"
if $test -f /lib/syscalls.exp; then
 echo " "
 echo "Also extracting names from /lib/syscalls.exp for good ole AIX..." >&4
 $sed -n 's/^\([^  ]*\)[  ]*syscall[0-9]*[  ]*$/\1/p' \
  /lib/syscalls.exp >>libc.list
fi
?X: remember, indentation is wrong on purpose--RAM
;;
esac
$rm -f libnames libpath
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libc.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
```

```
?RCS:
?RCS: Copyright (c) 1999 Jarkko Hietaniemi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?MAKE:sitehtml3dir sitehtml3direxp installsitehtml3dir: Getfile \
 Setprefixvar prefix siteprefix html3dir sed
?MAKE: -pick add $@ %<
?Y:TOP
?D:sitehtml3dir="
?S:sitehtml3dir:
?S: This variable contains the name of the directory in which site-specific
?S: library html source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S: The standard distribution will put nothing in this directory.
?S: After
 perl has been installed, users may install their own local
?S: library html pages in this directory with
?S:  MakeMaker Makefile.PL
?S: or equivalent.  See INSTALL for details.
?S:.
?D:sitehtml3direxp="
?S:sitehtml3direxp:
?S: This variable is the same as the sitehtml3dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installsitehtml3dir="
?S:installsitehtml3dir:
?S: This variable is really the same as sitehtml3direxp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: html3direxp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installsitehtml3dir
?LINT:set sitehtml3dir
?LINT:set sitehtml3direxp
: determine where add-on library html pages go
: There is no standard location, so try to copy the previously-selected
: directory structure for the core html pages.
case
 "$sitehtml3dir" in
")    dflt=`echo "$html3dir" | $sed "s#^$prefix#$siteprefix#"` ;;
```

```
*)     dflt=$sitehtml3dir ;;
esac
case "$dflt" in
"|' ') dflt=none ;;
esac
fn=dn+~
rp='Pathname where the site-specific library html pages should be installed?'
. ./getfile
prefixvar=sitehtml3dir
. ./setprefixvar

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/sitehtml3dir.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: warnflags.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Orginal Author: Graham Stoney <greyham@research.canon.oz.au>
?RCS:
?RCS: $Log: warnflags.U,v $
?RCS: Revision 3.0  1993/08/18  12:10:02  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:warnflags: cat cc contains Myread Guess Oldconfig Findhdr
?MAKE: -pick add $@ %<
?S:warnflags:
?S: This variable contains any additional C compiler flags to generate
?S: warnings from the compiler. It is up to the Makefile to use this.
?S:.
: offer additional
 warning flags for compilation
$cat <<EOH

You may wish to compile with extra compiler warnings enabled.
Note that doing so enhances your chance of receiving your free set of steak
knives, particularly if you find any bugs and report them.
If you don't want extra warnings, answer "none".

EOH
case "$warnflags" in
```

```
") case "$cc" in
 *gcc*)
  dflt="-Wall -Wno-comment"
  if $contains 'fprintf' `./findhdr stdio.h` >/dev/null 2>&1; then
   :
  else
   dflt="$dflt -Wno-implicit"
  fi
  ;;
 *) dflt="none";;
 esac
 ;;
' ') dflt="none";;
*) dflt="$warnflags";;
esac

rp="Any $cc flags to enable warnings?"
. ./myread
case "$ans" in
none) warnflags=' ';;
*) warnflags="$ans";;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/warnflags.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Options.U,v $
?RCS: Revision 3.0.1.7  1997/02/28  15:08:15  ram
?RCS: patch61: optdef.sh now starts with a "startsh"
?RCS: patch61: moved some code from Head.U
?RCS:
?RCS: Revision 3.0.1.6  1995/09/25  09:14:46  ram
?RCS: patch59: protected option parsing code against 'echo -*' option failure
?RCS:
?RCS: Revision 3.0.1.5  1995/05/12  12:04:52  ram
?RCS: patch54: added -K option for experts
?RCS:
```

```
?RCS: Revision 3.0.1.4  1995/01/30  14:27:52  ram
?RCS: patch49: this unit now exports file optdef.sh,
 not a variable
?RCS:
?RCS: Revision 3.0.1.3  1995/01/11  15:19:00  ram
?RCS: patch45: new -O option allowing -D and -U to override config.sh settings
?RCS: patch45: file optdef.sh is no longer removed after sourcing
?RCS:
?RCS: Revision 3.0.1.2  1994/10/29  15:58:06  ram
?RCS: patch36: ensure option definition file is removed before appending
?RCS: patch36: protect variable definitions with spaces in them
?RCS:
?RCS: Revision 3.0.1.1  1994/06/20  06:55:44  ram
?RCS: patch30: now uses new me symbol to tag error messages
?RCS: patch30: new -D and -U options to define/undef symbols (JHI)
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:14  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: Command line parsing. It is really important that the variables used here
?X: be not listed in the MAKE line, or they will be saved in config.sh and
?X: loading this file to fetch default answers would clobber the values set
?X: herein.
?X:
?MAKE:Options: startsh
?MAKE: -pick wipe $@ %<
?V:reuseval
 alldone error realsilent silent extractsh fastread \
 override knowitall: config_sh
?T:arg argn symbol config_arg0 config_args config_argc xxx yyy zzz uuu
?T:args_exp args_sep arg_exp
?F:!Configure
?F:./optdef.sh ./cmdline.opt ./posthint.sh ./cmdl.opt
: Save command line options in file UU/cmdline.opt for later use in
: generating config.sh.
?X: This temporary file will be read by Oldsym.U.  I used a temporary
?X: file to preserve all sorts of potential command line quotes and
?X: also because we don't know in advance how many variables we'll
?X: need, so I can't actually declare them on the MAKE line.
?X: The config_args variable won't be quite correct if Configure is
?X: fed something like    ./Configure -Dcc="gcc -B/usr/ccs/bin/"
?X: since the quotes are gone by the time we see them.  You'd have to
?X: reconstruct the command line from the config_arg? lines, but since
?X: I don't imagine anyone actually having to do that, I'm not going
?X: to worry too much.
cat > cmdline.opt
```

```
 <<EOSH
: Configure command line arguments.
config_arg0='$0'
config_args='$*'
config_argc=$#
EOSH
argn=1
args_exp="
args_sep="
for arg in "$@"; do
 cat >>cmdline.opt <<EOSH
config_arg$argn='$arg'
EOSH
?X: Extreme backslashitis: replace each ' by """"
 cat <<EOC | sed -e "s/'/""""""""""""""/g" > cmdl.opt
$arg
EOC
 arg_exp=`cat cmdl.opt`
 args_exp="$args_exp$args_sep'$arg_exp'"
 argn=`expr $argn + 1`
 args_sep=' '
done
?X: args_exp is good for restarting self: eval "set X $args_exp"; shift; $0 "$@"
?X: used by hints/os2.sh in Perl, for instance
rm -f cmdl.opt

: produce awk script to parse command line options
cat >options.awk <<'EOF'
BEGIN {
 optstr = "A:dD:eEf:hKOrsSU:V"; # getopt-style specification

 len = length(optstr);
 for (i = 1; i <= len; i++) {
  c = substr(optstr, i, 1);
?X: some older awk's do not have the C ?: construct
  if (i < len) a = substr(optstr, i + 1, 1); else a = "";
  if (a == ":") {
   arg[c] = 1;
   i++;
  }
  opt[c] = 1;
 }
}
{
 expect = 0;
 str = $0;
 if (substr(str,
```

```
 1, 1) != "-") {
  printf("'%s'\n", str);
  next;
 }
 len = length($0);
 for (i = 2; i <= len; i++) {
  c = substr(str, i, 1);
  if (!opt[c]) {
   printf("-%s\n", substr(str, i));
   next;
  }
  printf("-%s\n", c);
  if (arg[c]) {
   if (i < len)
    printf("'%s'\n", substr(str, i + 1));
   else
    expect = 1;
   next;
  }
 }
}
END {
 if (expect)
  print "?";
}
EOF

: process the command line options
?X: Use "$@" to keep arguments with spaces in them from being split apart.
?X: For the same reason, awk will output quoted arguments and the final eval
?X: removes them and sets a proper $* array. An 'X' is prependend to each
?X: argument before being fed to echo to guard against 'echo -x', where -x
?X: would be understood as an echo option! It is removed before feeding awk.
set X `for arg in "$@"; do echo "X$arg"; done |
 sed -e s/X// | awk -f options.awk`
eval "set $*"
shift
rm -f options.awk

: set up default values
fastread="
reuseval=false
config_sh="
alldone="
error="
silent="
extractsh="
override="
```

```
knowitall="
rm
 -f optdef.sh posthint.sh
cat >optdef.sh <<EOS
$startsh
EOS

?X:
?X: Given that we now have the possibility to execute Configure remotely
?X: thanks to the new src.U support, we have to face the possibility
?X: of having to ask where the source lie, which means we need the Myread.U
?X: stuff and possibly other things that might echo something on the
?X: screen...
?X:
?X: That's not pretty, and might be confusing in 99% of the time. So...
?X: We introduce a new realsilent variable which is set when -s is given,
?X: and we force silent=true if -S is supplied. The Extractall.U unit
?X: will then undo the >&4 redirection based on the value of the
?X: realsilent variable... -- RAM, 18/93/96
?X:

: option parsing
while test $# -gt 0; do
 case "$1" in
 -d) shift; fastread=yes;;
 -e) shift; alldone=cont;;
 -f)
  shift
  cd ..
  if test -r "$1"; then
   config_sh="$1"
  else
   echo "$me: cannot read config file $1." >&2
   error=true
  fi
  cd UU
  shift;;
 -h)
 shift; error=true;;
 -r) shift; reuseval=true;;
 -s) shift; silent=true; realsilent=true;;
 -E) shift; alldone=exit;;
 -K) shift; knowitall=true;;
 -O) shift; override=true;;
 -S) shift; silent=true; extractsh=true;;
 -D)
  shift
  case "$1" in
```

```
*=)
 echo "$me: use '-U symbol=', not '-D symbol='." >&2
 echo "$me: ignoring -D $1" >&2
 ;;
*=*) echo "$1" | \
  sed -e "s/'/'\"'\"'/g" -e "s/=\(.*\)/='\1'/" >> optdef.sh;;
*) echo "$1='define'" >> optdef.sh;;
esac
shift
;;
-U)
shift
case "$1" in
*=) echo "$1" >> optdef.sh;;
*=*)
 echo "$me: use '-D symbol=val', not '-U symbol=val'." >&2
 echo "$me: ignoring -U $1" >&2
 ;;
*) echo "$1='undef'" >> optdef.sh;;
esac
shift
;;
-A)
   shift
   xxx=''
   yyy="$1"
   zzz=''
   uuu=undef
   case "$yyy" in
        *=*) zzz=`echo "$yyy"|sed 's!=.*!!'`
            case "$zzz" in
            *:*) zzz='' ;;
            *)   xxx=append
                zzz=" "`echo
"$yyy"|sed 's!^[^=]*=!!'`
                yyy=`echo "$yyy"|sed 's!=.*!!'` ;;
            esac
            ;;
        esac
        case "$xxx" in
        '')  case "$yyy" in
            *:*) xxx=`echo "$yyy"|sed 's!:.*!!'`
                yyy=`echo "$yyy"|sed 's!^[^:]*:!!'`
                zzz=`echo "$yyy"|sed 's!^[^=]*=!!'`
                yyy=`echo "$yyy"|sed 's!=.*!!'` ;;
            *)   xxx=`echo "$yyy"|sed 's!:.*!!'`
                yyy=`echo "$yyy"|sed 's!^[^:]*:!!'` ;;
            esac
```

```
            ;;
        esac
    case "$xxx" in
    append)
 echo "$yyy=\"\${$yyy}$zzz\"" >> posthint.sh ;;
    clear)
 echo "$yyy=""   >> posthint.sh ;;
    define)
        case "$zzz" in
 ") zzz=define ;;
 esac
 echo "$yyy='$zzz'"  >> posthint.sh ;;
    eval)
 echo "eval \"$yyy=$zzz\"" >> posthint.sh ;;
    prepend)
 echo "$yyy=\"$zzz\${$yyy}\"" >> posthint.sh ;;
    undef)
        case "$zzz" in
 ")
 zzz="$uuu" ;;
 esac
 echo "$yyy=$zzz"  >> posthint.sh ;;
        *)  echo "$me: unknown -A command '$xxx', ignoring -A $1" >&2 ;;
    esac
    shift
    ;;
 -V) echo "$me generated by metaconfig <VERSION> PL<PATCHLEVEL>." >&2
    exit 0;;
 --) break;;
 -*) echo "$me: unknown option $1" >&2; shift; error=true;;
 *) break;;
 esac
done

case "$error" in
true)
 cat >&2 <<EOM
Usage: $me [-dehrsEKOSV] [-f config.sh] [-D symbol] [-D symbol=value]
            [-U symbol] [-U symbol=] [-A command:symbol...]
 -d : use defaults for all answers.
 -e : go on without questioning past the production of config.sh.
 -f : specify an alternate default configuration file.
 -h : print this help message and exit (with an error status).
 -r : reuse C symbols value if possible (skips costly nm extraction).
 -s : silent mode, only echoes questions and essential information.
 -D : define symbol to have some value:
      -D symbol         symbol gets the value 'define'
      -D symbol=value
```

```
  symbol gets the value 'value'
 -E : stop at the end of questions, after having produced config.sh.
 -K : do not use unless you know what you are doing.
 -O : let -D and -U override definitions from loaded configuration file.
 -S : perform variable substitutions on all .SH files (can mix with -f)
 -U : undefine symbol:
       -U symbol    symbol gets the value 'undef'
       -U symbol=   symbol gets completely empty
 -A : manipulate symbol after the platform specific hints have been applied:
  -A symbol=value  append " "value to symbol
  -A append:symbol=value  append value to symbol
  -A define:symbol=value  define symbol to have value
       -A clear:symbol  define symbol to be "
  -A define:symbol  define symbol to be 'define'
  -A eval:symbol=value  define symbol to be eval of value
  -A prepend:symbol=value prepend value to symbol
  -A undef:symbol  define symbol to be 'undef'
  -A undef:symbol=  define symbol to be "
 -V : print version number and exit (with
 a zero status).
EOM
 exit 1
 ;;
esac

?X:
?X: Unless they specified either -S or both -d and -e/E, make sure we're
?X: running interactively, i.e. attached to a terminal. Moved from Head.U to
?X: be able to handle batch configurations...
?X:
?X: We have to hardwire the Configure name and cannot use $me, since if they
?X: said 'sh <Configure', then $me is 'sh'...
?X:
: Sanity checks
case "$fastread$alldone" in
yescont|yesexit) ;;
*)
 case "$extractsh" in
 true) ;;
 *)
  if test ! -t 0; then
   echo "Say 'sh Configure', not 'sh <Configure'"
   exit 1
  fi
  ;;
 esac
 ;;
esac
```

```
?X: In silent mode, the standard output is closed. Questions are asked by
?X: outputing on file descriptor #4, which is the original stdout descriptor.
?X: This filters out all the "junk", since all the needed information is written
?X: on #4. Note that ksh will not let us redirect output if the file descriptor
?X: has not be defined yet, unlike sh, hence the following line...--RAM.
exec 4>&1
case "$silent" in
true)
 exec 1>/dev/null;;
esac

: run the defines and the undefines, if any, but leave the file out there...
touch optdef.sh
. ./optdef.sh
: create the posthint manipulation script and leave the file out there...
?X: this file will be perused by Oldconfig.U
touch posthint.sh

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Options.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Oldsym.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Oldsym.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  15:06:58  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:13  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit follows the creation of the config.sh file. It adds some
?X: special symbols: defines from patchlevel.h file if any and PERL_CONFIG_SH,
?X: which is set to true. Then, we try to keep all the new symbols that
?X: may come from a hint
 file or a previous config.sh file.
?X:
?MAKE:Oldsym: Config_sh cat test hint src sed sort uniq perl_patchlevel
```

```
?MAKE: -pick add $@ %<
?T:PERL_CONFIG_SH PERL_PATCHLEVEL sym tmp
?F:!UU
: add special variables
$test -f $src/patchlevel.h && \
awk '/^#define[  ]+PERL_/ {printf "%s=%s\n",$2,$3}' $src/patchlevel.h >>config.sh
echo "PERL_PATCHLEVEL='$perl_patchlevel'" >>config.sh
echo "PERL_CONFIG_SH=true" >>config.sh

: propagate old symbols
if $test -f UU/config.sh; then
?X: Make sure each symbol is unique in oldconfig.sh
 <UU/config.sh $sort | $uniq >UU/oldconfig.sh
?X:
?X: All the symbols that appear twice come only from config.sh (hence the
?X: two config.sh in the command line). These symbols will be removed by
?X: the uniq -u command. The oldsyms file thus contains all the symbols
?X: that did not appear in the produced config.sh (Larry Wall).
?X:
?X: Do not touch the -u flag of uniq.  This means you too, Jarkko.
?X:
 $sed -n 's/^\([a-zA-Z_0-9]*\)=.*/\1/p' \
  config.sh config.sh UU/oldconfig.sh
 |\
  $sort | $uniq -u >UU/oldsyms
 set X `$cat UU/oldsyms`
 shift
 case $# in
 0) ;;
 *)
  $cat <<EOM
Hmm...You had some extra variables I don't know about...I'll try to keep 'em...
EOM
  echo ": Variables propagated from previous config.sh file." >>config.sh
  for sym in `$cat UU/oldsyms`; do
   echo "    Propagating $hint variable '"'$sym...'"
   eval 'tmp="'"${sym}"'"'
   echo "$tmp" | \
    sed -e "s/'/'\"'\"'/g" -e "s/^/$sym='/" -e "s/$/'/" >>config.sh
  done
  ;;
 esac
fi

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Oldsym.U
No license file was found, but licenses were detected in source scan.
```

```
?RCS: $Id: vendorprefix.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: vendorprefix.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
?RCS:
?MAKE:usevendorprefix vendorprefix vendorprefixexp +oldvendorprefix: \
 Getfile Loc Oldconfig cat prefix Myread
?MAKE: -pick add $@ %<
?S:usevendorprefix:
?S: This variable tells whether the vendorprefix
?S: and consequently other vendor* paths are in use.
?S:.
?S:vendorprefix:
?S: This variable holds the full absolute path of the directory below
?S: which
 the vendor will install add-on packages.
?S: See INSTALL for usage and examples.
?S:.
?S:vendorprefixexp:
?S: This variable holds the full absolute path of the directory below
?S: which the vendor will install add-on packages.  Derived from vendorprefix.
?S:.
?S:oldvendorprefix:
?S: This variable is set non-null if the vendorprefix was previously defined
?S: and gets set to a new value. Used internally by Configure only.
?S:.
: Set the vendorprefix variables
$cat <<EOM

The installation process will also create a directory for
vendor-supplied add-ons.  Vendors who supply perl with their system
may find it convenient to place all vendor-supplied files in this
directory rather than in the main distribution directory.  This will
ease upgrades between binary-compatible maintenance versions of perl.

Of course you may also use these directories in whatever way you see
fit.  For example, you might use them to access modules shared over a
company-wide network.
```

```
The default answer should be
 fine for most people.
This causes further questions about vendor add-ons to be skipped
and no vendor-specific directories will be configured for perl.

EOM
rp='Do you want to configure vendor-specific add-on directories?'
case "$usevendorprefix" in
define|true|[yY]*) dflt=y ;;
*) : User may have set vendorprefix directly on Configure command line.
 case "$vendorprefix" in
 "|' ') dflt=n ;;
 *) dflt=y ;;
 esac
 ;;
esac
. ./myread
case "$ans" in
[yY]*) fn=d~+
 rp='Installation prefix to use for vendor-supplied add-ons?'
 case "$vendorprefix" in
 '') dflt="$prefix" ;;
 *)  dflt=$vendorprefix ;;
 esac
 . ./getfile
 : XXX Prefixit unit does not yet support siteprefix and vendorprefix
 oldvendorprefix=''
 case "$vendorprefix" in
 '') ;;
 *) case "$ans" in
  "$prefix") ;;
  *) oldvendorprefix="$prefix";;
  esac
  ;;
 esac
 usevendorprefix="$define"
 vendorprefix="$ans"
 vendorprefixexp="$ansexp"
 ;;
*) usevendorprefix="$undef"
 vendorprefix=''
 vendorprefixexp=''
 ;;
esac

Found in path(s):
*
```

/perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorprefix.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Extract.U,v 3.0.1.2 1997/02/28 14:58:52 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
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?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Extract.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  14:58:52  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0.1.1  1994/10/29  15:51:46  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:52  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a shell script which can be doted in order to extract
?X: .SH files with variable substitutions.
?X:
?X: When running
 Configure from a remote directory ($src is not '.'),
?X: then the files will be created in that directory, so beware!
?X:
?MAKE:Extract: src
?MAKE: -pick add $@ %<
?F:./extract
?T:PERL_CONFIG_SH dir file name create mkdir_p
: script used to extract .SH files with variable substitutions
cat >extract <<'EOS'
PERL_CONFIG_SH=true
echo "Doing variable substitutions on .SH files..."
if test -f MANIFEST; then
 set x `awk '{print $1}' < MANIFEST | grep '\.SH$'`
else
 echo "(Looking for .SH files under the source directory.)"
 set x `(cd "$src"; find . -name "*.SH" -print)`
fi
shift
case $# in
0) set x `(cd "$src"; echo *.SH)`; shift;;
```

```
esac
if test ! -f "$src/$1"; then
 shift
fi
?X: script to emulate mkdir -p
mkdir_p='
name=$1;
create="";
while test $name; do
 if test ! -d "$name"; then
  create="$name $create";
  name=`echo $name | sed -e "s|^[^/]*$||"`;
  name=`echo $name | sed -e "s|\(.*\)/.*|\1|"`;
 else
  name="";
 fi;
done;
for file in $create; do
 mkdir $file;
done
'
for file in $*;
 do
 case "$src" in
 ".")
  case "$file" in
  */*)
   dir=`expr X$file : 'X\(.*\)/'`
   file=`expr X$file : 'X.*/\(.*\)'`
   (cd "$dir" && . ./$file)
   ;;
  *)
   . ./$file
   ;;
  esac
  ;;
 *)
?X:
?X: When running Configure remotely ($src is not '.'), we cannot source
?X: the files directly, since that would wrongly cause the extraction
?X: where the source lie instead of withing the current directory. Therefore,
?X: we need to 'sh <file' then, which is okay since they will source the
?X: existing config.sh file. It's not possible to use:
?X:  ../src/Configure -S -O -Dsomething
?X: unfortunately since no new config.sh with the -Dsomething override
?X: will be created before running the .SH files. A minor buglet.
?X:
?X: Note that we must create the directory hierarchy ourselves if it does
```

```
?X: not exist already, and that is done through a shell emulation of the
?X: 'mkdir -p' command. We don't want to use the $installdir metaconfig
?X: symbol here since that would require too much to
 be configured for
?X: this simple extraction task that may happen quickly with 'Configure -S'.
?X:  -- RAM, 18/03/96
?X:
  case "$file" in
  */*)
   dir=`expr X$file : 'X\(.*\)/'`
   file=`expr X$file : 'X.*/\(.*\)'`
   (set x $dir; shift; eval $mkdir_p)
   sh <"$src/$dir/$file"
   ;;
  *)
   sh <"$src/$file"
   ;;
  esac
  ;;
 esac
done
if test -f "$src/config_h.SH"; then
 if test ! -f config.h; then
 : oops, they left it out of MANIFEST, probably, so do it anyway.
 . "$src/config_h.SH"
 fi
fi
EOS

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Extract.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Init.U,v 3.0.1.1 1994/10/31 09:45:59 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Init.U,v $
?RCS: Revision 3.0.1.1  1994/10/31  09:45:59  ram
?RCS: patch44: removed Options from MAKE to prevent Init overrides
?RCS: patch44: option processing now done after Myinit thanks to new Begin.U
?RCS: patch44: moved "Beginning of configuration questions" to Begin.U
```

```
?RCS: patch44: moved signal trapping instruction to Begin.U as well
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:02  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This file
 initializes certain default variables used by Configure.  They
?X: may be overridden or added to by definitions in Myinit.U.
?X:
?MAKE:Init eunicefix: Null
?MAKE: -pick add $@ %<
?MAKE: -pick weed $@ ./Init
?S:eunicefix:
?S: When running under Eunice this variable contains a command which will
?S: convert a shell script to the proper form of text file for it to be
?S: executable by the shell.  On other systems it is a no-op.
?S:.
?V:define undef smallmach:rmlist
?X:
?X: Throughout the units, one may make use of $define and $undef to reference
?X: a defined symbol or an undefined one. There is no need to add them in
?X: the dependency line since this unit makes them visible via ?V:, and
?X: everyone inherits from those symbols since by convention Init.U is the
?X: root dependency.
?X:
?LINT:extern DJGPP
?LINT:extern _exe
?LINT:change _exe
?LINT:extern is_os2
: Detect odd OSs
define='define'
undef='undef'
smallmach='pdp11 i8086 z8000 i80286 iAPX286'
rmlist=''

: We must find out about
 Eunice early
eunicefix=':'
if test -f /etc/unixtovms; then
 eunicefix=/etc/unixtovms
fi
if test -f /etc/unixtovms.exe; then
 eunicefix=/etc/unixtovms.exe
fi

: Set executable suffix now -- needed before hints available
if test -f "/libs/version.library"; then
```

```
: Amiga OS
  _exe=""
elif test -f "/system/gnu_library/bin/ar.pm"; then
: Stratus VOS
  _exe=".pm"
elif test -n "$DJGPP"; then
: DOS DJGPP
  _exe=".exe"
elif test -f /kern/cookiejar; then
: MiNT
  _exe=""
elif test -d c:/. -o -n "$is_os2" ; then
: OS/2 or cygwin
  _exe=".exe"
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Init.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: rcs_branch.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: rcs_branch.U,v $
?RCS: Revision 3.0  1993/08/18  12:09:40  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:rcs_branch: Myread contains Loc
?MAKE: -pick add $@ %<
?S:rcs_branch:
?S: This variable will hold "true" if rcs can take the -b<revision>
?S: option, which can make Life Easier on those folks who like to run
?S: rcsdiff manually.
?S:.
?T:xxx
: Tra la la la la
echo " "
echo "Checking to see if RCS understands the -b switch..." >&4
xxx=`./loc
 rcs " $pth`
case "$xxx" in
```

```
")
 rcs_branch=false
 echo "Oh.  You don't seem to have RCS here."
 ;;
*)
 rcs > rcsbranch.out 2>&1
 if $contains 'b\[rev\]' rcsbranch.out  >/dev/null 2>&1 ; then
  rcs_branch=true
  echo "Nice!  Your RCS is spiffy!"
 else
  rcs_branch=false
 echo "Well, at least you have RCS.  You know, a newer version is available."
 fi
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/rcs_branch.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: patchlevel.U,v 3.0.1.1 1997/02/28 16:18:41 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: This file is included with or a derivative work of a file included
?RCS: with the metaconfig program of Raphael Manfredi's "dist" distribution.
?RCS: In accordance with clause 7 of dist's modified Artistic License:
?RCS:
?RCS:     You may distribute under the terms of either the GNU General Public
?RCS:     License or the Artistic License, as specified in the README file.
?RCS:
?RCS: $Log: patchlevel.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:18:41  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:31  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:patchlevel revision version subversion \
 perl_patchlevel version_patchlevel_string \
 api_revision api_version api_subversion api_versionstring: \
 package test rsrc echo awk osname
?MAKE: -pick
 add $@ %<
?S:revision:
?S: The value of revision comes from the patchlevel.h file.
?S: In a version number such as 5.6.1, this is the "5".
?S: In patchlevel.h, this is referred to as "PERL_REVISION".
```

?S:.
?S:patchlevel:
?S: The patchlevel level of this package.
?S: The value of patchlevel comes from the patchlevel.h file.
?S: In a version number such as 5.6.1, this is the "6".
?S: In patchlevel.h, this is referred to as "PERL_VERSION".
?S:.
?S:subversion:
?S: The subversion level of this package.
?S: The value of subversion comes from the patchlevel.h file.
?S: In a version number such as 5.6.1, this is the "1".
?S: In patchlevel.h, this is referred to as "PERL_SUBVERSION".
?S: This is unique to perl.
?S:.
?S:version:
?S: The full version number of this package, such as 5.6.1 (or 5_6_1).
?S: This combines revision, patchlevel, and subversion to get the
?S: full version number, including any possible subversions.
?S: This is suitable for use as a directory name, and hence is
?S: filesystem
 dependent.
?S:.
?S:api_revision:
?S: The three variables, api_revision, api_version, and
?S: api_subversion, specify the version of the oldest perl binary
?S: compatible with the present perl. In a full version string
?S: such as '5.6.1', api_revision is the '5'.
?S: Prior to 5.5.640, the format was a floating point number,
?S: like 5.00563.
?S:
?S: perl.c:incpush() and lib/lib.pm will automatically search in
?S: $sitelib/.. for older directories back to the limit specified
?S: by these api_ variables. This is only useful if you have a
?S: perl library directory tree structured like the default one.
?S: See INSTALL for how this works. The versioned site_perl
?S: directory was introduced in 5.005, so that is the lowest
?S: possible value. The version list appropriate for the current
?S: system is determined in inc_version_list.U.
?S:
?S: XXX To do: Since compatibility can depend on compile time
?S: options (such as bincompat, longlong, etc.) it should
?S: (perhaps) be set by
 Configure, but currently it isn't.
?S: Currently, we read a hard-wired value from patchlevel.h.
?S: Perhaps what we ought to do is take the hard-wired value from
?S: patchlevel.h but then modify it if the current Configure
?S: options warrant. patchlevel.h then would use an #ifdef guard.
?S:.

```
?S:api_version:
?S: The three variables, api_revision, api_version, and
?S: api_subversion, specify the version of the oldest perl binary
?S: compatible with the present perl.  In a full version string
?S: such as '5.6.1', api_version is the '6'.  See api_revision for
?S: full details.  As a special case, 5.5.0 is rendered in the
?S: old-style as 5.005.  (In the 5.005_0x maintenance series,
?S: this was the only versioned directory in $sitelib.)
?S:.
?S:api_subversion:
?S: The three variables, api_revision, api_version, and
?S: api_subversion, specify the version of the oldest perl binary
?S: compatible with the present perl.  In a full version string
?S: such as '5.6.1', api_subversion is the
 '1'.  See api_revision for
?S: full details.
?S:.
?S:api_versionstring:
?S: This variable combines api_revision, api_version, and
?S: api_subversion in a format such as 5.6.1 (or 5_6_1) suitable
?S: for use as a directory name.  This is filesystem dependent.
?S:.
?S:perl_patchlevel:
?S: This is the Perl patch level, a numeric change identifier,
?S: as defined by whichever source code maintenance system
?S: is used to maintain the patches; currently Perforce.
?S: It does not correlate with the Perl version numbers or
?S: the maintenance versus development dichotomy except
?S: by also being increasing.
?S:.
?S:version_patchlevel_string:
?S: This is a string combining version, subversion and
?S: perl_patchlevel (if perl_patchlevel is non-zero).
?S: It is typically something like
?S: 'version 7 subversion 1'  or
?S: 'version 7 subversion 1 patchlevel 11224'
?S: It is computed here to avoid duplication of code in myconfig.SH
?S: and lib/Config.pm.
?S:.
?LINT:extern LC_ALL
?LINT:extern LANGUAGE
:
 get the patchlevel
echo " "
echo "Getting the current patchlevel..." >&4
if $test -r $rsrc/patchlevel.h;then
 revision=`awk '/define[  ]+PERL_REVISION/ {print $3}' $rsrc/patchlevel.h`
 patchlevel=`awk '/define[  ]+PERL_VERSION/ {print $3}' $rsrc/patchlevel.h`
```

```
 subversion=`awk '/define[  ]+PERL_SUBVERSION/ {print $3}' $rsrc/patchlevel.h`
 api_revision=`awk '/define[  ]+PERL_API_REVISION/ {print $3}' $rsrc/patchlevel.h`
 api_version=`awk '/define[  ]+PERL_API_VERSION/ {print $3}' $rsrc/patchlevel.h`
 api_subversion=`awk '/define[  ]+PERL_API_SUBVERSION/ {print $3}' $rsrc/patchlevel.h`
 perl_patchlevel=`egrep ','"(MAINT|SMOKE)[0-9][0-9]*"' $rsrc/patchlevel.h|tail -1|sed 's/[^0-9]//g'`
else
 revision=0
 patchlevel=0
 subversion=0
 api_revision=0
 api_version=0
 api_subversion=0
 perl_patchlevel=0
 $echo "(You do not have patchlevel.h.  Eek.)"
fi
: Define a handy string here to avoid duplication in myconfig.SH and configpm.
version_patchlevel_string="version $patchlevel subversion $subversion"
case
 "$perl_patchlevel" in
0|'') ;;
*)  perl_patchlevel=`echo $perl_patchlevel | sed 's/.* //'`
   version_patchlevel_string="$version_patchlevel_string patch $perl_patchlevel"
   ;;
esac

$echo "(You have $package $version_patchlevel_string.)"

case "$osname" in
dos|vms)
 : XXX Should be a Configure test for double-dots in filenames.
 version=`echo $revision $patchlevel $subversion | \
   $awk '{ printf "%d_%d_%d", $1, $2, $3 }'`
 api_versionstring=`echo $api_revision $api_version $api_subversion | \
   $awk '{ printf "%d_%d_%d", $1, $2, $3 }'`
 ;;
*)
 version=`echo $revision $patchlevel $subversion | \
   $awk '{ printf "%d.%d.%d", $1, $2, $3 }'`
 api_versionstring=`echo $api_revision $api_version $api_subversion | \
   $awk '{ printf "%d.%d.%d", $1, $2, $3 }'`
 ;;
esac
: Special case the 5.005_xx maintenance series, which used 5.005
: without any subversion label as a subdirectory in $sitelib
if test "${api_revision}${api_version}${api_subversion}" = "550"; then
 api_versionstring='5.005'
fi
```

Found
in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/patchlevel.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Prefixup.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Prefixup.U,v $
?RCS: Revision 3.0.1.1 1995/01/30 14:30:40 ram
?RCS: patch49: created
?RCS:
?X:
?X: Used as: "set dflt; eval $prefixup" to set $dflt to be $prefix/dir
?X: instead of $prefixexp/dir, in case portability was involved somehow
?X: and $prefix uses ~name expansion.
?X:
?MAKE:Prefixup: prefix prefixexp
?MAKE: -pick add $@ %<
?LINT:define prefixup
?S:prefixup:
?S: This shell variable is used internally by Configure to reset
?S: the leading
installation prefix correctly when $prefix uses
?S: ~name expansion.
?S: set dflt
?S: eval $prefixup
?S: That will set $dflt to $prefix/dir if it was $prefixexp/dir and
?S: $prefix differs from $prefixexp.
?S:.
?V:prefixup
: set the prefixup variable, to restore leading tilda escape
prefixup='case "$prefixexp" in
"$prefix") ;;
*) eval "$1=\`echo \$$1 | sed \"s,^$prefixexp,$prefix,\"\`";;
esac'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Prefixup.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: cf_name.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Graham Stoney <greyham@research.canon.oz.au>
?RCS:
?RCS: $Log: cf_name.U,v $
?RCS: Revision 3.0.1.2  1994/05/06  14:29:36  ram
?RCS: patch23: fixed user name computation from /etc/passwd in bsd systems
?RCS:
?RCS: Revision 3.0.1.1  1994/01/24  14:05:11  ram
?RCS: patch16: created
?RCS:
?RCS:
?MAKE:+cf_name: cf_by passcat Filexp nametype cat test
?MAKE: -pick add $@ %<
?S:cf_name:
?S: Full name of the person who ran the Configure script and
 answered the
?S: questions. This can be used by units that require the user's full name.
?S: This variable is for internal use only.
?S:.
?T:xxx fn NAME
: figure out their full name
case "$NAME" in
") case "$nametype" in
 other)
  fn=`./filexp ~/.fullname`
  xxx=usg
  $test -f $fn && xxx=other
  ;;
 *)
  xxx="$nametype"
  ;;
 esac

 case "$xxx" in
 bsd)
  cf_name=`$passcat | grep "^$cf_by:" | \
   sed -e 's/^[^:]*:[^:]*:[^:]*:[^:]*:\([^:]*\):.*/\1/' \
   -e 's/,.*//'`
  ;;
```

```
  usg)
  cf_name=`$passcat | grep "^$cf_by:" | \
   sed -e 's/^[^:]*:[^:]*:[^:]*:[^:]*:[^:]*:\([^:]*\):.*/\1/' \
   -e 's/[^-]*-\(.*\)(.*)/\1/'`
  ;;
 *)
  cf_name=`$cat $fn`
  ;;
 esac
 ;;
*)
 cf_name="$NAME"
 ;;
esac
?X:
?X: In the original unit, Graham asked for the user name, in case the above
?X: code was unable to figure it out correctly. Since now cf_name has been
?X: made an internal variable only (i.e. it is not saved in config.sh), letting
?X: the user override the computed default each time would be a pain.
?X:
 Therefore, I have decided to trust the above code to get it right, and for
?X: those rare cases where it will fail, too bad :-) --RAM.
?X:
echo " "
echo "Pleased to meet you, $cf_name."
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/cf_name.U
No license file was found, but licenses were detected in source scan.

```
?RCS: Copyright (c) 2016 Dagfinn Ilmari Mannsker & H.Merijn Brand
?RCS:
?RCS: You may distribute under the terms of either the GNU General Public
?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?X:
?X: This unit produces a variable that is intended to be eval'ed in
?X: order to define/undefine a symbol. A consistency check is made
?X: regarding any previous value and a warning is issued if there
?X: is any discrepancy.
?X:
?X: To use it, say:
?X: set d_siginfo_si_errno siginfo_t int si_errno $d_sigaction signal.h
?X: eval $hasfield_t;
?X:
?MAKE:Hasfield_t: test Compile rm_try Setvar
?MAKE: -pick add $@ %<
?LINT:define hasfield_t
```

```
?S:hasfield_t:
?S: Internal macro for Configure
?S:.
?V:hasfield_t:
?T:varname struct type field
: Define hasfield_t macro for Configure internal use
hasfield_t='varname=$1; struct=$2; type=$3; field=$4; shift; shift; shift; shift;
while $test $# -ge 2; do
   case
 "$1" in
 $define) echo "#include <$2>";;
   esac ;
   shift 2;
done > try.c;
echo "int main () { $struct foo; $type bar = foo.$field; }" >> try.c;
set try;
if eval $compile; then
 val="$define";
else
 val="$undef";
fi;
set $varname;
eval $setvar;
$rm_try'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Hasfield_t.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: lib.U,v 3.0.1.3 1995/09/25 09:16:47 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: lib.U,v $
?RCS: Revision 3.0.1.3  1995/09/25  09:16:47  ram
?RCS: patch59: unit is now forced to the top of Configure, if possible
?RCS:
?RCS: Revision 3.0.1.2  1995/01/30  14:38:08  ram
?RCS: patch49: can now handle installation prefix changes (from WED)
?RCS:
?RCS: Revision 3.0.1.1  1994/08/29  16:27:40  ram
?RCS: patch32: now uses installation prefix to set the default
```

```
?RCS:
?RCS: Revision 3.0  1993/08/18  12:08:56  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?LINT:
 empty
?X:?MAKE:lib libexp: Getfile Loc Oldconfig Prefixit Prefixup prefixexp
?X:?MAKE: -pick add $@ %<
?X:?Y:TOP
?X:?S:lib:
?X:?S: This variable holds the name of the directory in which the user wants
?X:?S: to put public library files for the package in question.  It is most
?X:?S: often a local directory such as /usr/local/lib. Programs using this
?X:?S: variable must be prepared to deal with filename expansion.
?X:?S:.
?X:?S:libexp:
?X:?S: This variable is the same as the lib variable, but is filename expanded
?X:?S: at configuration time, for convenient use in your makefiles.
?X:?S:.
?X:: determine where public libraries go
?X:set lib lib
?X:eval $prefixit
?X:case "$lib" in
?X:")
?X: dflt=`./loc . "." $prefixexp/lib /usr/local/lib /usr/lib /lib`
?X: set dflt
?X: eval $prefixup
?X: ;;
?X:*)  dflt="$lib";;
?X:esac
?X:echo " "
?X:fn=d~
?X:rp='Where do you want to put the public libraries?'
?X:. ./getfile
?X:lib="$ans"
?X:libexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/nullified/lib.U
No license file was found, but licenses were detected in source scan.

```
?RCS: In accordance with clause 7 of dist's modified Artistic License:
?RCS:     You may distribute under the terms of either the GNU General Public
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/privlib.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/startperl.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/archlib.U

* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/perlpath.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/a_dvisory/multiarch.U
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_portable.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: man3dir.U,v 3.1 1999/07/08 20:52:19 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1996-1999, Andy Dougherty
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: man3dir.U,v $
?RCS: Revision 3.1  1999/07/08 20:52:19  doughera
?RCS: Updated for perl5.005_5x
?RCS:
?RCS: Revision 3.0.1.1  1997/02/28  16:10:34  ram
?RCS: patch61: created
?RCS:
?X: This was originally specific to perl5.  Since perl5 has man pages that
?X: go in both man1/ and man3/ directories, we need both man1dir
?X: and man3dir.  This unit is basically dist's mansrc.U with
?X: man3 used instead
 of man everywhere.
?X: I then added various tests because perl5 has *lots* of man3
?X: pages with long file names. -- ADO
?X:
?MAKE:man3dir man3direxp man3ext installman3dir: cat nroff Loc Oldconfig \
 sed man1dir spackage package Getfile Setprefixvar Prefixit Prefixup \
 d_flexfnam privlib Myread test
?MAKE: -pick add $@ %<
?Y:TOP
?D:man3dir="
?S:man3dir:
?S: This variable contains the name of the directory in which manual
?S: source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S:.
?D:man3direxp="
?S:man3direxp:
?S: This variable is the same as the man3dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
```

```
?D:installman3dir="
?S:installman3dir:
?S: This variable is really the same as man3direxp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: man3direxp only
 points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?S:man3ext:
?S: This variable contains the extension that the manual page should
?S: have: one of 'n', 'l', or '3'.  The Makefile must supply the '.'.
?S: See man3dir.
?S:.
?T:prog tdflt
?LINT:change prefixvar
?LINT:set man3direxp
: determine where library module manual pages go
set man3dir man3dir none
eval $prefixit
$cat <<EOM

$spackage has manual pages for many of the library modules.
EOM

case "$nroff" in
nroff)
 $cat <<'EOM'
However, you don't have nroff, so they're probably useless to you.
EOM
 case "$man3dir" in
 ") man3dir="none";;
 esac;;
esac

case "$d_flexfnam" in
undef)
 $cat <<'EOM'
However, your system can't handle the long file names like File::Basename.3.
EOM
 case "$man3dir" in
 ") man3dir="none";;
 esac;;
esac

echo "If you don't want the manual sources installed, answer 'none'."
?X: In 5.005_57 and earlier, I had the following notes:
?X:
```

```
 We do not use /usr/local/man/man3 because some man programs will
?X: only show the /usr/local/man/man3 contents, and not the system ones,
?X: thus man less will show the perl module less.pm, but not the system
?X: less command.  We might also conflict with Tcl man pages.
?X: However, something like /opt/perl/man/man3 is fine.
?X:
?X: However, opinion seems to be shifting such that 'man POSIX' ought
?X: to just work.  -- Andy Dougherty  July 8, 1999
?X:
?X: remove any trailing -3.0 or other version indication from $package
prog=`echo $package | $sed 's/-*[0-9.]*$//'`
case "$man3dir" in
'') dflt=`echo "$man1dir" | $sed -e 's/man1/man3/g' -e 's/man\.1/man\.3/g'`
 if $test -d "$privlib/man/man3"; then
  cat <<EOM >&4

WARNING:  Previous versions of perl installed man3 pages into
$privlib/man/man3.  This version will suggest a
new default of $dflt.
EOM
  tdflt=$dflt
  dflt='n'
  rp='Do you wish to preserve the old behavior?(y/n)'
  . ./myread
  case "$ans" in
  y*) dflt="$privlib/man/man3"
 ;;
  *)  dflt=$tdflt ;;
  esac
   fi
 ;;
*) dflt="$man3dir" ;;
esac
case "$dflt" in
' ') dflt=none ;;
esac
echo " "
fn=dn+~
rp="Where do the $package library man pages (source) go?"
. ./getfile
prefixvar=man3dir
. ./setprefixvar

case "$man3dir" in
'') man3dir=' '
 installman3dir='';;
esac
```

```
: What suffix to use on installed man pages
case "$man3dir" in
' ')
 man3ext='0'
 ;;
*)
 rp="What suffix should be used for the $package library man pages?"
 case "$man3ext" in
 '') case "$man3dir" in
  *3)  dflt=3 ;;
  *3p) dflt=3p ;;
  *3pm) dflt=3pm ;;
  *l) dflt=l;;
  *n) dflt=n;;
  *o) dflt=o;;
  *p) dflt=p;;
  *C) dflt=C;;
  *L) dflt=L;;
  *L3) dflt=L3;;
  *) dflt=3;;
  esac
  ;;
 *) dflt="$man3ext";;
 esac
 . ./myread
 man3ext="$ans"
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/man3dir.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Typedef.U,v 3.0.1.3 1995/07/25 13:42:07 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Typedef.U,v $
?RCS: Revision 3.0.1.3  1995/07/25  13:42:07  ram
?RCS: patch56: added backslash escapes within evals to prevent space problems
?RCS:
?RCS: Revision 3.0.1.2  1994/10/29  16:01:16  ram
```

```
?RCS: patch36: don't clobber visible 'val' variable, use 'varval' instead
?RCS:
?RCS: Revision 3.0.1.1  1994/08/29  16:05:14  ram
?RCS: patch32: created
?RCS:
?X:
?X: This unit checks for the definition of a given typedef.
?X:
?X: To use it, say:
?X: set typedef
 val_t default [includes]
?X: eval $typedef
?X:
?MAKE:Typedef: cppstdin cppminus cppflags rm sed contains Oldconfig Myread
?MAKE: -pick add $@ %<
?LINT:define typedef
?LINT:define typedef_ask
?V:typedef typedef_ask
?S:typedef:
?S: This shell variable is used internally by Configure to check
?S: whether a given typedef is defined or not. A typical use is:
?S:  set typedef val_t default [includes]
?S:  eval $typedef
?S: That will return val_t set to default if the typedef was not found,
?S: to typedef otherwise. If no includes are specified, look in sys/types.h.
?S:.
?S:typedef_ask:
?S: This shell variable is used internally by Configure to check
?S: whether a given typedef is defined or not.  If it is not defined,
?S: this will call the ./myread script to prompt for an answer.
?S: It is intended to be used to avoid unnecessary prompts.
?S: A typical use is
?S:  rp="What is the type for file position used by fsetpos()?"
?S:  set fpos_t fpostype long stdio.h sys/types.h
?S:  eval $typedef_ask
?S: This
 will set fpostype=fpos_t, if fpos_t is available.  Otherwise
?S: it will call myread with a default of 'long', and a prompt of $rp.
?S:.
?T:type var def inclist varval inc
?F:!temp.c
: define an is-a-typedef? function
typedef='type=$1; var=$2; def=$3; shift; shift; shift; inclist=$@;
case "$inclist" in
"") inclist="sys/types.h";;
esac;
eval "varval=\$$var";
case "$varval" in
```

```
"")
 $rm -f temp.c;
 for inc in $inclist; do
  echo "#include <$inc>" >>temp.c;
 done;
?X: Maybe it's a #define instead of a typedef.
 echo "#ifdef $type" >> temp.c;
 echo "printf(\"We have $type\");" >> temp.c;
 echo "#endif" >> temp.c;
 $cppstdin $cppflags $cppminus < temp.c >temp.E 2>/dev/null;
 if $contains $type temp.E >/dev/null 2>&1; then
  eval "$var=\$type";
 else
  eval "$var=\$def";
 fi;
 $rm -f temp.?;;
*) eval "$var=\$varval";;
esac'

?X: Originally, I eval'd $typedef and then checked the results against
?X: $type.  Unfortunately, it then became complicated to check
?X: whether you are re-using
 an old config.sh value, and the logic got
?X: so convoluted it became easier to just copy the function above
?X: and alter it slightly.  A.D.  3/1998
: define an is-a-typedef? function that prompts if the type is not available.
typedef_ask='type=$1; var=$2; def=$3; shift; shift; shift; inclist=$@;
case "$inclist" in
"") inclist="sys/types.h";;
esac;
eval "varval=\$$var";
case "$varval" in
"")
 $rm -f temp.c;
 for inc in $inclist; do
  echo "#include <$inc>" >>temp.c;
 done;
?X: Maybe it's a #define instead of a typedef.
 echo "#ifdef $type" >> temp.c;
 echo "printf(\"We have $type\");" >> temp.c;
 echo "#endif" >> temp.c;
 $cppstdin $cppflags $cppminus < temp.c >temp.E 2>/dev/null;
 echo " " ;
 echo "$rp" | $sed -e "s/What is/Looking for/" -e "s/?/./";
 if $contains $type temp.E >/dev/null 2>&1; then
  echo "$type found." >&4;
  eval "$var=\$type";
 else
```

```
  echo "$type NOT found." >&4;
  dflt="$def";
  . ./myread ;
  eval "$var=\$ans";
 fi;
 $rm -f temp.?;;
*) eval "$var=\$varval";;
esac'

Found
 in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/typedefs/Typedef.U
No license file was found, but licenses were detected in source scan.

/*|?:[\\/]*)
if test -f "$xxx"; then
: ok
else
./warn "no $xxx -- ignoring your setting for $file."
xxx=`./loc $file $file $pth`
fi
;;
") xxx=`./loc $file $file $pth`;;
*) xxx=`./loc $xxx $xxx $pth`;;
esac
eval $file=$xxx$_exe
eval _$file=$xxx
case "$xxx" in
/*)
echo $file is in $xxx.
;;
?X: Under OS/2, we have PC-like paths
?:[\\/]*)
echo $file is in $xxx.
;;
*)
echo "I don't know where '$file' is, and my life depends on it." >&4
echo "Go find a public domain implementation or fix your PATH setting!" >&4
exit 1
;;
esac
done
echo " "
echo "Don't worry if any of the following aren't found..."
say=offhand
for file in $trylist; do
?X: Allow them to -Dmake=pmake on the command line for instance (see above)
eval xxx=\$$file
```

```
case "$xxx" in
/*|?:[\/]*)
if test -f "$xxx"; then
: ok
else
./warn "no $xxx -- ignoring your setting for $file."
xxx=`./loc $file $file $pth`
fi
;;
") xxx=`./loc $file $file $pth`;;
*) xxx=`./loc $xxx
 $xxx $pth`;;
esac
eval $file=$xxx$_exe
eval _$file=$xxx
case "$xxx" in
/*)
echo $file is in $xxx.
;;
?X: Under OS/2, we have PC-like paths
?:[\/]*)
echo $file is in $xxx.
;;
*)
echo "I don't see $file out there, $say."
say=either
;;
esac
done
case "$egrep" in
egrep)
echo "Substituting grep for egrep."
egrep=$grep
_egrep=$_grep
;;
esac
@if ln
case "$ln" in
ln)
echo "Substituting cp for ln."
ln=$cp
_ln=$_cp
;;
esac
@end
@if make || gmake
case "$make" in
make)
```

```
case "$gmake" in
gmake)
echo "I can't find make or gmake, and my life depends on it." >&4
echo "Go find a public domain implementation or fix your PATH setting!" >&4
exit 1
;;
esac
;;
esac
case "$gmake" in
gmake) ;;
*) # We can't have osname yet.
if test -f "/system/gnu_library/bin/ar.pm"; then # Stratus VOS
# Assume that gmake, if found, is definitely GNU make
# and prefer it over the system make.
echo "Substituting gmake for make."
make=$gmake
_make=$_gmake
fi
;;
esac
@end
case "$test" in
test)
echo "Hopefully test is built into
 your sh."
;;
*)
if `sh -c "PATH= test true" >/dev/null 2>&1`; then
echo "Using the test built into your sh."
?X:
?X: We need to set both test and _test, since Oldconfig.U will use the _test
?X: value to systematically restore computed paths, which may be wrong if
?X: we choose to load an old config.sh generated on another platform.
?X:
test=test
_test=test
fi
;;
esac
?LINT:change n c
case "$echo" in
echo)
echo "Hopefully echo is built into your sh."
;;
?X: For those rare cases where we don't need $echo...
") ;;
*)
```

```
echo " "
echo "Checking compatibility between $echo and builtin echo (if any)..." >&4
$echo $n "hi there$c" >foo1
echo $n "hi there$c" >foo2
if cmp foo1 foo2 >/dev/null 2>&1; then
echo "They are compatible.  In fact, they may be identical."
else
case "$n" in
'-n') n='' c='\c';;
*) n='-n' c='';;
esac
cat <<FOO
They are not compatible!  You are probably running ksh on a non-USG system.
I'll have to use $echo instead of the builtin, since Bourne shell doesn't
have echo built
 in and we may have to run some Bourne shell scripts.  That
means I'll have to use '$n$c' to suppress newlines now.  Life is ridiculous.

FOO
$echo $n "The star should be here-->$c"
$echo "*"
fi
$rm -f foo1 foo2
;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Loc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Myinit.U,v $
?RCS: Revision 3.0.1.1  1994/10/31  09:47:29  ram
?RCS: patch44: leading comment states this unit comes before option processing
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:07  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
```

?X: If you want to initialize any default values, copy this unit to your
?X: personal U directory and add the assignments to the end. This file
?X: is included after variables are initialized but before any old
?X: config.sh file is read in and before
 any Configure switch processing.
?X:
?MAKE:Myinit: Init
?MAKE: -pick add $@ %<
?LINT: nocomment

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Myinit.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: sitebin.U,v $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: sitebin.U,v $
?RCS:
?MAKE:sitebin sitebinexp installsitebin : Getfile Oldconfig \
 Setprefixvar siteprefix
?MAKE: -pick add $@ %<
?Y:TOP
?D:sitebin="
?S:sitebin:
?S: This variable holds the name of the directory in which the user wants
?S: to put add-on publicly executable files for the package in question. It
?S: is most often a local directory such as /usr/local/bin. Programs using
?S: this variable must be prepared to deal with ~name substitution.
?S: The standard distribution will put nothing
 in this directory.
?S: After perl has been installed, users may install their own local
?S: executables in this directory with
?S: MakeMaker Makefile.PL
?S: or equivalent. See INSTALL for details.
?S:.
?D:sitebinexp="
?S:sitebinexp:
?S: This is the same as the sitebin variable, but is filename expanded at
?S: configuration time, for use in your makefiles.
?S:.

```
?D:installsitebin="
?S:installsitebin:
?S: This variable is usually the same as sitebinexp, unless you are on
?S: a system running AFS, in which case they may differ slightly. You
?S: should always use this variable within your makefiles for portability.
?S:.
?LINT:change prefixvar
?LINT:set installsitebin
?LINT:set sitebin
?LINT:set sitebinexp
: determine where add-on public executables go
case "$sitebin" in
") dflt=$siteprefix/bin ;;
*) dflt=$sitebin ;;
esac
fn=d~
rp='Pathname where the add-on public executables should be installed?'
. ./getfile
prefixvar=sitebin
. ./setprefixvar

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/sitebin.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Whoa.U,v 3.0.1.2 1997/02/28 15:21:21 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Whoa.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  15:21:21  ram
?RCS: patch61: whoa script now starts with leading "startsh"
?RCS:
?RCS: Revision 3.0.1.1  1994/10/29  16:02:01  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:19  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a bit of shell code that must be dotted in in order
?X: to warn the user in case a change into a variable
```

```
 is noticed.
?X:
?X: To use this unit, $was must hold the old value that has changed. Upon
?X: exit, the two variables $td and $tu are set to the correct value for
?X: respectively defining or undefining a variable. For instance, if $vas was
?X: $undef, but now $var is $define, after calling . whoa, you should use
?X: eval "$var=\$tu" to finally set $var to the correct value. See unit Inlibc.
?X:
?MAKE:Whoa: Myread startsh hint
?MAKE: -pick add $@ %<
?F:./whoa
?T:var was td tu hintfile
: set up the script used to warn in case of inconsistency
cat <<EOS >whoa
$startsh
EOS
cat <<'EOSC' >>whoa
dflt=y
case "$hint" in
   recommended)
 case "$hintfile" in
 ") echo "The $hint value for \$$var on this machine was \"$was\"!" >&4
  ;;
 *) echo "Hmm.  Based on the hints in hints/$hintfile.sh, " >&4
  echo "the $hint value for \$$var on this machine was \"$was\"!" >&4
  ;;
 esac
 ;;
   *) echo " "
 echo "*** WHOA THERE!!! ***" >&4
 echo "    The $hint value for \$$var on this machine was
 \"$was\"!" >&4
 ;;
esac
rp="    Keep the $hint value?"
. ./myread
case "$ans" in
y) td=$was; tu=$was;;
esac
EOSC

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Whoa.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: lex.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
```

```
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Orginal Author: Graham Stoney <greyham@research.canon.oz.au>
?RCS:
?RCS: $Log: lex.U,v $
?RCS: Revision 3.0.1.3  1994/10/29  16:22:50  ram
?RCS: patch36: spurious single quote could cause Configure to crash
?RCS: patch36: (reported by Xavier Le Vourch <xavierl@eiffel.com>.)
?RCS:
?RCS: Revision 3.0.1.2  1994/08/29  16:27:09  ram
?RCS: patch32: added lexflags variable for lex flags setting
?RCS:
?RCS: Revision 3.0.1.1  1994/05/06  15:06:01  ram
?RCS: patch23: added
 trailing blank line for metalint
?RCS:
?RCS: Revision 3.0  1993/08/18  12:08:55  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:lex lexflags: Guess Myread Oldconfig flex test
?MAKE: -pick add $@ %<
?S:lex:
?S: This variable holds the name of the lexical analyser generator we
?S: want to use in the Makefile. It can be lex or flex.
?S:.
?S:lexflags:
?S: This variable holds any flags that should be passed to the lexical
?S: analyzer.  It is up to the Makefile to use it.
?S:.
: determine lexical analyser generator
case "$lex" in
")
 dflt=lex;;
*)
 dflt="$lex";;
esac
echo " "
if $test -f "$flex"; then
 rp='Which lexical analyser generator (lex or flex) shall I use?'
else
 rp='Which lexical analyser generator shall I use?'
fi
. ./myread
```

```
lex="$ans"

@if lexflags
: if using lex this will normally be useless, but flex frequently takes args
echo " "
case "$lexflags" in
'') dflt='none';;
*) dflt="$lexflags";;
esac
rp="What flags should be given to $lex?"
. ./myread
case "$ans"
 in
none) lexflags='';;
*) lexflags="$ans";;
esac

@end

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/lex.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Extractall.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  15:00:43  ram
?RCS: patch61: created
?RCS:
?X:
?X: If extraction has been requested, load the configuration file, perform
?X: the extraction and exit.
?X:
?X: This unit was originally a part of Options.U. It had to be removed from
?X: it to prevent a dependency cycle: Extract -> src -> Options -> Extract
?X: The Begin.U unit now requires us before beginning to do anything
?X: interesting, to ensure proper semantics. -- RAM, 15/03/96
?X:
?MAKE:Extractall:
```

```
 Extract Options
?MAKE: -pick wipe $@ %<
: extract files and exit if asked to do so
case "$extractsh" in
true)
?X: Undo the forced silent=true when -S was supplied, by probing realsilent
?X: which was set iff -s was also given. See Options.U for details.
 case "$realsilent" in
 true) ;;
 *) exec 1>&4;;
 esac
 case "$config_sh" in
 '') config_sh='config.sh';;
 esac
 echo " "
 echo "Fetching answers from $config_sh..."
 cd ..
 . $config_sh
 test "$override" && . ./optdef.sh
 echo " "
?X: extract has to be run from the top directory, not within UU.
 . UU/extract
 rm -rf UU
 echo "Extraction done."
 exit 0
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Extractall.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Csym.U,v $
?RCS: Revision 3.0.1.4  1995/07/25  13:36:29  ram
?RCS: patch56: re-arranged compile line to include ldflags before objects
?RCS: patch56: added quotes for OS/2 support
?RCS:
?RCS: Revision 3.0.1.3  1995/05/12  12:00:33  ram
```

```
?RCS: patch54: fixed C test program to bypass gcc builtin type checks (ADO)
?RCS:
?RCS: Revision 3.0.1.2  1994/10/31  09:34:13  ram
?RCS: patch44: added Options to the MAKE line since it's no longer in Init.U
?RCS:
?RCS: Revision 3.0.1.1  1993/08/25  14:00:05  ram
?RCS:
 patch6: added ldflags as a conditional dependency and to compile line
?RCS: patch6: a final double quote was missing in csym variable after eval
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:50  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:Csym: Options contains libc libs runnm +cc +ccflags +ldflags rm
?MAKE: -pick add $@ %<
?LINT:define csym
?LINT:use libc
?S:csym:
?S: This shell variable is used internally by Configure to check
?S: wether a given C symbol is defined or not. A typical use is:
?S:  set symbol result [-fva] [previous]
?S:  eval $csym
?S: That will set result to 'true' if the function [-f], variable [-v]
?S: or array [-a] is defined, 'false' otherwise. If a previous value is
?S: given and the -r flag was provided on the command line, that value
?S: is reused without questioning.
?S:.
?V:csym
?T:tval tx tlook tf tdc tc
: is a C symbol defined?
csym='tlook=$1;
case "$3" in
-v) tf=libc.tmp; tc=""; tdc="";;
-a) tf=libc.tmp; tc="[0]"; tdc="[]";;
*) tlook="^$1\$";
 tf=libc.list; tc=""; tdc="()";;
esac;
tx=yes;
case "$reuseval-$4" in
true-) ;;
true-*) tx=no; eval "tval=\$$4"; case "$tval" in "") tx=yes;; esac;;
esac;
case "$tx" in
yes)
 case "$runnm" in
 true)
  if $contains $tlook $tf >/dev/null 2>&1;
  then tval=true;
```

```
 else tval=false;
 fi;;
*)
?X:
?X: We use 'char' instead of 'int' to try to circumvent overzealous
?X: optimizing compilers using built-in prototypes for commonly used
?X: routines to complain when seeing a different external declaration. For
?X: instance, gcc 2.6.3 fails if we use 'int' and we attempt a test against
?X: memcpy() on machines where sizeof(int) == sizeof(char *) (the usual return
?X: type), the compiler assuming it's a built-in declaration given that the
?X: returned size matches. At least with 'char' we are safe! -- RAM, for ADO
?X:
?X: Let's thank GNU cc for making our lifes so easy! :-)
?X: (An alternative for the future would be to use our knowledge about gcc
?X: to force a -fno-builtin option in the
 compile test, in case the 'char'
?X: trick is obsoleted by future gcc releases). -- RAM
?X:
?X: Lastly, gcc 3.4 otimizes &missing == 0 away, so we use + 2 instead now.
?X: The GNU folks like to do weird things, don't they? -- RAM, 2004-06-05
?X:
 echo "extern char $1$tdc; int main() { return &$1$tc + 2; }" > t.c;
 if $cc $ccflags $ldflags -o t t.c $libs >/dev/null 2>&1;
 then tval=true;
 else tval=false;
 fi;
 $rm -f t t.c;;
esac;;
*)
case "$tval" in
$define) tval=true;;
*) tval=false;;
esac;;
esac;
eval "$2=$tval"'
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Csym.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Mkdirp.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
```

```
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Extract.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  14:58:52  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0.1.1  1994/10/29  15:51:46  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:52  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a shell script which can launched to create a
?X: directory path like "mkdir -p" would do.
?X:
?MAKE:Mkdirp:
 eunicefix startsh
?MAKE: -pick add $@ %<
?F:./mkdirp
?T:name create file
: script used to emulate mkdir -p
cat >mkdirp <<EOS
$startsh
EOS
cat >>mkdirp <<'EOS'
name=$1;
create="";
while test $name; do
 if test ! -d "$name"; then
  create="$name $create"
  name=`echo $name | sed -e "s|^[^/]*$||"`
  name=`echo $name | sed -e "s|\(.*\)/.*|\1|"`
 else
  name=""
 fi
done
for file in $create; do
 mkdir $file
done
EOS
chmod +x mkdirp
$eunicefix mkdirp
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Mkdirp.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Chk_MANI.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Chk_MANI.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  14:57:25  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0.1.1  1994/10/31  09:33:14  ram
?RCS: patch44: now lists Begin instead of Myinit in its dependencies
?RCS: patch44: leading comment now explains how this unit is included
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:45  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit checks the package by making sure
 every file listed in MANIFEST
?X: is present. It is systematically "included" via the Finish unit (which
?X: is always present in every Configure script), although it may result in
?X: an empty inclusion when no MANIFEST is present.
?X:
?MAKE:Chk_MANI: Begin c n rsrc
?MAKE: -pick wipe $@ %<
?T:filelist ans tmppwd
?X: This check happens at metaconfig-time, so it's ok to hard-code the path.
@if {test -f ../MANIFEST}
: Now test for existence of everything in MANIFEST
echo " "
if test -f "$rsrc/MANIFEST"; then
 echo "First let's make sure your kit is complete.  Checking..." >&4
?X:
?X: Files spelled uppercased and beginning with PACK are produced by the
?X: shell archive builder and may be removed by the user. Usually, they are
?X: not listed in the MANIFEST file, but you never know...
?X:
?X: "split -l" is the new way of running a split, but we also try the older way
?X:
 awk '$1 !~ /PACK[A-Z]+/ {print $1}' "$rsrc/MANIFEST" | \
  (split -l 50 2>/dev/null || split -50)
 rm -f missing
 tmppwd=`pwd`
```

```
 for
 filelist in x??; do
  (cd "$rsrc"; ls `cat "$tmppwd/$filelist"` \
   >/dev/null 2>>"$tmppwd/missing")
 done
 if test -s missing; then
  cat missing >&4
  cat >&4 <<'EOM'

THIS PACKAGE SEEMS TO BE INCOMPLETE.

You have the option of continuing the configuration process, despite the
distinct possibility that your kit is damaged, by typing 'y'es.  If you
do, don't blame me if something goes wrong.  I advise you to type 'n'o
and contact the author (<MAINTLOC>).

EOM
?X: Can't use $echo at this early stage
  echo $n "Continue? [n] $c" >&4
  read ans
  case "$ans" in
  y*)
    echo "Continuing..." >&4
    rm -f missing
    ;;
  *)
?X:
?X: Use kill and not exit, so that the trap gets executed to clean up
?X:
    echo "ABORTING..." >&4
    kill $$
    ;;
  esac
 else
  echo "Looks good..."
 fi
else
 echo "There is no MANIFEST file.  I hope your kit is complete !"
fi
rm -f missing x??

@end

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Chk_MANI.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: so.U 1 2006-08-24 12:32:52Z rmanfredi $
```

```
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: so.U,v $
?RCS: Revision 3.0.1.2  1994/10/29  16:30:04  ram
?RCS: patch36: now tells user how he can suppress shared lib lookup (ADO)
?RCS: patch36: removed echo at the top, since it's now in the here-doc (ADO)
?RCS:
?RCS: Revision 3.0.1.1  1994/06/20  07:07:02  ram
?RCS: patch30: created
?RCS:
?X:
?X: This unit computes the shared-object / shared-lib extension
?X:
?MAKE:so d_libname_unique: test libpth Loc Myread Oldconfig cat Setvar
?MAKE: -pick add $@ %<
?S:so:
?S: This
 variable holds the extension used to identify shared libraries
?S: (also known as shared objects) on the system. Usually set to 'so'.
?S:.
?S:d_libname_unique:
?S: This variable is defined if the target system insists on unique
?S: basenames for shared library files. This is currently true on Android,
?S: false everywhere else we know of.
?S: Defaults to 'undef'.
?S:.
?LINT:set d_libname_unique
?T: xxx
: compute shared library extension
case "$so" in
")
 if xxx=`./loc libc.sl X $libpth`; $test -f "$xxx"; then
  dflt='sl'
 else
  dflt='so'
 fi
 ;;
*) dflt="$so";;
esac
$cat <<EOM
```

```
On some systems, shared libraries may be available.  Answer 'none' if
you want to suppress searching of shared libraries for the remainder
of this configuration.

EOM
rp='What is the file extension used for shared libraries?'
. ./myread
so="$ans"

: Does target system insist that shared library basenames are unique
$cat << EOM

Some dynamic loaders assume that the *basename* of shared library
 filenames
are globally unique.  We'll default this to undef as we assume your system
is not this weird. Set to defined if you're on one of them.

EOM

dflt='n'
rp='Make shared library basenames unique?'
. ./myread
case "$ans" in
y|Y) val="$define" ;;
*)   val="$undef"  ;;
esac
set d_libname_unique
eval $setvar

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/so.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: installprefix.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
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?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: Original Author: Andy Dougherty <doughera@lafcol.lafayette.edu>
?RCS:
?RCS: $Log: installprefix.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
```

```
?RCS:
?RCS:
?MAKE:installprefix installprefixexp: Getfile Loc \
 Oldconfig afs cat package prefix
?MAKE: -pick add $@ %<
?S:installprefix:
?S: This variable holds the name of the directory below which
?S: "make install" will install the package.  For most users, this
?S: is the same
 as prefix.  However, it is useful for
?S: installing the software into a different (usually temporary)
?S: location after which it can be bundled up and moved somehow
?S: to the final location specified by prefix.
?S:.
?S:installprefixexp:
?S: This variable holds the full absolute path of installprefix
?S: with all ~-expansion done.
?S:.
: determine installation prefix for where package is to be installed.
if $afs; then
$cat <<EOM

Since you are running AFS, I need to distinguish the directory in which
files will reside from the directory in which they are installed (and from
which they are presumably copied to the former directory by occult means).

EOM
 case "$installprefix" in
 '') dflt=`echo $prefix | sed 's#^/afs/#/afs/.#'`;;
 *) dflt="$installprefix";;
 esac
else
$cat <<EOM

In some special cases, particularly when building $package for distribution,
it is convenient to distinguish the directory in which files should be
installed from the directory ($prefix) in which they will
eventually
 reside.  For most users, these two directories are the same.

EOM
 case "$installprefix" in
 '') dflt=$prefix ;;
 *) dflt=$installprefix;;
 esac
fi
fn=d~
rp='What installation prefix should I use for installing files?'
```

```
. ./getfile
installprefix="$ans"
installprefixexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/installprefix.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: as specified in the README file that comes with the distribution.
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Andy Dougherty <doughera@lafcol.lafayette.edu>
?RCS:
?RCS: $Log: lns.U,v $
?RCS: Revision 3.0.1.1  1994/06/20  07:05:52  ram
?RCS: patch30: created by ADO
?RCS:
?X:
?X: This unit checks whether symbolic links are really supported.
?X: We can't rely on d_symlink because that may be listed in the
?X: C library but unimplemented.
?X:
?MAKE:lns: ln rm touch test
?MAKE: -pick add $@ %<
?S:lns:
?S: This variable holds the name of the command to make
?S: symbolic links (if they are supported).
  It can be used
?S: in the Makefile. It is either 'ln -s' or 'ln'
?S:.
: determine whether symbolic links are supported
echo " "
$rm -f blurfl sym
$touch blurfl
if $ln -s blurfl sym > /dev/null 2>&1 && $test -f sym; then
 echo "Symbolic links are supported." >&4
 lns="$ln -s"
else
 echo "Symbolic links are NOT supported." >&4
 lns="$ln"
fi
```

```
$rm -f blurfl sym

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/lns.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: cf_email.U,v $
?RCS: Revision 3.0.1.1  1994/01/24  14:05:06  ram
?RCS: patch16: created
?RCS:
?RCS:
?MAKE:cf_email: cat cf_by test myhostname mydomain Oldconfig Myread
?MAKE: -pick add $@ %<
?S:cf_email:
?S: Electronic mail address of the person who ran Configure. This can be
?S: used by units that require the user's e-mail, like MailList.U.
?S:.
?T:cont maildomain
?LINT:extern MAILDOMAIN
: determine the e-mail address of the user who is running us
$cat <<EOM

I need to get your e-mail address
 in Internet format if possible, i.e.
something like user@host.domain. Please answer accurately since I have
no easy means to double check it. The default value provided below
is most probably close to reality but may not be valid from outside
your organization...

EOM
cont=x
while test "$cont"; do
 case "$MAILDOMAIN" in
 '')
  if $test -s /etc/mailname; then
   maildomain=`$cat /etc/mailname`
  else
   maildomain="$myhostname$mydomain"
```

```
 fi
 ;;
*)  maildomain="$MAILDOMAIN";;
esac
case "$cf_email" in
") dflt="$cf_by@$maildomain";;
*)  dflt="$cf_email";;
esac
rp='What is your e-mail address?'
. ./myread
cf_email="$ans"
case "$cf_email" in
*@*.*) cont=" ;;
*)
 rp='Address does not look like an Internet one.  Use it anyway?'
 case "$fastread" in
 yes) dflt=y ;;
 *) dflt=n ;;
 esac
 . ./myread
 case "$ans" in
 y*) cont=" ;;
 *) echo " " ;;
 esac
 ;;
esac
done
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/cf_email.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
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?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: usenm.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:26:40  ram
?RCS: patch61: don't use nm with the GNU C library
?RCS: patch61: added support for Linux shared libs
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:57  ram
```

```
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:usenm runnm nm_opt nm_so_opt: cat test Myread Oldconfig grep \
 d_gnulibc nm egrep rsrc osname Guess
?MAKE: -pick add $@ %<
?S:usenm:
?S: This variable contains 'true' or 'false' depending whether the
?S: nm extraction is wanted
 or not.
?S:.
?S:runnm:
?S: This variable contains 'true' or 'false' depending whether the
?S: nm extraction should be performed or not, according to the value
?S: of usenm and the flags on the Configure command line.
?S:.
?S:nm_opt:
?S: This variable holds the options that may be necessary for nm.
?S:.
?S:nm_so_opt:
?S: This variable holds the options that may be necessary for nm
?S: to work on a shared library but that can not be used on an
?S: archive library.  Currently, this is only used by Linux, where
?S: nm --dynamic is *required* to get symbols from an ELF library which
?S: has been stripped, but nm --dynamic is *fatal* on an archive library.
?S: Maybe Linux should just always set usenm=false.
?S:.
: see if nm is to be used to determine whether a symbol is defined or not
?X: If there is enough inquiries, it might be worth to wait for the nm
?X: extraction. Otherwise, the C compilations might be a better deal.
?X:
?X: Don't bother if we're using GNU libc -- skimo
case "$usenm"
 in
")
 dflt="
 case "$d_gnulibc" in
 "$define")
  echo " "
  echo "$nm probably won't work on the GNU C Library." >&4
  dflt=n
  ;;
 esac
 case "$dflt" in
 ")
  if $test "$osname" = aix -a ! -f /lib/syscalls.exp; then
   echo " "
   echo "Whoops!  This is an AIX system without /lib/syscalls.exp!" >&4
   echo "'nm' won't be sufficient on this system." >&4
```

```
  dflt=n
 fi
 ;;
esac
case "$dflt" in
")
 if ./gnu; then
  echo " "
  echo "Hmm...  A GNU system without a GNU C Library?  Weird..." >&4
  dflt=n
 else
  dflt=`$egrep 'inlibc|csym' $rsrc/Configure | wc -l 2>/dev/null`
  if $test $dflt -gt 20; then
   dflt=y
  else
   dflt=n
  fi
 fi
 ;;
esac
;;
*)
case "$usenm" in
true|$define) dflt=y;;
*) dflt=n;;
esac
;;
esac
$cat <<EOM

I can use $nm to extract the symbols from your C libraries. This
is a time consuming task which may generate huge output on the disk (up
to 3 megabytes) but that should make the symbols extraction faster. The
alternative is to skip the
 'nm' extraction part and to compile a small
test program instead to determine whether each symbol is present. If
you have a fast C compiler and/or if your 'nm' output cannot be parsed,
this may be the best solution.

EOM
rp='Shall I use nm to extract C symbols from the libraries?'
. ./myread
case "$ans" in
[Nn]*) usenm=false;;
*) usenm=true;;
esac

?X: Name extraction is to be run if 'nm' usage is wanted and if no -r flag
```

```
?X: was provided to configure (in which case we simply re-use the previous
?X: values).
runnm=$usenm
case "$reuseval" in
true) runnm=false;;
esac

: nm options which may be necessary
case "$nm_opt" in
'') if $test -f /mach_boot; then
  nm_opt=''  # Mach
 elif $test -d /usr/ccs/lib; then
  nm_opt='-p'  # Solaris (and SunOS?)
 elif $test -f /dgux; then
  nm_opt='-p'  # DG-UX
 elif $test -f /lib64/rld; then
  nm_opt='-p'  # 64-bit Irix
 else
  nm_opt=''
 fi;;
esac

?X: nm options which may be necessary for shared libraries but illegal
?X: for archive libraries.  Thank you,
 Linux.
case "$nm_so_opt" in
'') case "$osname" in
 *linux*)
  if $nm --help | $grep 'dynamic' > /dev/null 2>&1; then
   nm_so_opt='--dynamic'
  fi
  ;;
 esac
 ;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/usenm.U
No license file was found, but licenses were detected in source scan.

# $Id: errnolist.a,v 3.0 1993/08/18 12:04:35 ram Exp ram $
#
#  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
#
#  You may redistribute only under the terms of the Artistic Licence,
#  as specified in the README file that comes with the distribution.
#  You may reuse parts of this distribution only within the terms of
#  that same Artistic Licence; a copy of which may be found at the root
```

```
#  of the source tree for dist 4.0.
#
# Original Author: Harlan Stenn <harlan@mumps.pfcs.com>
#
# $Log: errnolist.a,v $
# Revision 3.0  1993/08/18 12:04:35  ram
# Baseline for dist 3.0 netwide release.
#
#
# This is a simple-minded awk script to generate an initialization for
# sys_errnolist on systems that don't have it.
# This file now depends only on sys/errno.h error numbers under maxerr being
# in order.  It will complain and die if not.  NOTE: It will still produce
# a compilable output file, even with errors, so you must
 check the output.
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/errnolist.a
No license file was found, but licenses were detected in source scan.

```
/*|?:[\\/]*)
if test -f "$xxx"; then
: ok
else
echo "WARNING: no $xxx -- ignoring your setting for $file." >&4
xxx=`./loc $file $file $pth`
fi
;;
") xxx=`./loc $file $file $pth`;;
*) xxx=`./loc $xxx $xxx $pth`;;
esac
eval $file=$xxx$_exe
eval _$file=$xxx
case "$xxx" in
/*)
echo $file is in $xxx.
;;
?X: Under OS/2, we have PC-like paths
?:[\\/]*)
echo $file is in $xxx.
;;
*)
echo "I don't know where '$file' is, and my life depends on it." >&4
echo "Go find a public domain implementation or fix your PATH setting!" >&4
exit 1
;;
esac
done
```

```
echo " "
echo "Don't worry if any of the following aren't found..."
say=offhand
for file in $trylist; do
?X: Allow them to -Dmake=pmake on the command line for instance (see above)
eval xxx=\$$file
case "$xxx" in
/*|?:[\/]*)
if test -f "$xxx"; then
: ok
else
echo "WARNING: no $xxx -- ignoring your setting for $file." >&4
xxx=`./loc $file $file $pth`
fi
;;
") xxx=`./loc $file $file $pth`;;
*)
 xxx=`./loc $xxx $xxx $pth`;;
esac
eval $file=$xxx$_exe
eval _$file=$xxx
case "$xxx" in
/*)
echo $file is in $xxx.
;;
?X: Under OS/2, we have PC-like paths
?:[\/]*)
echo $file is in $xxx.
;;
*)
echo "I don't see $file out there, $say."
say=either
;;
esac
done
case "$egrep" in
egrep)
echo "Substituting grep for egrep."
egrep=$grep
_egrep=$grep
;;
esac
@if less
case "$less" in
") ;;
*) if $less -R </dev/null >/dev/null 2>&1; then
echo "Substituting less -R for less."
less="$less -R"
```

```
_less=$less
fi
;;
esac
@end
@if ln
case "$ln" in
ln)
echo "Substituting cp for ln."
ln=$cp
_ln=$cp
;;
esac
@end
@if make || gmake
case "$make" in
make)
case "$gmake" in
gmake)
echo "I can't find make or gmake, and my life depends on it." >&4
echo "Go find a public domain implementation or fix your PATH setting!" >&4
exit 1
;;
esac
;;
esac
case "$gmake" in
gmake) ;;
*) # We can't have osname yet.
if test -f "/system/gnu_library/bin/ar.pm"; then # Stratus VOS
# Assume that gmake, if found, is definitely
 GNU make
# and prefer it over the system make.
echo "Substituting gmake for make."
make=$gmake
_make=$gmake
fi
;;
esac
@end
case "$test" in
test)
echo "Hopefully test is built into your sh."
;;
*)
if `sh -c "PATH= test true" >/dev/null 2>&1`; then
echo "Using the test built into your sh."
?X:
```

```
?X: We need to set both test and _test, since Oldconfig.U will use the _test
?X: value to systematically restore computed paths, which may be wrong if
?X: we choose to load an old config.sh generated on another platform.
?X:
test=test
_test=test
fi
;;
esac
?LINT:change n c
case "$echo" in
echo)
echo "Hopefully echo is built into your sh."
;;
?X: For those rare cases where we don't need $echo...
") ;;
*)
echo " "
echo "Checking compatibility between $echo and builtin echo (if any)..." >&4
$echo $n "hi there$c" >foo1
echo $n "hi there$c" >foo2
if cmp foo1 foo2 >/dev/null 2>&1; then
echo "They are compatible.  In fact, they may be identical."
else
case "$n" in
'-n') n='' c='\c';;
*) n='-n' c='';;
esac
cat
 <<FOO
They are not compatible!  You are probably running ksh on a non-USG system.
I'll have to use $echo instead of the builtin, since Bourne shell doesn't
have echo built in and we may have to run some Bourne shell scripts.  That
means I'll have to use '$n$c' to suppress newlines now.  Life is ridiculous.

FOO
$echo $n "The star should be here-->$c"
$echo "*"
fi
$rm -f foo1 foo2
;;
esac

?X: The next part is irrelevant to the real process
# This question was auctioned at YAPC::Europe-2007 in Vienna
# I never promised you could answer it. I only auctioned the question.
cat <<FOO
The following message is sponsored by
```

Dresden.pm<--The stars should be here.

Dear Perl user, system administrator or package
maintainer, the Perl community sends greetings to
you. Do you (emblematical) greet back [Y/n]? n

FOO

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Loc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Setvar.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Setvar.U,v $
?RCS: Revision 3.0.1.1 1994/10/29 15:58:28 ram
?RCS: patch36: call ./whoa explicitly instead of relying on PATH
?RCS:
?RCS: Revision 3.0 1993/08/18 12:05:16 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a variable that is intended to be eval'ed in
?X: order to define/undefine a symbol. A consistency check is made
?X: regarding any previous value and a warning is issued if there
?X: is any discrepancy.
?X:
?X:
 To use it, say:
?X: val=<value>
?X: set d_variable
?X: eval $setvar
?X:
?MAKE:Setvar: Whoa
?MAKE: -pick add $@ %<
?LINT:define setvar
?S:setvar:
?S: This shell variable is used internally by Configure to set a value
?S: to a given symbol that is defined or not. A typical use is:

?S: val=<value computed>
?S: set d_variable
?S: eval $setvar
?S: That will print a message in case the $val value is not the same
?S: as the previous value of $d_variable.
?S:.
?V:setvar:val
?T:var was td tu
: function used to set '$1' to '$val'
setvar='var=$1; eval "was=\$$1"; td=$define; tu=$undef;
case "$val$was" in
$define$undef) . ./whoa; eval "$var=\$td";;
$undef$define) . ./whoa; eval "$var=\$tu";;
*) eval "$var=$val";;
esac'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Setvar.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: cc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
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?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: cc.U,v $
?RCS: Revision 3.0.1.4 1995/05/12 12:06:47 ram
?RCS: patch54: may now abort Configure when cc does not work
?RCS:
?RCS: Revision 3.0.1.3 1995/01/11 15:20:11 ram
?RCS: patch45: changed gcc checking message to a more explicit one (WED)
?RCS:
?RCS: Revision 3.0.1.2 1994/10/29 16:04:29 ram
?RCS: patch36: detect gcc even when not called as 'gcc' (ADO)
?RCS: patch36: simplified gcc version checking (ADO)
?RCS: patch36: added ?F: line for metalint
 file checking
?RCS:
?RCS: Revision 3.0.1.1 1994/05/06 14:26:06 ram
?RCS: patch23: added support for gcc version (ADO)
?RCS:
?RCS: Revision 3.0 1993/08/18 12:05:30 ram
?RCS: Baseline for dist 3.0 netwide release.

```
?RCS:
?MAKE:cc: Myread Oldconfig Checkcc test
?MAKE: -pick add $@ %<
?S:cc:
?S: This variable holds the name of a command to execute a C compiler which
?S: can resolve multiple global references that happen to have the same
?S: name.  Usual values are 'cc' and 'gcc'.
?S: Fervent ANSI compilers may be called 'c89'.  AIX has xlc.
?S:.
?F:!cc.cbu
?D:cc='cc'
: Determine the C compiler to be used
echo " "
case "$cc" in
") dflt=cc;;
*) dflt="$cc";;
esac
rp="Use which C compiler?"
. ./myread
cc="$ans"

: See whether they have no cc but they do have gcc
. ./trygcc
?X: Look for a hint-file generated 'call-back-unit'.  Now that the
?X: user has specified the compiler, we may need to set or change some
?X: other defaults.
if $test -f cc.cbu; then
   . ./cc.cbu
fi
. ./checkcc

Found
 in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/cc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: nis.U,v 3.0.1.3 1997/02/28 16:17:38 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
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?RCS: as specified in the README file that comes with the distribution.
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: nis.U,v $
?RCS: Revision 3.0.1.3  1997/02/28  16:17:38  ram
```

```
?RCS: patch61: ensure suitable defaults for hostcat and friends
?RCS:
?RCS: Revision 3.0.1.2  1995/03/21  08:48:34  ram
?RCS: patch52: continued fix for NeXT NIS/NetInfo handling
?RCS:
?RCS: Revision 3.0.1.1  1995/02/15  14:16:23  ram
?RCS: patch51: now correctly handles NeXT using NIS rather than NetInfo
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:24  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:passcat
 groupcat hostcat: Myread Oldconfig test contains
?MAKE: -pick add $@ %<
?S:passcat:
?S: This variable contains a command that produces the text of the
?S: /etc/passwd file.  This is normally "cat /etc/passwd", but can be
?S: "ypcat passwd" when NIS is used.
?S: On some systems, such as os390, there may be no equivalent
?S: command, in which case this variable is unset.
?S:.
?S:groupcat:
?S: This variable contains a command that produces the text of the
?S: /etc/group file.  This is normally "cat /etc/group", but can be
?S: "ypcat group" when NIS is used.
?S: On some systems, such as os390, there may be no equivalent
?S: command, in which case this variable is unset.
?S:.
?S:hostcat:
?S: This variable contains a command that produces the text of the
?S: /etc/hosts file.  This is normally "cat /etc/hosts", but can be
?S: "ypcat hosts" when NIS is used.
?S: On some systems, such as os390, there may be no equivalent
?S: command, in which case this variable is unset.
?S:.
:
 see if we have to deal with yellow pages, now NIS.
?X: NeXT gives us some fun here, as always, by having both NIS (former YP)
?X: and NetInfo. But since it has both, it's ok to put the test inside the if.
?X: Contributed by Thomas Neumann <tom@smart.bo.open.de>.
if $test -d /usr/etc/yp || $test -d /etc/yp || $test -d /usr/lib/yp; then
@if passcat || groupcat
 case "$passcat" in
 nidump*) ;;
 *)
  case "$passcat" in
  *ypcat*) dflt=y;;
  ") if $contains '^\+' /etc/passwd >/dev/null 2>&1; then
```

```
   dflt=y
  else
   dflt=n
  fi;;
 *) dflt=n;;
 esac
 echo " "
 rp='Are you getting the passwd file via yellow pages?'
 . ./myread
 case "$ans" in
 y*) passcat='ypcat passwd'
@if groupcat
   echo "(Assuming /etc/group is also distributed.)"
   groupcat='ypcat group'
@end
   ;;
 *) passcat='cat /etc/passwd'
@if groupcat
   echo "(Assuming /etc/group is also local.)"
   groupcat='cat /etc/group'
@end
   ;;
 esac
 ;;
esac
@end
@if hostcat
 case "$hostcat" in
 nidump*) ;;
 *)
  case
 "$hostcat" in
  *ypcat*) dflt=y;;
  ") if $contains '^\+' /etc/passwd >/dev/null 2>&1; then
    dflt=y
   else
    dflt=n
   fi;;
  *) dflt=n;;
  esac
  echo " "
  rp='Are you getting the hosts file via yellow pages?'
  . ./myread
  case "$ans" in
  y*) hostcat='ypcat hosts';;
  *) hostcat='cat /etc/hosts';;
  esac
  ;;
```

```
 esac
@end
fi
?X: Ensure suitable default -- Manoj Srivastava
case "$hostcat" in
") test -f /etc/hosts && hostcat='cat /etc/hosts';;
esac
case "$groupcat" in
") test -f /etc/group && groupcat='cat /etc/group';;
esac
case "$passcat" in
") test -f /etc/passwd && passcat='cat /etc/passwd';;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/nis.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: sysman.U,v 3.0.1.2 1994/06/20 07:08:43 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
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?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: sysman.U,v $
?RCS: Revision 3.0.1.2  1994/06/20  07:08:43  ram
?RCS: patch30: now explicitly states that /usr/man/man1 is the default
?RCS: patch30: added /usr/local/man/man1 to the search list
?RCS:
?RCS: Revision 3.0.1.1  1993/09/13  16:13:50  ram
?RCS: patch10: added support for /local/man/man1 (WAD)
?RCS: patch10: added temporary syspath variable to cut down on line length
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:55  ram
?RCS: Baseline for dist 3.0 netwide
 release.
?RCS:
?MAKE:sysman: test Loc Oldconfig
?MAKE: -pick add $@ %<
?S:sysman:
?S: This variable holds the place where the manual is located on this
?S: system. It is not the place where the user wants to put his manual
?S: pages. Rather it is the place where Configure may look to find manual
?S: for unix commands (section 1 of the manual usually). See mansrc.
```

```
?S:.
?T:syspath
: determine where manual pages are on this system
echo " "
case "$sysman" in
")
 syspath='/usr/share/man/man1 /usr/man/man1'
 syspath="$syspath /usr/man/mann /usr/man/manl /usr/man/local/man1"
 syspath="$syspath /usr/man/u_man/man1"
 syspath="$syspath /usr/catman/u_man/man1 /usr/man/l_man/man1"
 syspath="$syspath /usr/local/man/u_man/man1 /usr/local/man/l_man/man1"
 syspath="$syspath /usr/man/man.L /local/man/man1 /usr/local/man/man1"
 sysman=`./loc . /usr/man/man1 $syspath`
 ;;
esac
if $test -d "$sysman"; then
 echo "System manual is in $sysman." >&4
else
 echo "Could not find manual pages in source form."
 >&4
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/sysman.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libpth.U,v $
?RCS: Revision 3.0.1.6  1997/02/28  16:08:49  ram
?RCS: patch61: new loclibpth variable
?RCS:
?RCS: Revision 3.0.1.5  1995/01/11  15:31:30  ram
?RCS: patch45: call ./mips instead of just mips (WED)
?RCS:
?RCS: Revision 3.0.1.4  1994/08/29  16:29:15  ram
?RCS: patch32: added /lib/pa1.1 for HP-UX specially tuned PA-RISC libs (ADO)
?RCS: patch32: fixed information message, making it clearer (ADO)
?RCS:
?RCS: Revision 3.0.1.3  1994/06/20  07:03:54  ram
```

?RCS: patch30: added /usr/shlib to
 glibpth for shared-only libraries
?RCS:
?RCS: Revision 3.0.1.2 1994/05/13 15:26:57 ram
?RCS: patch27: fixed a typo (libpth -> glibpth)
?RCS:
?RCS: Revision 3.0.1.1 1994/05/06 15:07:53 ram
?RCS: patch23: now asks for library directories to be searched (ADO)
?RCS:
?RCS: Revision 3.0 1993/08/18 12:09:02 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit initializes the path for C library lookup.
?X:
?MAKE:libpth glibpth xlibpth plibpth loclibpth: \
 usrinc incpath test cat Myread Oldconfig
?MAKE: -pick add $@ %<
?S:libpth:
?S: This variable holds the general path (space-separated) used to find
?S: libraries. It is intended to be used by other units.
?S:.
?S:glibpth:
?S: This variable holds the general path (space-separated) used to
?S: find libraries. It may contain directories that do not exist on
?S: this platform, libpth is the cleaned-up version.
?S:.
?S:xlibpth:
?S: This variable holds extra path (space-separated) used to find
?S: libraries on this platform,
 for example CPU-specific libraries
?S: (on multi-CPU platforms) may be listed here.
?S:.
?S:loclibpth:
?S: This variable holds the paths (space-separated) used to find local
?S: libraries. It is prepended to libpth, and is intended to be easily
?S: set from the command line.
?S:.
?S:plibpth:
?S: Holds the private path used by Configure to find out the libraries.
?S: Its value is prepend to libpth. This variable takes care of special
?S: machines, like the mips. Usually, it should be empty.
?S:.
?T: xxx dlist
?LINT:use usrinc
?INIT:: change the next line if compiling for Xenix/286 on Xenix/386
?INIT:xlibpth='/usr/lib/386 /lib/386'
?INIT:: Possible local library directories to search.

```
?INIT:loclibpth="/usr/local/lib /opt/local/lib /usr/gnu/lib"
?INIT:loclibpth="$loclibpth /opt/gnu/lib /usr/GNU/lib /opt/GNU/lib"
?INIT:
?INIT:: general looking path for locating libraries
?INIT:glibpth="/lib /usr/lib $xlibpth"
?INIT:glibpth="$glibpth /usr/ccs/lib /usr/ucblib /usr/local/lib"
?X: /shlib
 is for Digital Unix 4.0
?X: /usr/shlib is for OSF/1 systems.
?INIT:test -f /usr/shlib/libc.so && glibpth="/usr/shlib $glibpth"
?INIT:test -f /shlib/libc.so     && glibpth="/shlib $glibpth"
?INIT:
?INIT:: Private path used by Configure to find libraries.  Its value
?INIT:: is prepended to libpth. This variable takes care of special
?INIT:: machines, like the mips.  Usually, it should be empty.
?INIT:plibpth="
?INIT:
: Set private lib path
case "$plibpth" in
") if ./mips; then
?X: on mips, we DO NOT want /lib, and we want $incpath/usr/lib
  plibpth="$incpath/usr/lib /usr/local/lib /usr/ccs/lib"
 fi;;
esac
case "$libpth" in
' ') dlist=";;
") dlist="$loclibpth $plibpth $glibpth";;
*) dlist="$libpth";;
esac

: Now check and see which directories actually exist, avoiding duplicates
libpth="
for xxx in $dlist
do
   if $test -d $xxx; then
  case " $libpth " in
  *" $xxx "*) ;;
  *) libpth="$libpth $xxx";;
  esac
   fi
done
$cat <<'EOM'

Some systems have incompatible or broken versions
 of libraries.  Among
the directories listed in the question below, please remove any you
know not to be holding relevant libraries, and add any that are needed.
Say "none" for none.
```

```
EOM
case "$libpth" in
'') dflt='none';;
*)
?X: strip leading space
 set X $libpth
 shift
 dflt=${1+"$@"}
 ;;
esac
rp="Directories to use for library searches?"
. ./myread
case "$ans" in
none) libpth=' ';;
*) libpth="$ans";;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libpth.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: maildir.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: maildir.U,v $
?RCS: Revision 3.0.1.1  1993/12/15  08:21:56  ram
?RCS: patch15: now also looks under /var/mail for BSD/386
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:09  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:maildir maildirexp: Getfile Loc Oldconfig
?MAKE: -pick add $@ %<
?S:maildir:
?S: This variable contains the name of the directory in which mail is
?S: spooled. Programs using this variable must be prepared to deal with
?S: ~name
 substitutions.
?S:.
?S:maildirexp:
```

```
?S: This is the same as the maildir variable, but is filename expanded
?S: at configuration time, for programs not willing to deal with it at
?S: run-time.
?S:.
: determine where mail is spooled
case "$maildir" in
") dflt=`./loc . /usr/spool/mail /usr/spool/mail /usr/mail /var/mail`;;
*) dflt="$maildir";;
esac
echo " "
fn=d~
rp='Where is yet-to-be-read mail spooled?'
. ./getfile
maildir="$ans"
maildirexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/maildir.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: yacc.U,v 3.0.1.1 1994/05/13 15:28:48 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: yacc.U,v $
?RCS: Revision 3.0.1.1  1994/05/13  15:28:48  ram
?RCS: patch27: added byacc as another alternative (ADO)
?RCS:
?RCS: Revision 3.0  1993/08/18  12:10:03  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:yacc yaccflags: Guess Myread Oldconfig byacc bison cat test _exe
?MAKE: -pick add $@ %<
?S:yacc:
?S: This variable holds the name of the compiler compiler we
?S: want to use in the Makefile. It can be yacc, byacc, or bison -y.
?S:.
?S:yaccflags:
?S: This
 variable contains any additional yacc flags desired by the
?S: user.  It is up to the Makefile to use this.
?S:.
```

```
?T:comp
: determine compiler compiler
case "$yacc" in
")
 dflt=yacc;;
*)
 dflt="$yacc";;
esac
echo " "
comp='yacc'
if $test -f "$byacc$_exe"; then
 dflt="$byacc"
 comp="byacc or $comp"
fi
if $test -f "$bison$_exe"; then
 comp="$comp or bison -y"
fi
rp="Which compiler compiler ($comp) shall I use?"
. ./myread
yacc="$ans"
case "$yacc" in
*bis*)
 case "$yacc" in
 *-y*) ;;
 *)
  yacc="$yacc -y"
  echo "(Adding -y option to bison to get yacc-compatible behavior.)"
  ;;
 esac
 ;;
esac

@if yaccflags
: see if we need extra yacc flags
dflt="$yaccflags"
case "$dflt" in
") dflt=none;;
esac
$cat <<EOH

Your yacc program may need extra flags to normally process the parser sources.
Do NOT specify any -d or -v flags here, since those are explicitly known
by the various Makefiles. However, if your machine has strange/undocumented
options (like -Sr# on SCO to specify the
 maximum number of grammar rules), then
please add them here.  To use no flags, specify the word "none".

EOH
```

```
rp="Any additional yacc flags?"
. ./myread
case "$ans" in
none) yaccflags="";;
*) yaccflags="$ans";;
esac

@end
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/yacc.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: MailList.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Graham Stoney <greyham@research.canon.oz.au>
?RCS:
?RCS: $Log: MailList.U,v $
?RCS: Revision 3.0.1.1  1994/01/24  14:01:49  ram
?RCS: patch16: created
?RCS:
?RCS:
?X:
?X: This unit offers the user the option of subscribing to the mailing
?X: list. To force inclusion of this unit, you must add it's name to the
?X: dependancies on the MAKE line in your private copy of End.U.
?X: The address of the mailing list server must be set via a "list_request=..."
?X:
 entry in the .package file. This is usually done by running packinit and
?X: answering the proper questions.
?X:
?MAKE:MailList: cat mailer package Myread cf_name cf_email
?MAKE: -pick wipe $@ %<
?T:list_request list_sub list_unsub list_name
?X:
?X: The cf_name dependency is used through list_sub when the mailing list
?X: manager happens to be listserv, whereas cf_email is used whith majordomo
?X: or when the mailing list request address is scanned by a human. Since
?X: they do not appear within the unit itself, we need a lint hint.
?X:
```

```
?LINT:use cf_name cf_email
: offer to join the mailing list
list_request='<$list_request>'
list_sub="<$list_sub>"
list_unsub="<$list_unsub>"
list_name="<$list_name>"
$cat <<EOM

There is a mailing list for discussion about $package and related issues.
This is the preferred place to ask questions about the program and discuss
modifications and additions with the author and other users.  If you are able
to send mail to the Internet, you
 are encouraged to subscribe.  You need only
ever subscribe once, and you can unsubscribe automatically at any time in the
future.  If you have already subscribed and you wish to unsubscribe now, you
may do so by answering "unsubscribe".  Answer "subscribe" to subscribe to the
list.

EOM
rp="Subscribe to or unsubscribe from the $list_name mailing list?"
dflt=neither
. ./myread
case "$ans" in
[sS]*) $cat <<EOM

You will be sent a message from the list server to let you know when your
subscription has been successful and telling you how to submit articles and
how to unsubscribe again when necessary. You may also unsubscribe by running
this script again and asking it to do so for you.

EOM
 echo "Sending mail to subscribe you to the $list_name list..." >&4
 $mailer $list_request <<EOM >/dev/null 2>&1
Precedence: junk
To: $list_request

$list_sub
EOM
 ;;
[uU]*) echo "Sending mail to unsubscribe you from the $list_name list..." >&4
 $mailer $list_request <<EOM >/dev/null 2>&1
Precedence: junk
To:
 $list_request

$list_unsub
EOM
 ;;
```

```
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/MailList.U
No license file was found, but licenses were detected in source scan.

```
/*
* $Id: scandir.C,v 3.0.1.1 1994/01/24 13:58:45 ram Exp ram $
*
*  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
*
*  You may redistribute only under the terms of the Artistic Licence,
*  as specified in the README file that comes with the distribution.
*  You may reuse parts of this distribution only within the terms of
*  that same Artistic Licence; a copy of which may be found at the root
*  of the source tree for dist 4.0.
*
* $Log: scandir.C,v $
* Revision 3.0.1.1  1994/01/24  13:58:45  ram
* patch16: created
*
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/C/fake/scandir.C
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: startsh.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: startsh.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  16:25:31  ram
?RCS: patch61: avoid needless chatter since this is now done very early
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:51  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:startsh: sh sharpbang eunicefix
?MAKE: -pick add $@ %<
?S:startsh:
?S: This variable contains the string to put on the front of a shell
```

```
?S: script to make sure (hopefully) that it runs with sh and not some
?S: other
 shell.
?S:.
?F:!sharp
: figure out how to guarantee sh startup
?X: Avoid needless chatter since this is now done very early.
?X: echo " "
?X: echo "Checking out how to guarantee sh startup..." >&2
case "$startsh" in
") startsh=${sharpbang}${sh} ;;
*)
?X: echo "Let's see if '$startsh' works..." ;;
esac
cat >sharp <<EOSS
$startsh
set abc
test "$?abc" != 1
EOSS

chmod +x sharp
$eunicefix sharp
if ./sharp; then
 : echo "Yup, it does."
else
 echo "Hmm... '$startsh' does not guarantee sh startup..."
 echo "You may have to fix up the shell scripts to make sure $sh runs them."
fi
rm -f sharp
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/startsh.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Begin.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Begin.U,v $
?RCS: Revision 3.0.1.3  1997/02/28  14:56:35  ram
?RCS: patch61: added Extractall dependency
?RCS:
```

```
?RCS: Revision 3.0.1.2  1995/01/30  14:25:08  ram
?RCS: patch49: avoid an empty rmlist: systems might choke on it (WED)
?RCS:
?RCS: Revision 3.0.1.1  1994/10/31  09:32:20  ram
?RCS: patch44: created
?RCS:
?X:
?X: This file comes after option processing had been done and after all
?X: the default values have been set up. It marks the beginning
 of questions.
?X: It is important that Options be listed *after* Myinit to ensure that the
?X: default initializations performed by Init and Myinit will not clobber
?X: any setting done on the command line via -D or -U.
?X:
?MAKE:Begin: Myinit Options package Extractall
?MAKE: -pick add $@ %<
: Eunice requires " " instead of "", can you believe it
echo " "
: Here we go...
echo "Beginning of configuration questions for $package."

?X: Make sure the rm below is given a non-empty list for some systems.
?X: This is run only when within the UU directory, hence we can safely
?X: attempt to rm a non-existent 'X' file...
trap 'echo " "; test -d ../UU && rm -rf X $rmlist; exit 1' 1 2 3 15

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Begin.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: installstyle.U,v 1.2 1999/07/13 14:56:06 doughera Exp $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: installstyle.U,v $
?RCS: Revision 1.2  1999/07/13 14:56:06  doughera
?RCS: Fix dependencies.  Add more comments.
?RCS:
?RCS: Revision 1.1  1999/07/12 17:30:41  doughera
?RCS: Initial revision
?RCS:
?RCS:
```

```
?MAKE:installstyle: prefix Myread
?MAKE: -pick add $@ %<
?X: Myread dependence is for dflt.
?S:installstyle:
?S: This variable describes the "style" of the perl installation.
?S: This is intended to be useful for tools that need to
?S: manipulate entire perl
 distributions.  Perl itself doesn't use
?S: this to find its libraries -- the library directories are
?S: stored directly in Config.pm.  Currently, there are only two
?S: styles:  "lib" and "lib/perl5".  The default library locations
?S: (e.g. privlib, sitelib) are either $prefix/lib or
?S: $prefix/lib/perl5.  The former is useful if $prefix is a
?S: directory dedicated to perl (e.g. /opt/perl), while the latter
?S: is useful if $prefix is shared by many packages, e.g. if
?S: $prefix=/usr/local.
?S:
?S: Unfortunately, while this "style" variable is used to set
?S: defaults for all three directory hierarchies (core, vendor, and
?S: site), there is no guarantee that the same style is actually
?S: appropriate for all those directories.  For example, $prefix
?S: might be /opt/perl, but $siteprefix might be /usr/local.
?S: (Perhaps, in retrospect, the "lib" style should never have been
?S: supported, but it did seem like a nice idea at the time.)
?S:
?S: The situation is even less clear for
 tools such as MakeMaker
?S: that can be used to install additional modules into
?S: non-standard places.  For example, if a user intends to install
?S: a module into a private directory (perhaps by setting PREFIX on
?S: the Makefile.PL command line), then there is no reason to
?S: assume that the Configure-time $installstyle setting will be
?S: relevant for that PREFIX.
?S:
?S: This may later be extended to include other information, so
?S: be careful with pattern-matching on the results.
?S:
?S: For compatibility with perl5.005 and earlier, the default
?S: setting is based on whether or not $prefix contains the string
?S: "perl".
?S:.
: determine installation style
: For now, try to deduce it from prefix unless it is already set.
: Reproduce behavior of 5.005 and earlier, maybe drop that in 5.7.
case "$installstyle" in
'') case "$prefix" in
  *perl*) dflt='lib';;
  *) dflt='lib/perl5' ;;
```

```
 esac
 ;;
*) dflt="$installstyle" ;;
esac
: Probably not worth prompting for this since we prompt
 for all
: the directories individually, and the prompt would be too long and
: confusing anyway.
installstyle=$dflt
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/installstyle.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: so.U,v $
?RCS: Revision 3.0.1.2  1994/10/29  16:30:04  ram
?RCS: patch36: now tells user how he can suppress shared lib lookup (ADO)
?RCS: patch36: removed echo at the top, since it's now in the here-doc (ADO)
?RCS:
?RCS: Revision 3.0.1.1  1994/06/20  07:07:02  ram
?RCS: patch30: created
?RCS:
?X:
?X: This unit computes the shared-object / shared-lib extension
?X:
?MAKE:so: test libpth Loc Myread Oldconfig cat
?MAKE: -pick add $@ %<
?S:so:
?S: This variable holds the extension used to identify
 shared libraries
?S: (also known as shared objects) on the system. Usually set to 'so'.
?S:.
?T: xxx
: compute shared library extension
case "$so" in
")
 if xxx=`./loc libc.sl X $libpth`; $test -f "$xxx"; then
  dflt='sl'
```

```
 else
  dflt='so'
 fi
 ;;
*) dflt="$so";;
esac
$cat <<EOM

On some systems, shared libraries may be available.  Answer 'none' if
you want to suppress searching of shared libraries for the remainder
of this configuration.

EOM
rp='What is the file extension used for shared libraries?'
. ./myread
so="$ans"

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/so.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: prototype.U,v 3.0.1.3 1994/05/06 15:11:49 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: prototype.U,v $
?RCS: Revision 3.0.1.3  1994/05/06  15:11:49  ram
?RCS: patch23: ensure cc flags used when looking for prototype support
?RCS:
?RCS: Revision 3.0.1.2  1994/01/24  14:15:36  ram
?RCS: patch16: prototype handling macros now appear only when needed
?RCS:
?RCS: Revision 3.0.1.1  1993/08/25  14:03:12  ram
?RCS: patch6: defines were referring to non-existent VOID symbol
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:36  ram
?RCS: Baseline for dist
 3.0 netwide release.
?RCS:
?MAKE:prototype: Nothing
?S:prototype:
?S: This variable holds the eventual value of CAN_PROTOTYPE, which
```

?S: indicates the C compiler can handle function prototypes.
?S:.
: stub, never used
prototype=nothing

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/prototype.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: longsize.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: longsize.U,v $
?RCS: Revision 3.0.1.2 1997/02/28 16:09:35 ram
?RCS: patch61: code moved to intsize.U
?RCS:
?RCS: Revision 3.0.1.1 1994/10/29 16:24:31 ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0 1993/08/18 12:09:07 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: 'longsize' is now defined within intsize.U
?X:
?LINT: empty

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/longsize.U
No license file was found, but licenses were detected in source scan.

Perl5 Metaconfig Units

Copyright (c) 1996-1998, Andy Dougherty
Copyright (c) 1999-2011, H.Merijn Brand
All rights reserved.

These units are the ones used to build Configure and config_h.SH
in the Perl5 distribution.

metaconfig will first look in its standard locations (specified when you

installed dist). It will then recurse through the 'U' subdirectory
and find any additional "private" units. Private units override
standard ones supplied with metaconfig.

Files in this directory:

README
  This file.

Glossary.patch
  The standard dist units contain some strings that make pod2man
  complain. This patch silences those warnings. As new units are
  added and Configure is regenerated, this patch may need more and more
  'fuzz' to be applied. It should be freshly regenerated every once
  in a while. See also mkgloss.pl

ln-all.pl
  Re-generate the all/ folder

mkglossary
  A script
 to regenerate Porting/Glossary. You have to manually
  edit the top of the script to point the location of your metaconfig
  units. It is called automatically by 'mksample'. See also mkgloss.pl

mkgloss.pl
  A perl script that calls U/mkglossary from the perl source tree, sorts
  the list of symbols, and applies the patch mentioned in Glossary.patch.
  When called on its own, redirect the output to a temporary file, and
  compare that file to Porting/Glossary before applying.

mksample
  A script to regenerate Porting/config.sh and Porting/config.H.
  It also calls mkglossary, if necessary.

Subdirectories:

The units and other related files have been broken up into the following
directories.

a_dvisory/
  These are units that have to go first in the generated config_h.SH.
  A word of explanation: Configure and config_h.SH are generated from 'Units'
  (the *.U files). Files indicate dependencies (using make(1)), and
  Configure is built to follow those dependencies.
 However, config_h.SH
  is simply built by putting all the units in alphabetical order and
  extracting the relevant lines. (This could be fixed, I suppose, but

it wasn't trivial the one time I looked.)
The a_dvisory/ directory, then, is a place to put units that need to be early in config_h.SH. (Most units are self-contained and ought to be able to go anywhere. However, some things, like byteorder, need to have the #defines from multiarch available.)

acl/
This is an old patch to begin to detect and use ACL (access control list) file protection schemes.

all/
A folder that conveniently holds symbolic links to all the modules that are used to build the current Configure and config_h.SH.

compline/
These are similar to the standard units, but I have modified them to have a more uniform compile command line, usually using the new Compile.U unit. (The ccflags.U unit is perl-specific since it mentions -DDEBUGGING and
-DPOSIX_SOURCE, but that's the only place it is perl-specific.)

dist_patches/
These are patches to dist that must be applied before it is built and installed. I have submitted these for inclusion in the regular dist distribution. They have already been applied to the ../dist-3.0at70b directory.

ebcdic/
These are units that had to be specially modified to work under either EBCDIC or ASCII.

installdirs/
These are units to handle perl's installation directories and related issues.

modified/
These are modified versions of the standard units. Also included in this directory are new units that are clearly derived from existing units. I have submitted these for inclusion in the regular dist distribution.

nullified/
These are null units that replace units in the standard distribution. Typically they are there because some part of the perl source accidentally uses a symbol that metaconfig thinks means we want the corresponding

unit.

perl/
  These are specific to perl. Some are heavily derived from
  original dist units, and are marked as such. Others are original.

perl_patches/
  These are patches to the perl source. This directory
  should ordinarily be empty, but there may have been drift between
  the standard version of perl and the one associated with these
  units.

protos/
  These are units modified to use the new Hasproto.U or Protochk.U
  units to check for prototypes.

threads/
  These are specific to threading perl.

typedefs/
  These are standard units modified to use the modified Typedef.U
  unit to check for typedefs. (The modified Typdef.U includes a
  function to avoid unnecessary prompts if the typdef being searched
  for exists.)

Where appropriate, I submitted these units for inclusion into the
regular dist distribution. However, since dist is no longer actively
maintained, and the alternative is for *me* to actively maintain it,
the units just
sit here.

Copyright Information:

Unless otherwise indicated, the files contained in this
distribution are:

  Copyright (c) 1996-1998, Andy Dougherty

The following licensing terms apply to all files contained in
this distribution:

You may distribute the files contained in this distribution
under the terms of either

  a) the "Artistic License" which comes with Perl, or

  b) the "Artistic License" which comes with dist, or

c) the GNU General Public License as published by the Free
Software Foundation; either version 1, or (at your option) any
later version (see the file "Copying" that comes with the
Perl distribution).

Which one to use is your choice.

The units in the "modified" directory have been derived from units
associated with the metaconfig program of Raphael Manfredi's "dist"
distribution. These units list Raphael Manfredi as the Copyright holder.
dist is distributed under a modified version of the Perl Artistic License.
Clause 7 of this modified
license as contained in dist-3.0-pl60 provides:

7. You may reuse parts of this Package in your own programs, provided
that you explicitly state where you got them from, in the source code
(and, left to your courtesy, in the documentation), duplicating
all the associated copyright notices and disclaimers. Besides
your changes, if any, must be clearly marked as such. Parts reused
that way will no longer fall under this license if, and only if,
the name of your program(s) have no immediate connection with the
name of the Package itself or its associated programs. You may then
apply whatever restrictions you wish on the reused parts or choose
to place them in the Public Domain--this will apply only within the
context of your package.

In accordance with this clause, the versions of these units
contained here are made available under the same terms as the
rest of the units.

If you have any questions about the use of these units or about
the differences
between these units and the standard versions, please
feel free to ask.

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Easton, PA 18042-1782

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/README
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Warn.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi

```
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Extract.U,v $
?X:
?X: This unit produces a shell script which can be run in order to emit
?X: an important warning to the user, which will be remembered and shown
?X: at the end of the Configure run as well.
?X:
?X: A typical use would be:
?X:
?X:  ./warn <<EOM
?X:  Problem with your C compiler: can't turn debugging on.
?X:  EOM
?X:
?X: or:
?X:
?X:  ./warn "Problem with your C compiler: can't turn debugging on."
?X:
?X: Which will both display to the user:
?X:
?X:  ***
 WARNING:
?X:  *** Problem with your C compiler: can't turn debugging on.
?X:  ***
?X:
?MAKE:Warn: startsh eunicefix
?MAKE: -pick add $@ %<
?F:./warn
: script used to emit important warnings
cat >warn <<EOS
$startsh
?X: Read the whole warning message from stdin into a temporary file
?X: when no argument was supplied.
if test \$# -gt 0; then
 echo "\$@" >msg
else
 cat >msg
fi
?X: Emit the warning, prefixing all lines with '*** '
echo "*** WARNING:" >&4
sed -e 's/^/*** /' <msg >&4
echo "*** " >&4
?X: Save the warning in the logs, which will be shown again at the end
```

```
cat msg >>config.msg
echo " " >>config.msg
rm -f msg
EOS
chmod +x warn
$eunicefix warn
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Warn.U
No license file was found, but licenses were detected in source scan.

```
/* $Id: Jmake.rules 18 2006-12-27 10:35:09Z rmanfredi $
*
*  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
*
*  You may redistribute only under the terms of the Artistic Licence,
*  as specified in the README file that comes with the distribution.
*  You may reuse parts of this distribution only within the terms of
*  that same Artistic Licence; a copy of which may be found at the root
*  of the source tree for dist 4.0.
*
* $Log: Jmake.rules,v $
* Revision 3.0.1.7  2004/08/22 08:28:58  ram
* patch71: random cleanup
*
* Revision 3.0.1.6  1997/02/28  14:56:01  ram
* patch61: now handles USRINC for dependencies
* patch61: smarter about dependencies computation
*
* Revision 3.0.1.5  1995/09/25  09:07:19  ram
* patch59: smarter sed command to strip /usr/include dependencies
*
* Revision 3.0.1.4  1995/07/25  13:33:59  ram
* patch56: install of script man pages can now cope with missing files
* patch56: the clobber
 target now removes the .config directory as well
*
* Revision 3.0.1.3  1995/03/21  08:35:28  ram
* patch52: suppressed extra argument to NormalProgramTarget call
*
* Revision 3.0.1.2  1995/01/11  14:49:55  ram
* patch45: new macros ShellScriptTargetExt and SimpleShellScriptTargetExt
* patch45: directory installation is now made via INSTALLDIR (Configure)
*
* Revision 3.0.1.1  1994/10/29  15:46:30  ram
* patch36: added RemoteDependency rule
*
* Revision 3.0  1993/08/18  12:04:14  ram
```

```
* Baseline for dist 3.0 netwide release.
*
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/files/Jmake.rules
No license file was found, but licenses were detected in source scan.

```
/*
* $Id: dup2.C,v 3.0.1.1 1994/01/24 13:58:37 ram Exp ram $
*
*  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
*
*  You may redistribute only under the terms of the Artistic Licence,
*  as specified in the README file that comes with the distribution.
*  You may reuse parts of this distribution only within the terms of
*  that same Artistic Licence; a copy of which may be found at the root
*  of the source tree for dist 4.0.
*
* Original Author: Larry Wall <lwall@netlabs.com>
*
* $Log: dup2.C,v $
* Revision 3.0.1.1  1994/01/24  13:58:37  ram
* patch16: created
*
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/C/fake/dup2.C
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: inc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: inc.U,v $
?RCS: Revision 3.0  1993/08/18  12:08:51  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:inc incexp: Loc Oldconfig Getfile usrinc
?MAKE: -pick add $@ %<
?S:inc:
```

```
?S: This variable holds the name of the directory in which the user wants
?S: to put public header files for the package in question.  It is most
?S: often a local directory such as /usr/local/include.
?S:.
?S:incexp:
?S: This is the same as the inc variable, but is filename
 expaned
?S: at configuration time for convenient use in your makefiles.
?S:.
: determine where public header files go
case "$inc" in
")
 dflt=`./loc . "." /usr/local/include /usr/include/local $usrinc`
 ;;
*)  dflt="$inc"
 ;;
esac
fn=d~
rp='Where do you want to put the public header files?'
. ./getfile
inc="$ans"
incexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/inc.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Setprefixvar.U,v 3.0 2006/04/01 17:25:29 hmbrand $
?RCS:
?RCS: Copyright (c) 2006-2006, H.Merijn Brand & Nicholas Clark
?RCS:
?RCS: This file is included with or a derivative work of a file included
?RCS: with the metaconfig program of Raphael Manfredi's "dist" distribution.
?RCS: In accordance with clause 7 of dist's modified Artistic License:
?RCS:
?RCS:   You may distribute under the terms of either the GNU General Public
?RCS:   License or the Artistic License, as specified in the README file.
?RCS:
?X:
?X: This unit sets up the scripts installprefix and setprefixvar, so code
?X: in other parts can be more simple and maintainable
?X:
?MAKE:Setprefixvar: Myread Getfile startsh eunicefix test \
 prefix prefixexp installprefix installprefixexp
?MAKE: -pick add $@ %<
?LINT:extern prefixvar
?X: metalint still sees "`\$${prefixvar}exp`" as variable :(
?T:prefixvarexp
```

```
?F:./setprefixvar
?F:./installprefix
: Perform
 the prefixexp/installprefixexp correction if necessary
cat <<EOS >installprefix
$startsh
EOS
cat <<'EOSC' >>installprefix
: Change installation prefix, if necessary.
if $test X"$prefix" != X"$installprefix"; then
   eval "install${prefixvar}=\`echo \$${prefixvar}exp | sed \"s#^\$prefixexp#\$installprefixexp#\"\`"
else
   eval "install${prefixvar}=\"\$${prefixvar}exp\""
fi
EOSC
chmod +x installprefix
$eunicefix installprefix

: Set variables such as privlib and privlibexp from the output of ./getfile
: performing the prefixexp/installprefixexp correction if necessary.
cat <<EOS >setprefixvar
$startsh
EOS
cat <<'EOSC' >>setprefixvar
eval "${prefixvar}=\"\$ans\""
eval "${prefixvar}exp=\"\$ansexp\""
. ./installprefix
EOSC
chmod +x setprefixvar
$eunicefix setprefixvar

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/Setprefixvar.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: package.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: package.U,v $
?RCS: Revision 3.0.1.3  1994/10/29  16:27:21  ram
?RCS: patch36: beware of non-ascii character sets when translating case
```

```
?RCS:
?RCS: Revision 3.0.1.2  1993/11/10  17:37:02  ram
?RCS: patch14: skip definition of spackage if not otherwise used
?RCS:
?RCS: Revision 3.0.1.1  1993/09/13  16:11:10  ram
?RCS: patch10: added spackage, suitable for starting sentences
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:28  ram
?RCS: Baseline for dist 3.0
 netwide release.
?RCS:
?MAKE:package spackage: Nothing
?MAKE: -pick wipe $@ %<
?S:package:
?S: This variable contains the name of the package being constructed.
?S: It is primarily intended for the use of later Configure units.
?S:.
?S:spackage:
?S: This variable contains the name of the package being constructed,
?S: with the first letter uppercased, i.e. suitable for starting
?S: sentences.
?S:.
?X: dist-4 has defined PACKAGE: here, which clashes with perly.h
?X:  as package is a reserved keyword in perl
?T:first last
: set package name
package='<PACKAGENAME>'
@if spackage
first=`echo $package | sed -e 's/^\(.\).*/\1/'`
last=`echo $package | sed -e 's/^.\(.*\)/\1/'`
?X:
?X: So early in the Configure script, we don't have ./tr set up and can't
?X: include Tr in our dependency or that would create a cycle. Therefore,
?X: we have to somehow duplicate the work done in Tr. That's life.
?X:
case "`echo AbyZ | tr '[:lower:]' '[:upper:]' 2>/dev/null`"-"`echo AbyZ | tr '[:upper:]' '[:lower:]'
 2>/dev/null`" in
ABYZ-abyz) spackage=`echo $first | tr '[:lower:]' '[:upper:]'`$last;;
*) spackage=`echo $first | tr '[a-z]' '[A-Z]'`$last;;
esac
@end

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/package.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Chk_whoami.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
```

```
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Chk_whoami.U,v $
?RCS: Revision 3.0  1993/08/18  12:04:46  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit makes sure we don't try to include whoami.h if uname() exists.
?X:
?MAKE:Chk_whoami: d_uname i_whoami
?MAKE: -pick add $@ %<
?LINT:change i_whoami
: weed out incompatibilities
case "$d_uname" in
 "$define") i_whoami="$undef" ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Chk_whoami.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: lns.U,v 3.0.1.1 1994/06/20 07:05:52 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: Original Author: Andy Dougherty <doughera@lafcol.lafayette.edu>
?RCS:
?RCS: $Log: lns.U,v $
?RCS: Revision 3.0.1.1  1994/06/20  07:05:52  ram
?RCS: patch30: created by ADO
?RCS:
?X:
?X: This unit checks whether symbolic links are really supported.
?X: We can't rely on d_symlink because that may be listed in the
?X: C library but unimplemented.
?X:
```

```
?MAKE:lns: ln rm touch
?MAKE: -pick add $@ %<
?S:lns:
?S: This variable holds the name of the command to make
?S: symbolic
 links (if they are supported).  It can be used
?S: in the Makefile. It is either 'ln -s' or 'ln'
?S:.
: determine whether symbolic links are supported
echo " "
$touch blurfl
if $ln -s blurfl sym > /dev/null 2>&1 ; then
 echo "Symbolic links are supported." >&4
 lns="$ln -s"
else
 echo "Symbolic links are NOT supported." >&4
 lns="$ln"
fi
$rm -f blurfl sym
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/lns.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libs.U,v $
?RCS: Revision 3.0.1.6  1997/02/28  16:09:11  ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS:
?RCS: Revision 3.0.1.5  1995/07/25  14:12:05  ram
?RCS: patch56: now knows about OS/2 platforms
?RCS:
?RCS: Revision 3.0.1.4  1994/10/29  16:24:22  ram
?RCS: patch36: removed old broken thislib/thatlib processing (ADO)
?RCS:
?RCS: Revision 3.0.1.3  1994/06/20  07:05:44  ram
?RCS: patch30: code cleanup with if/elif by ADO and RAM
?RCS: patch30: undone patch23 for libswanted default
```

setting
?RCS:
?RCS: Revision 3.0.1.2 1994/05/06 15:08:45 ram
?RCS: patch23: now includes ordered default libswanted variable (ADO)
?RCS: patch23: major cleanup for library lookups (ADO)
?RCS:
?RCS: Revision 3.0.1.1 1993/08/25 14:02:31 ram
?RCS: patch6: added default for libs
?RCS:
?RCS: Revision 3.0 1993/08/18 12:09:03 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libs libsfound libsfiles libsdirs libspath libscheck: \
 test cat Myread Oldconfig Loc libpth package xlibpth so _a \
 +usesocks sed +cc +ccflags +ldflags rm
?MAKE: -pick add $@ %<
?S:libs:
?S: This variable holds the additional libraries we want to use.
?S: It is up to the Makefile to deal with it. The list can be empty.
?S:.
?S:libsfound:
?S: This variable holds the full pathnames of the libraries
?S: we found and accepted.
?S:.
?S:libsfiles:
?S: This variable holds the filenames aka basenames of the libraries
?S: we found and accepted.
?S:.
?S:libsdirs:
?S: This variable holds the directory
 names aka dirnames of the libraries
?S: we found and accepted, duplicates are removed.
?S:.
?S:libspath:
?S: This variable holds the directory names probed for libraries.
?S:.
?S:libscheck:
?S: This variable is intended to be set by hint files, if needed.
?S: It should contain shell code that will be eval'ed with $xxx holding
?S: some library file. It may change $xxx if needed.
?S: For instance, on an Irix platform, you may make sure the right
?S: library file is used depending on the cc command line, so that the
?S: correct library is used depending on the selected ABI (for 32 and
?S: 64-bit compilations).
?S:
?S: Here is an example of code that could be found in a hint file on Irix
?S: when the selected compiler was for 32-bit -- that code is put in the
?S: cc.cbu call-back unit to be invoked AFTER the C compiler and its

```
?S: flags have been chosen:
?S:
?S:  libscheck='case "$xxx" in
?S:  *.a) /bin/ar p $xxx `/bin/ar t $xxx | sed q` >$$.o;
?S:   case "`/usr/bin/file $$.o`" in
?S:   *N32*)
 rm -f $$.o ;;
?S:   *) rm -f $$.o; xxx=/no/n32$xxx ;;
?S:   esac ;;
?S:  *) case "`/usr/bin/file $xxx`" in
?S:   *N32*) ;;
?S:   *) xxx=/no/n32$xxx ;;
?S:   esac ;;
?S:  esac'
?S:.
?D:libs="
?LINT:extern libswanted
?LINT:change libswanted
?INIT:: default library list
?INIT:libswanted="
?X: This order is chosen so that libraries  -lndir, -ldir, -lucb, -lbsd,
?X: -lBSD, -lPW, and -lx only get used if there are unresolved
?X: routines at link time.  Usually, these are backwards compatability
?X: libraries, and may not be as reliable as the standard c library.
?X:
?X: The -lsocket -linet -lnsl order has been reported to be necessary
?X: for at least one SVR4 implementation.
?X: -lc must proceed -lucb or -lbsd for most Solaris applications.
?X: -lc_s proceeds -lc so we pick up the shared library version, if
?X: it is available.
?X:
?X: The ordering of c, posix, and cposix is a guess and almost
?X: certainly wrong on about half of all systems.
?X:
?X: Set proper libswanted in your private
 Myinit.U if needed.
?X:
?X:: default ordered library list
?X:libswanted='net socket inet bind nsl nm sdbm gdbm ndbm dbm malloc dl'
?X:libswanted="$libswanted dld sun m c_s c posix cposix ndir dir ucb"
?X:libswanted="$libswanted bsd BSD PW x"
?X:
?INIT:: should be set by hint files if needed
?INIT:libscheck="
?T:xxx yyy thislib thisdir libstyle linkmsg
?F:lt.c lt
: Looking for optional libraries
echo " "
```

```
echo "Checking for optional libraries..." >&4
case "$libs" in
' '|'') dflt='';;
*) dflt="$libs";;
esac
case "$libswanted" in
'') libswanted='c_s';;
esac
?X: libsocks has nasty naming scheme.
?X: This does not work if somebody wants SOCKS 4.
case "$usesocks" in
"$define") libswanted="$libswanted socks5 socks5_sh" ;;
esac
?X: Used later for link checks
echo "extern char printf(); int main() { printf(); return 0; }" > lt.c
libsfound="
libsfiles="
libsdirs="
libspath="
for thisdir in $libpth $xlibpth; do
 test -d $thisdir && libspath="$libspath $thisdir"
done
for thislib in $libswanted;
 do
 for thisdir in $libspath; do
    xxx="
    if $test ! -f "$xxx" ; then
  xxx=`ls $thisdir/lib$thislib.$so.[0-9]* 2>/dev/null | $sed -n '1p'`
  $test -f "$xxx" && eval $libscheck
  $test -f "$xxx" && libstyle=shared
    fi
    if test ! -f "$xxx"; then
  xxx=$thisdir/lib$thislib.$so
  $test -f "$xxx" && eval $libscheck
  $test -f "$xxx" && libstyle=shared
    fi
    if test ! -f "$xxx"; then
  xxx=$thisdir/lib$thislib$_a
       $test -f "$xxx" && eval $libscheck
  $test -f "$xxx" && libstyle=static
    fi
    if test ! -f "$xxx"; then
  xxx=$thisdir/$thislib$_a
       $test -f "$xxx" && eval $libscheck
  $test -f "$xxx" && libstyle=static
    fi
    if test ! -f "$xxx"; then
  xxx=$thisdir/lib${thislib}_s$_a
```

```
        $test -f "$xxx" && eval $libscheck
    $test -f "$xxx" && libstyle=static
    $test -f "$xxx" && thislib=${thislib}_s
      fi
      if test ! -f "$xxx"; then
    xxx=$thisdir/Slib$thislib$_a
        $test -f "$xxx" && eval $libscheck
    $test
   -f "$xxx" && libstyle=static
      fi
      if $test -f "$xxx"; then
  ?X:
  ?X: It is not sufficient to find a .so on the disk.  We must make sure
  ?X: that we can indeed supply the -lfoo line on the cc line to link against
  ?X: that library.  On Linux for instance, a versionned .so will not be
  ?X: implicitly linked against, whereas it will work fine on Solaris 2.6.
  ?X:  --RAM, 10/10/2003
  ?X:
    if $cc -o lt $ccflags $ldflags lt.c -l$thislib >/dev/null 2>&1;
    then
     linkmsg=""
    else
     linkmsg=" but I can't link against it"
    fi
    case "$libstyle" in
    shared) echo "Found -l$thislib (shared)$linkmsg." ;;
    static) echo "Found -l$thislib$linkmsg." ;;
    *)      echo "Found -l$thislib ($libstyle)$linkmsg." ;;
    esac
    case " $dflt " in
    *"-l$thislib "*) ;;
    *)
     case "$linkmsg" in
     ")
      dflt="$dflt -l$thislib"
      libsfound="$libsfound $xxx"
      yyy=`basename $xxx`
      libsfiles="$libsfiles $yyy"
      yyy=`echo $xxx|$sed -e "s%/$yyy\\$%%"`
      case " $libsdirs
   " in
      *" $yyy "*) ;;
      *) libsdirs="$libsdirs $yyy" ;;
      esac
        ;;
     esac
     ;;
    esac
```

```
  break
    fi
 done
 if $test ! -f "$xxx"; then
    echo "No -l$thislib."
 fi
done
set X $dflt
shift
dflt="$*"
case "$libs" in
'') dflt="$dflt";;
*) dflt="$libs";;
esac
case "$dflt" in
' '|'') dflt='none';;
esac
$rm -f lt.c lt

$cat <<EOM

In order to compile $package on your machine, a number of libraries
are usually needed.  Include any other special libraries here as well.
Say "none" for none.  The default list is almost always right.
EOM

echo " "
rp="Which libraries to use?"
. ./myread
case "$ans" in
none) libs=' ';;
*) libs="$ans";;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libs.U
No license file was found, but licenses were detected in source scan.

Perl5 Metaconfig Units

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  All rights reserved.

These units are the ones I used to build Configure and config_h.SH
in the Perl5 distribution.

The Configure script and config_h.SH file in the Perl distribution are

generated by a program called metaconfig. To run metaconfig, you will
need the full dist 3.0 distribution, maintained by Raphael Manfredi.
As of this writing, the current version is dist3.0, patchlevel 70.
Dist version dist-3.0@70.tar.gz is available on CPAN (the Comprehensive
Perl Archive Network) as
<http://www.perl.com/perl/CPAN/authors/id/RAM/dist-3.0@70.tar.gz>.

Instructions:

1. Unpack the full perl5 sources. Execute the following command

 chmod +w Configure config_h.SH Porting/Glossary Porting/config*

2. Unpack the archive containing this file in the perl5 source
   directory. This will create a directory
 'U' under the perl5
   sources. That directory will contain the metaconfig units for perl5.
   This will also create two files in the perl5 source tree:
   MANIFEST.new and .package.

3. Apply any patches to perl in the perl_patches/ directory.
   (This may well be empty.)

4. Obtain and install dist-3.0pl70.

4. Apply any patches to dist under the dist_patches subdirectory.

5. From your main perl5 source directory, run packinit to
   regenerate the .package file. IMPORTANT: Change the name and
   address of the maintainer to your own name and address. I don't
   want bug reports intended for you coming to me.

6. From your main perl5 source directory, run

 metalint (or mlint)

   and repair every failure it reports.

7. From your main perl5 source directory, run

 metaconfig -m (or mconfig -m)

8. Edit U/mkglossary and/or U/mkgloss.pl to point to your dist-3.0pl70
   location. (See comments at the top.)

9. Run the Porting/mksample script to update the contents
 of the Porting/
   subdirectory, or run all parts by hand. (see README)

NB: this script used to be U/mksample replaced by Porting/mksample;
see Porting/pumpkin.pod instead for current documentation on its
use.

10. Let me know about any changes, corrections, or enhancements.

Things to watch out for:

1. Future support of better random number generators should probably
start with the randfunc.U unit included here. It's currently
broken, but well commented and probably a good place to start.

Descriptions:

The units and other related files have been broken up into the following
directories:

acl/
This is an old patch to begin to detect and use ACL (access
control list) file protection schemes.

compline/
These are similar to the standard units, but I have modified them
to have a more uniform compile command line, usually using the new
Compile.U unit. I have submitted these for inclusion into the
regular dist distribution. (The ccflags.U
unit is actually
perl-specific since it mentions -DDEBUGGING and -DPOSIX_SOURCE,
but that's the only place it is perl-specific.)

dist_patches/
These are patches to dist that must be applied before it is built
and installed. I have submitted these for inclusion in the
regular dist distribution.

modified/
These are modified versions of the standard units. Also included in
this directory are new units that are clearly derived from existing
units. I have submitted these for inclusion in the regular dist
distribution.

perl/
These are specific to perl. Some are heavily derived from
original dist units, and are marked as such. Others are original.

perl_patches/
These are patches to the perl source. This directory

should ordinarily be empty, but there may have been drift between the standard version of perl and the one associated with these units.

protos/
These are units modified to use the new Hasproto.U or Protochk.U units to check for prototypes. I have submitted these for inclusion into the regular dist distribution.

target/
This is the very, very beginning of cross-compiler support. It doesn't work yet, and many standard units will need modification.

typedefs/
These are standard units modified to use the modified Typedef.U unit to check for typedefs. (The modified Typdef.U includes a function to avoid unnecessary prompts if the typdef being searched for exists.) I have submitted these for inclusion into the regular dist distribution.

threads/
These are specific to threading perl.

Copyright Information:

Unless otherwise indicated, the files contained in this distribution are:

Copyright (c) 1996-1998, Andy Dougherty

The following licensing terms apply to all files contained in this distribution:

You may distribute the files contained in this distribution under the terms of either

a) the "Artistic License" which comes with Perl,
or

b) the "Artistic License" which comes with dist, or

c) the GNU General Public License as published by the Free Software Foundation; either version 1, or (at your option) any later version (see the file "Copying" that comes with the Perl distribution).

Which one to use is your choice.

The units in the "modified" directory have been derived from units
associated with the metaconfig program of Raphael Manfredi's "dist"
distribution. These units list Raphael Manfredi as the Copyright holder.
dist is distributed under a modified version of the Perl Artistic License.
Clause 7 of this modified license as contained in dist-3.0-pl60 provides:

  7. You may reuse parts of this Package in your own programs, provided
  that you explicitly state where you got them from, in the source code
  (and, left to your courtesy, in the documentation), duplicating
  all the associated copyright notices and disclaimers. Besides
  your changes, if any, must be clearly marked
 as such. Parts reused
  that way will no longer fall under this license if, and only if,
  the name of your program(s) have no immediate connection with the
  name of the Package itself or its associated programs. You may then
  apply whatever restrictions you wish on the reused parts or choose
  to place them in the Public Domain--this will apply only within the
  context of your package.

In accordance with this clause, the versions of these units
contained here are made available under the same terms as the
rest of the units.

If you have any questions about the use of these units or about
the differences between these units and the standard versions, please
feel free to ask.

  Andy Dougherty   doughera@lafayette.edu
  Dept. of Physics
  Lafayette College
  Easton, PA 18042-1782

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/README.dist
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Inlibc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Inlibc.U,v $

```
?RCS: Revision 3.0.1.1  1994/10/29  15:55:08  ram
?RCS: patch36: call ./whoa explicitly instead of relying on PATH
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:03  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit checks for the definition of a given function.
?X:
?X: To use it, say:
?X: set function d_func
?X: eval $inlibc
?X:
?MAKE:Inlibc: Csym Whoa Oldconfig
?MAKE: -pick add $@ %<
?LINT:define inlibc
?V:inlibc
?S:inlibc:
?S: This
 shell variable is used internally by Configure to check
?S: wether a given function is defined or not. A typical use is:
?S:  set function d_func
?S:  eval $inlibc
?S: That will print a message, saying wether function was found or
?S: not and set d_func accordingly.
?S:.
?T:was tx sym tres td tu var
: define an is-in-libc? function
inlibc='echo " "; td=$define; tu=$undef;
sym=$1; var=$2; eval "was=\$$2";
tx=yes;
case "$reuseval$was" in
true) ;;
true*) tx=no;;
esac;
case "$tx" in
yes)
 set $sym tres -f;
 eval $csym;
 case "$tres" in
 true)
  echo "$sym() found." >&4;
  case "$was" in $undef) . ./whoa; esac; eval "$var=\$td";;
 *)
  echo "$sym() NOT found." >&4;
  case "$was" in $define) . ./whoa; esac; eval "$var=\$tu";;
 esac;;
*)
```

```
 case "$was" in
 $define) echo "$sym() found." >&4;;
 *) echo "$sym() NOT found." >&4;;
 esac;;
esac'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Inlibc.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Whoa.U,v $
?RCS: Revision 3.0.1.2  1997/02/28  15:21:21  ram
?RCS: patch61: whoa script now starts with leading "startsh"
?RCS:
?RCS: Revision 3.0.1.1  1994/10/29  16:02:01  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:19  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a bit of shell code that must be dotted in in order
?X: to warn the user in case a change into a variable is noticed.
?X:
?X: To use this
 unit, $was must hold the old value that has changed. Upon
?X: exit, the two variables $td and $tu are set to the correct value for
?X: respectively defining or undefining a variable. For instance, if $vas was
?X: $undef, but now $var is $define, after calling . whoa, you should use
?X: eval "$var=\$tu" to finally set $var to the correct value. See unit Inlibc.
?X:
?MAKE:Whoa: Myread startsh hint
?MAKE: -pick add $@ %<
?F:./whoa
?T:var was
?LINT:change td tu
: set up the script used to warn in case of inconsistency
cat <<EOS >whoa
```

```
$startsh
EOS
cat <<'EOSC' >>whoa
dflt=y
echo " "
echo "*** WHOA THERE!!! ***" >&4
echo "    The $hint value for \$$var on this machine was \"$was\"!" >&4
rp="    Keep the $hint value?"
. ./myread
case "$ans" in
y) td=$was; tu=$was;;
esac
EOSC
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Whoa.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Rcs.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Rcs.U,v $
?RCS: Revision 3.0  1993/08/18  12:05:15  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This is a unit that helps people who write SH scripts and keep them under
?X: RCS, but don't think to protect the $Log and other $Id keywords from
?X: variable substitution (or people like me who do not like to).
?X:
?MAKE:Author Date Header Id Locker Log RCSfile Revision Source State: Oldconfig
?MAKE: -pick weed $@ %<
?LINT:describe Author
 Date Header Id Locker Log RCSfile Revision Source State
: preserve RCS keywords in files with variable substitution, grrr
?Author:Author='$Author'
?Date:Date='$Date'
?Header:Header='$Header'
?Id:Id='$Id'
?$Locker'
?Log:Log='$Log'
```

?RCSfile:RCSfile='$RCSfile'
?Revision:Revision='$Revision'
?Source:Source='$Source'
?State:State='$State'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Rcs.U
No license file was found, but licenses were detected in source scan.

?RCS: Id
?RCS:
?RCS: Copyright (c) 2000, Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?MAKE:versiononly: cat Myread Setvar Devel
?MAKE: -pick add $@ %<
?LINT:set versiononly
?Y:TOP
?S:versiononly:
?S: If set, this symbol indicates that only the version-specific
?S: components of a perl installation should be installed.
?S: This may be useful for making a test installation of a new
?S: version without disturbing the existing installation.
?S: Setting versiononly is equivalent to setting installperl's -v option.
?S: In particular, the non-versioned scripts and programs such as
?S: a2p, c2ph, h2xs, pod2*, and perldoc
 are not installed
?S: (see INSTALL for a more complete list). Nor are the man
?S: pages installed.
?S: Usually, this is undef.
?S:.
?LINT:extern inc_version_list
?LINT:change inc_version_list
?LINT:extern inc_version_list_init
?LINT:change inc_version_list_init
?LINT:extern version
: determine whether to use a version number suffix for installed binaries
echo " "
$cat <<EOM
Do you want to use a version number suffix for installed binaries? This
will install 'perl$version' instead of 'perl', and likewise for other
binaries like 'perldoc' and 'cpan'. This allows many versions of perl
to be installed side-by-side. Unless you are a developer, you probably

```
do *not* want to do this.
EOM
case "$versiononly" in
"$define"|[Yy]*|true) dflt='y' ;;
*) dflt='n';
esac
rp="Do you want to use a version number suffix for installed binaries?"
. ./myread
case "$ans" in
[yY]*) val="$define";;
*) val="$undef" ;;
esac
set versiononly
eval $setvar

case "$versiononly" in
"$define") inc_version_list="
        inc_version_list_init=0
       ;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/versiononly.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Finish.U,v $
?RCS: Revision 3.0.1.6  1995/02/15  14:09:30  ram
?RCS: patch51: now clearer about how to edit config.sh at the prompt (WED)
?RCS:
?RCS: Revision 3.0.1.5  1994/10/29  15:53:14  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS:
?RCS: Revision 3.0.1.4  1994/05/06  14:19:37  ram
?RCS: patch23: added blank lines around 'End of Configure'
?RCS:
?RCS: Revision 3.0.1.3  1993/10/16  13:46:09  ram
?RCS: patch12: replaced Config_h by Magic_h in the dependency line
?RCS:
```

```
?RCS:
 Revision 3.0.1.2  1993/09/13  15:45:26  ram
?RCS: patch10: fixed shell evaluation w/o shell escape while in silent mode
?RCS:
?RCS: Revision 3.0.1.1  1993/08/30  08:55:59  ram
?RCS: patch8: prevents myread from blocking on empty answers, exceptionally
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:55  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit is the very last one in the Configure script.  It runs all the
?X: SH files, which among other things produce config.h and (usually) Makefile.
?X: It offers to do a make depend if the Makefile contains that target.
?X:
?MAKE:Finish: Chk_MANI Extract Myread Oldsym Magic_h cat rm contains \
 test package make
?MAKE: -pick add $@ %<
?F:!config.sh
?T:pwd
: Finish up by extracting the .SH files
case "$alldone" in
exit)
?X: They supplied the -E switch
 echo "Stopping at your request, leaving temporary files around."
 exit 0
 ;;
cont)
 ;;
")
 dflt="
 nostick=true
 $cat <<EOM

If you'd like to make any changes to the config.sh
 file before I begin
to configure things, do it as a shell escape now (e.g. !vi config.sh).

EOM
 rp="Press return or use a shell escape to edit config.sh:"
 . UU/myread
 nostick="
 case "$ans" in
 ") ;;
 *) : in case they cannot read
  sh 1>&4 -c "$ans";;
 esac
 ;;
```

```
esac

: if this fails, just run all the .SH files by hand
. ./config.sh

?X:
?X: Turn silent mode off from now on (we want a verbose file extraction).
?X: This means we have to explicitly test for '$silent' from now on to
?X: strip off any verbose messages.
?X:
echo " "
exec 1>&4
pwd=`pwd`
. ./UU/extract
cd "$pwd"

if $contains '^depend:' [Mm]akefile >/dev/null 2>&1; then
 dflt=y
 case "$silent" in
 true) ;;
 *)
  $cat <<EOM

Now you need to generate make dependencies by running "$make depend".
You might prefer to run it in background: "$make depend > makedepend.out &"
It can take a while, so you might not want to run it right now.

EOM
  ;;
 esac
 rp="Run $make depend now?"
 . UU/myread
 case "$ans" in
 y*)
  $make depend
 && echo "Now you must run '$make'."
  ;;
 *)
  echo "You must run '$make depend' then '$make'."
  ;;
 esac
elif test -f [Mm]akefile; then
 echo " "
 echo "Now you must run a $make."
else
 echo "Configure done."
fi
```

```
if $test -f Policy.sh; then
  $cat <<EOM

If you compile $package on a different machine or from a different object
directory, copy the Policy.sh file from this object directory to the
new one before you run Configure -- this will help you with most of
the policy defaults.

EOM
fi
if $test -f UU/config.msg; then
  echo "Hmm.  I also noted the following information while running:"
  echo " "
  $cat UU/config.msg >&4
fi
?X:
?X: kit*isdone files are left over by shell archives built using the makedist
?X: script which comes from dist, while ark*isdone files are left over by
?X: the cshar archive maker.
?X:
$rm -f kit*isdone ark*isdone
$rm -rf UU

: End of Configure
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Finish.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: libyacc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libyacc.U,v $
?RCS: Revision 3.0.1.4  1997/02/28  16:09:19  ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS:
?RCS: Revision 3.0.1.3  1994/05/13  15:27:12  ram
?RCS: patch27: added byacc case (ADO)
?RCS:
?RCS: Revision 3.0.1.2  1994/05/06  15:09:01  ram
?RCS: patch23: now uses full library path instead of -l notation
```

```
?RCS:
?RCS: Revision 3.0.1.1  1994/01/24  14:13:49  ram
?RCS: patch16: un-obsoleted this unit for smooth yacc compilations
?RCS:
?RCS:
 Revision 3.0  1993/08/18  12:09:04  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libyacc: Loc yacc libpth _a
?MAKE: -pick add $@ %<
?S:libyacc:
?S: This variable contains the argument to pass to the loader in order
?S: to get the yacc library routines.  If there is no yacc or yacc
?S: library, it is null.
?S:.
?T:xxx
: see if we should include -ly
echo " "
case "$yacc" in
*byacc*)
 echo "You are using byacc, so I won't look for a yacc library." >&4
 libyacc="
 ;;
*yacc)
 xxx=`./loc liby$_a x $libpth`
 case "$xxx" in
 x)
  echo "No yacc library found." >&4
  libyacc="
  ;;
 *)
  echo "yacc library found in $xxx." >&4
  libyacc="$xxx"
  ;;
 esac
 ;;
*bison*)
 echo "You are using bison, so I won't look for a yacc library." >&4
 libyacc="
 ;;
*)
echo "You don't seem to have yacc, so I won't look for the yacc library." >&4
 libyacc="
 ;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libyacc.U
```

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

```
?RCS: $Id: lintlib.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: lintlib.U,v $
?RCS: Revision 3.0  1993/08/18  12:09:05  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:lintlib lintlibexp: Getfile Loc Oldconfig
?MAKE: -pick add $@ %<
?S:lintlib:
?S: This variable holds the name of the directory in which the user wants
?S: to put public lint-library files for the package in question.  It is
?S: most often a local directory such as /usr/local/lib/lint. Programs using
?S: this variable must be prepared to
 deal with ~name expansion.
?S:.
?S:lintlibexp:
?S: This variable is the same as the lintlib variable, but is filename
?S: expanded at configuration time, for convenient use in your makefiles.
?S:.
: determine where public lint libraries go
case "$lintlib" in
'') dflt=`./loc . "." /usr/local/lib/lint /usr/lib/lint /usr/lib`;;
*) dflt="$lintlib" ;;
esac
echo " "
fn=d~
rp='Where do you want to put the public lint libraries?'
. ./getfile
lintlib="$ans"
lintlibexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/lintlib.U
No license file was found, but licenses were detected in source scan.

```
?RCS:     c) the GNU General Public License as published by the Free
?RCS:     Software Foundation; either version 1, or (at your option) any
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/d_builtin_overflow.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Extractall.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Extractall.U,v $
?RCS: Revision 3.0.1.1  1997/02/28  15:00:43  ram
?RCS: patch61: created
?RCS:
?X:
?X: If extraction has been requested, load the configuration file, perform
?X: the extraction and exit.
?X:
?X: This unit was originally a part of Options.U. It had to be removed from
?X: it to prevent a dependency cycle: Extract -> src -> Options -> Extract
?X: The Begin.U unit now requires us before beginning to do anything
?X: interesting, to ensure
 proper semantics. -- RAM, 15/03/96
?X:
?MAKE:Extractall: Extract Options
?MAKE: -pick wipe $@ %<
: extract files and exit if asked to do so
case "$extractsh" in
true)
?X: Undo the forced silent=true when -S was supplied, by probing realsilent
?X: which was set iff -s was also given. See Options.U for details.
 case "$realsilent" in
 true) ;;
 *) exec 1>&4;;
 esac
 case "$config_sh" in
 '') config_sh='config.sh';;
 esac
 echo " "
 echo "Fetching answers from $config_sh..."
 cd ..
 . $config_sh
?X: extract has to be run from the top directory, not within UU.
 . UU/optdef.sh
```

```
 echo " "
?X: extract has to be run from the top directory, not within UU.
 . UU/extract
 rm -rf UU
 echo "Extraction done."
 exit 0
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Extractall.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1999 Jarkko Hietaniemi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?MAKE:sitehtml1dir sitehtml1direxp installsitehtml1dir: Getfile \
 Setprefixvar prefix siteprefix html1dir sed
?MAKE: -pick add $@ %<
?Y:TOP
?D:sitehtml1dir="
?S:sitehtml1dir:
?S: This variable contains the name of the directory in which site-specific
?S: html source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S: The standard distribution will put nothing in this directory.
?S: After perl
 has been installed, users may install their own local
?S: html pages in this directory with
?S:  MakeMaker Makefile.PL
?S: or equivalent.  See INSTALL for details.
?S:.
?D:sitehtml1direxp="
?S:sitehtml1direxp:
?S: This variable is the same as the sitehtml1dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installsitehtml1dir="
?S:installsitehtml1dir:
?S: This variable is really the same as sitehtml1direxp, unless you are using
```

```
?S: AFS in which case it points to the read/write location whereas
?S: html1direxp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installsitehtml1dir
?LINT:set sitehtml1dir
?LINT:set sitehtml1direxp
: determine where add-on html pages go
: There is no standard location, so try to copy the previously-selected
: directory structure for the core html pages.
case "$sitehtml1dir" in
")
   dflt=`echo "$html1dir" | $sed "s#^$prefix#$siteprefix#"` ;;
*)     dflt=$sitehtml1dir ;;
esac
case "$dflt" in
"|' ') dflt=none ;;
esac
fn=dn+~
rp='Pathname where the site-specific html pages should be installed?'
. ./getfile
prefixvar=sitehtml1dir
. ./setprefixvar
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/sitehtml1dir.U
No license file was found, but licenses were detected in source scan.

```
/*
* This file was produced by running the config_h.SH script, which
* gets its values from $CONFIG_SH, which is generally produced by
* running Configure.
*
* Feel free to modify any of this as the need arises.  Note, however,
* that running config_h.SH again will wipe out any changes you've made.
* For a more permanent change edit $CONFIG_SH and rerun config_h.SH.
*
* \$Id: Config_h.U 1 2006-08-24 12:32:52Z rmanfredi $
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Config_h.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
```

```
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Typedef.U,v $
?RCS: Revision 3.0.1.3  1995/07/25  13:42:07  ram
?RCS: patch56: added backslash escapes within evals to prevent space problems
?RCS:
?RCS: Revision 3.0.1.2  1994/10/29  16:01:16  ram
?RCS: patch36: don't clobber visible 'val' variable, use 'varval' instead
?RCS:
?RCS: Revision 3.0.1.1  1994/08/29  16:05:14  ram
?RCS: patch32: created
?RCS:
?X:
?X: This unit checks for the definition of a given typedef.
?X:
?X: To use it, say:
?X: set typedef val_t default [includes]
?X: eval $typedef
?X:
?MAKE:Typedef:
 cppstdin cppminus cppflags rm contains Oldconfig
?MAKE: -pick add $@ %<
?F:!temp.c
?LINT:define typedef
?V:typedef
?S:typedef:
?S: This shell variable is used internally by Configure to check
?S: wether a given typedef is defined or not. A typical use is:
?S:  set typedef val_t default [includes]
?S:  eval $typedef
?S: That will return val_t set to default if the typedef was not found,
?S: to typedef otherwise. If no includes are specified, look in sys/types.h.
?S:.
?T:type var def inclist varval inc
: define an is-a-typedef? function
typedef='type=$1; var=$2; def=$3; shift; shift; shift; inclist=$@;
case "$inclist" in
"") inclist="sys/types.h";;
esac;
eval "varval=\$$var";
case "$varval" in
"")
 $rm -f temp.c;
```

```
 for inc in $inclist; do
  echo "#include <$inc>" >>temp.c;
 done;
 $cppstdin $cppflags $cppminus < temp.c >temp.E 2>/dev/null;
 if $contains $type temp.E >/dev/null 2>&1; then
  eval "$var=\$type";
 else
  eval "$var=\$def";
 fi;
 $rm -f temp.?;;
*) eval
 "$var=\$varval";;
esac'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Typedef.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Instruct.U,v $
?RCS: Revision 3.0.1.3  1997/02/28  15:02:55  ram
?RCS: patch61: logname / whoami sequence rewritten to use case
?RCS:
?RCS: Revision 3.0.1.2  1995/02/15  14:11:34  ram
?RCS: patch51: author name now appears at the end of the paragraph (WED)
?RCS:
?RCS: Revision 3.0.1.1  1995/01/11  15:12:05  ram
?RCS: patch45: now documents the & escape to turn -d on at the read prompt
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:04  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X:
 This unit spew out the directions that we want everyone to read.  I try to
?X: keep the first "pagefull" much less than a page since they don't know it
?X: isn't going to go shooting off the top of the screen, and we don't want
?X: to panic them yet.
?X:
```

```
?MAKE:Instruct: Begin Myread Configdir contains
?MAKE: -pick wipe $@ %<
?T:user needman firsttime
: general instructions
needman=true
firsttime=true
user=`(logname) 2>/dev/null`
case "$user" in
") user=`whoami 2>&1`;;
esac
if $contains "^$user\$" ../.config/instruct >/dev/null 2>&1; then
 firsttime=false
 echo " "
 rp='Would you like to see the instructions?'
 dflt=n
 . ./myread
 case "$ans" in
 [yY]*) ;;
 *) needman=false;;
 esac
fi
if $needman; then
 cat <<EOH

This installation shell script will examine your system and ask you questions
to determine how the <PACKAGENAME> package should be installed. If you get
stuck on a question, you may use a ! shell escape to start a subshell or
execute a command.  Many of the questions will have
 default answers in square
brackets; typing carriage return will give you the default.

On some of the questions which ask for file or directory names you are allowed
to use the ~name construct to specify the login directory belonging to "name",
even if you don't have a shell which knows about that.  Questions where this is
allowed will be marked "(~name ok)".

EOH
 rp=''
 dflt='Type carriage return to continue'
 . ./myread
 cat <<'EOH'

The prompter used in this script allows you to use shell variables and
backticks in your answers.  You may use $1, $2, etc...  to refer to the words
in the default answer, as if the default line was a set of arguments given to a
script shell.  This means you may also use $* to repeat the whole default line,
so you do not have to re-type everything to add something to the default.
```

```
Everytime there is a substitution, you will have to confirm.  If there is an
error (e.g. an unmatched backtick), the default answer will remain unchanged
and you will be prompted
 again.

If you are in a hurry, you may run 'Configure -d'.  This will bypass nearly all
the questions and use the computed defaults (or the previous answers if there
was already a config.sh file). Type 'Configure -h' for a list of options.
You may also start interactively and then answer '& -d' at any prompt to turn
on the non-interactive behaviour for the remainder of the execution.

EOH
 . ./myread
 cat <<EOH

Much effort has been expended to ensure that this shell script will run on any
Unix system.  If despite that it blows up on yours, your best bet is to edit
Configure and run it again.  If you can't run Configure for some reason,
you'll have to generate a config.sh file by hand.  Whatever problems you
have, let me (<MAINTLOC>) know how I blew it.

This installation script affects things in two ways:

1) it may do direct variable substitutions on some of the files included
  in this kit.
2) it builds a config.h file for inclusion in C programs.  You may edit
  any of these
 files as the need arises after running this script.

If you make a mistake on a question, there is no easy way to back up to it
currently.  The easiest thing to do is to edit config.sh and rerun all the SH
files.  Configure will offer to let you do this before it runs the SH files.

EOH
?X: In case they played with the prompter...
 dflt='Type carriage return to continue'
 . ./myread
 case "$firsttime" in
 true) echo $user >>../.config/instruct;;
 esac
fi

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Instruct.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: libflex.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
```

```
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libflex.U,v $
?RCS: Revision 3.0.1.3  1997/02/28  15:57:48  ram
?RCS: patch61: replaced .a with $_a all over the place
?RCS:
?RCS: Revision 3.0.1.2  1994/05/06  15:07:02  ram
?RCS: patch23: now uses full library path instead of -l notation
?RCS:
?RCS: Revision 3.0.1.1  1994/01/24  14:13:25  ram
?RCS: patch16: un-obsoleted this unit to allow smooth lex/flex compilations
?RCS:
?RCS: Revision 3.0  1993/08/18  12:08:59  ram
?RCS: Baseline for dist 3.0 netwide
 release.
?RCS:
?MAKE:libflex: Loc lex libpth _a
?MAKE: -pick add $@ %<
?S:libflex:
?S: This variable contains the argument to pass to the loader in order
?S: to get the flex/lex library routines.  If there is no flex or flex
?S: library, it is null.
?S:.
?T:xxx
: see if we should include -lfl
echo " "
case "$lex" in
*flex)
 xxx=`./loc libfl$_a x $libpth`
 case "$xxx" in
 x)
  echo "No flex library found." >&4
  libflex="
  ;;
 *)
  echo "flex library found in $xxx." >&4
  libflex="$xxx"
  ;;
 esac
 ;;
*lex)
 xxx=`./loc libl$_a x $libpth`
```

```
 case "$xxx" in
 x)
  echo "No lex library found." >&4
  libflex="
  ;;
 *)
  echo "lex library found in $xxx." >&4
  libflex="$xxx"
  ;;
 esac
 ;;
*)
echo "You don't seem to have lex or flex, so I won't look for libraries." >&4
 ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/libflex.U
No license file was found, but licenses were detected in source scan.

```
/*
* $Id: setsid.C,v 3.0.1.1 1994/01/24 13:58:47 ram Exp ram $
*
*  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
*
*  You may redistribute only under the terms of the Artistic Licence,
*  as specified in the README file that comes with the distribution.
*  You may reuse parts of this distribution only within the terms of
*  that same Artistic Licence; a copy of which may be found at the root
*  of the source tree for dist 4.0.
*
* $Log: setsid.C,v $
* Revision 3.0.1.1  1994/01/24  13:58:47  ram
* patch16: created
*
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/C/fake/setsid.C
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Nothing.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
```

?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Nothing.U,v $
?RCS: Revision 3.0 1993/08/18 12:05:09 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: The purpose of this file is to supply an empty target for the private
?X: Makefile built by metaconfig to order the units.
?X:
?MAKE:Nothing: Head

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Nothing.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: spitshell.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: spitshell.U,v $
?RCS: Revision 3.0.1.4 1997/02/28 16:22:12 ram
?RCS: patch61: removed useless chatter as this is now done very early
?RCS:
?RCS: Revision 3.0.1.3 1995/01/11 15:37:01 ram
?RCS: patch45: use 'test -f' instead of 'test -r' for exec-only cat progs (WED)
?RCS: patch45: protected "sh -c" within backquotes for Linux and SGI
?RCS:
?RCS: Revision 3.0.1.2 1994/08/29 16:33:00 ram
?RCS: patch32: don't create spitshell under the UU directory
?RCS:
 patch32: allow for cat in /bin or /usr/bin
?RCS:
?RCS: Revision 3.0.1.1 1993/09/13 16:12:58 ram
?RCS: patch10: made #!-failure message more friendly (WAD)
?RCS:
?RCS: Revision 3.0 1993/08/18 12:09:49 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:spitshell shsharp sharpbang: eunicefix sh Head
?MAKE: -pick add $@ %<

```
?S:spitshell:
?S: This variable contains the command necessary to spit out a runnable
?S: shell on this system.  It is either cat or a grep -v for # comments.
?S:.
?S:shsharp:
?S: This variable tells further Configure units whether your sh can
?S: handle # comments.
?S:.
?S:sharpbang:
?S: This variable contains the string #! if this system supports that
?S: construct.
?S:.
?F:!sharp
?T:xcat p
?X: "paths" comes from Head
?LINT:extern paths _exe
: see if sh knows # comments
?X: This is loaded up early, so avoid being chatty.
?X: echo " "
?X: echo "Checking your $sh to see if it knows about # comments..." >&2
if `$sh -c '#' >/dev/null 2>&1`; then
?X: echo
 "Your $sh handles # comments correctly."
 shsharp=true
 spitshell=cat
?X: echo " "
?X: echo "Okay, let's see if #! works on this system..."
 xcat=/bin/cat
 test -f $xcat$_exe || xcat=/usr/bin/cat
 if test ! -f $xcat$_exe; then
  for p in `echo $PATH | sed -e "s/$p_/ /g"` $paths; do
   if test -f $p/cat$_exe; then
    xcat=$p/cat
    break
   fi
  done
  if test ! -f $xcat$_exe; then
   echo "Can't find cat anywhere!"
   exit 1
  fi
 fi
 echo "#!$xcat" >sharp
 $eunicefix sharp
 chmod +x sharp
 ./sharp > today 2>/dev/null
 if test -s today; then
?X:  echo "It does."
  sharpbang='#!'
```

```
 else
  echo "#! $xcat" > sharp
  $eunicefix sharp
  chmod +x sharp
  ./sharp > today 2>/dev/null
  if test -s today; then
?X:   echo "It does."
   sharpbang='#! '
  else
?X:   echo "Okay, let's see if #! works on this system..."
?X:   echo "It's just a comment."
   sharpbang=': use '
  fi
 fi
else
 echo " "
 echo "Your $sh doesn't grok # comments--I will strip them later on."
 shsharp=false
?X: The
 spitshell script will be perused, so leave it out the UU directory
 cd ..
 echo "exec grep -v '^[  ]*#'" >spitshell
 chmod +x spitshell
 $eunicefix spitshell
 spitshell=`pwd`/spitshell
 cd UU
 echo "I presume that if # doesn't work, #! won't work either!"
 sharpbang=': use '
fi
rm -f sharp today
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/spitshell.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: manfmt.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: manfmt.U,v $
?RCS: Revision 3.0.1.5  1997/02/28  16:11:57  ram
?RCS: patch61: don't ask for AFS when they choose to not install pages
```

```
?RCS:
?RCS: Revision 3.0.1.4  1995/09/25  09:16:52  ram
?RCS: patch59: unit is now forced to the top of Configure, if possible
?RCS:
?RCS: Revision 3.0.1.3  1995/01/30  14:39:20  ram
?RCS: patch49: new installmanfmt and AFS-lookup for formatted man pages
?RCS: patch49: can now handle installation prefix changes (from WED)
?RCS:
?RCS:
 Revision 3.0.1.2  1994/08/29  16:30:31  ram
?RCS: patch32: now uses installation prefix for default setting
?RCS:
?RCS: Revision 3.0.1.1  1993/09/13  16:09:22  ram
?RCS: patch10: allows for L1 man page extension (WAD)
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:13  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:manfmt manfmtexp installmanfmt: Getfile Loc Oldconfig cat manext \
 spackage Prefixit prefixexp Prefixup afs test
?MAKE: -pick add $@ %<
?Y:TOP
?S:manfmt:
?S: This variable contains the name of the directory in which formatted
?S: manual pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command. Note
?S: that you may have to do ~name substitution. Use manfmtexp otherwise.
?S:.
?S:manfmtexp:
?S: This is the same as the manfmt variable, but is filename expanded
?S: at configuration time, for programs not willing to deal with it at
?S: run-time.
?S:.
?S:installmanfmt:
?S: This variable is really
 the same as manfmtexp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: mansrcexp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?LINT:change manext
?T:lookpath
: determine where manual pages go
set manfmt manfmt
eval $prefixit
$cat <<EOM

$spackage has pre-formatted manual pages.  If you don't want these installed,
```

```
answer 'none' to the next question.

EOM
case "$manfmt" in
")
 lookpath="$prefixexp/catman/man1 $prefixexp/man/cat1"
 lookpath="$lookpath $prefixexp/catman/u_man/man1"
 lookpath="$lookpath $prefixexp/catman/l_man/man1"
 lookpath="$lookpath $prefixexp/catman/cat1 /usr/catman/local/man1"
 lookpath="$lookpath /usr/catman/manl /usr/man/cat1"
 lookpath="$lookpath /usr/catman/mann /usr/catman/l_man/man1"
 lookpath="$lookpath /usr/catman/u_man/man1 /usr/catman/man1"
 dflt=`./loc . none $lookpath`
 set dflt
 eval $prefixup
 ;;
*)  dflt="$manfmt"
 ;;
esac
fn=dn~
rp='Where
 do pre-formatted manual pages go?'
. ./getfile
if test "X$manfmtexp" != "X$ansexp"; then
 installmanfmt="
fi
manfmt="$ans"
manfmtexp="$ansexp"
if $afs && $test "$manfmt"; then
 $cat <<EOM

Since you are running AFS, I need to distinguish the directory in which
manual pages reside from the directory in which they are installed (and from
which they are presumably copied to the former directory by occult means).

EOM
 case "$installmanfmt" in
 ") dflt=`echo $manfmtexp | sed 's#^/afs/#/afs/.#'`;;
 *) dflt="$installmanfmt";;
 esac
 fn=de~
 rp='Where will pre-formatted man pages be installed?'
 . ./getfile
 installmanfmt="$ans"
else
 installmanfmt="$manfmtexp"
fi
```

```
case "$manfmt" in
") manext='0';;
*l) manext=l;;
*n) manext=n;;
*o) manext=l;;
*p) manext=n;;
*C) manext=C;;
*L) manext=L;;
*L1) manext=L1;;
*) manext=1;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/manfmt.U
No license file was found, but licenses were detected in source scan.

```
/*
* $Id: rename.C,v 3.0.1.1 1994/01/24 13:58:42 ram Exp ram $
*
*  Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
*
*  You may redistribute only under the terms of the Artistic Licence,
*  as specified in the README file that comes with the distribution.
*  You may reuse parts of this distribution only within the terms of
*  that same Artistic Licence; a copy of which may be found at the root
*  of the source tree for dist 4.0.
*
* $Log: rename.C,v $
* Revision 3.0.1.1  1994/01/24  13:58:42  ram
* patch16: created
*
*/
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/lib/C/fake/rename.C
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: package.U,v $
```

```
?RCS: Revision 3.0.1.3  1994/10/29  16:27:21  ram
?RCS: patch36: beware of non-ascii character sets when translating case
?RCS:
?RCS: Revision 3.0.1.2  1993/11/10  17:37:02  ram
?RCS: patch14: skip definition of spackage if not otherwise used
?RCS:
?RCS: Revision 3.0.1.1  1993/09/13  16:11:10  ram
?RCS: patch10: added spackage, suitable for starting sentences
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:28  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:package spackage:
 Nothing
?MAKE: -pick wipe $@ %<
?S:package:
?S: This variable contains the name of the package being constructed.
?S: It is primarily intended for the use of later Configure units.
?S:.
?S:spackage:
?S: This variable contains the name of the package being constructed,
?S: with the first letter uppercased, i.e. suitable for starting
?S: sentences.
?S:.
?C:PACKAGE:
?C: This variable contains the name of the package being built.
?C:.
?H:#define PACKAGE "$package"
?H:.
?T:first last
: set package name
package='<PACKAGENAME>'
@if spackage
first=`echo $package | sed -e 's/^\(.\).*/\1/'`
last=`echo $package | sed -e 's/^.\(.*\)/\1/'`
?X:
?X: So early in the Configure script, we don't have ./tr set up and can't
?X: include Tr in our dependency or that would create a cycle. Therefore,
?X: we have to somehow duplicate the work done in Tr. That's life.
?X:
case "`echo AbyZ | tr '[:lower:]' '[:upper:]' 2>/dev/null`" in
ABYZ) spackage=`echo $first | tr '[:lower:]' '[:upper:]'`$last;;
*) spackage=`echo
 $first | tr '[a-z]' '[A-Z]'`$last;;
esac
@end
```

Found in path(s):

```
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/package.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: vendorhtml3dir.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1999, Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: vendorhtml3dir.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
?RCS:
?MAKE:vendorhtml3dir vendorhtml3direxp installvendorhtml3dir: html3dir Getfile \
 Oldconfig Setprefixvar Prefixit test vendorprefix prefix sed
?MAKE: -pick add $@ %<
?Y:TOP
?S:vendorhtml3dir:
?S: This variable contains the name of the directory for html
?S: library pages.  It may have a ~ on the front.
?S: The standard distribution will put nothing
 in this directory.
?S: Vendors who distribute perl may wish to place their own
?S: html pages for modules and extensions in this directory with
?S:  MakeMaker Makefile.PL INSTALLDIRS=vendor
?S: or equivalent.  See INSTALL for details.
?S:.
?S:vendorhtml3direxp:
?S: This variable is the ~name expanded version of vendorhtml3dir, so that you
?S: may use it directly in Makefiles or shell scripts.
?S:.
?D:installvendorhtml3dir="
?S:installvendorhtml3dir:
?S: This variable is really the same as vendorhtml3direxp but may differ on
?S: those systems using AFS. For extra portability, only this variable
?S: should be used in makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installvendorhtml3dir
: Set the vendorhtml3dir variables
case "$vendorprefix" in
") vendorhtml3dir="
 vendorhtml3direxp="
 ;;
```

```
*) : determine where vendor-supplied module html pages go.
 : There is no standard location, so try to copy the previously-selected
 : directory structure for the core html pages.
 : XXX Better default
 suggestions would be welcome.
 case "$vendorhtml3dir" in
 '') dflt=`echo "$html3dir" | $sed "s#^$prefix#$vendorprefix#"` ;;
 *) dflt=$vendorhtml3dir ;;
 esac
 case "$dflt" in
 ''|' ') dflt=none ;;
 esac
 fn=dn+~
 rp='Pathname for the vendor-supplied html pages?'
 . ./getfile
 vendorhtml3dir="$ans"
 vendorhtml3direxp="$ansexp"
 ;;
esac
: Use ' ' for none so value is preserved next time through Configure
$test X"$vendorhtml3dir" = "X" && vendorhtml3dir=' '
prefixvar=vendorhtml3dir
. ./installprefix

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorhtml3dir.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: html3dir.U,v $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: html3dir.U,v $
?RCS:
?MAKE:html3dir html3direxp installhtml3dir: cat sed Loc Myread \
 spackage test Getfile Setprefixvar Prefixit Prefixup html1dir
?MAKE: -pick add $@ %<
?Y:TOP
?D:html3dir=''
?S:html3dir:
?S: This variable contains the name of the directory in which html
?S: source pages are to be put.  This directory is for pages
```

```
?S: that describe libraries or modules.  It is intended to
?S: correspond roughly to section 3 of the Unix manuals.
?S:.
?D:html3direxp="
?S:html3direxp:
?S: This variable
 is the same as the html3dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installhtml3dir="
?S:installhtml3dir:
?S: This variable is really the same as html3direxp, unless you are
?S: using a different installprefix.  For extra portability, you
?S: should only use this variable within your makefiles.
?S:.
?LINT:change prefixvar
?LINT:set html3direxp
?LINT:set installhtml3dir
: determine where html pages for libraries and modules go
set html3dir html3dir none
eval $prefixit
$cat <<EOM

If you wish to install html files for modules associated with $spackage,
indicate the appropriate directory here.  To skip installing html files,
answer "none".
EOM
: There is no obvious default.  If they have specified html1dir, then
: try to key off that, possibly changing .../html1 into .../html3.
case "$html3dir" in
") html3dir=`echo "$html1dir" | $sed 's/1$/3$/'` ;;
*) dflt=$html3dir ;;
esac
fn=dn+~
rp="Directory for the $spackage module
 html pages?"
. ./getfile
prefixvar=html3dir
. ./setprefixvar
: Use ' ' for none so value is preserved next time through Configure
$test X"$html3dir" = "X" && html3dir=' '

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/html3dir.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: kernel.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
```

```
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: kernel.U,v $
?RCS: Revision 3.0  1993/08/18  12:08:54  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:kernel: Getfile test
?MAKE: -pick add $@ %<
?S:kernel:
?S: This variable becomes the (fully rooted) path name of the kernel.
?S:.
: find the name of the kernel.
echo " "
case "$kernel" in
")
 if $test -r /unix; then
  dflt=/unix
 elif $test -r /vmunix; then
  dflt=/vmunix
 elif $test -r /xenix; then
  dflt=/xenix
 elif $test -r /mach; then
  dflt=/mach
 elif
 $test -r /dgux; then
  dflt=/dgux
 elif $test -r /hp-ux; then
  dflt=/hp-ux
 elif $test -r /syst; then
  dflt=/syst
 elif $test -r /arix; then
  dflt=/arix
 elif $test -r /irix; then
  dflt=/arix
 else
  dflt='unknown'
  set X /*x
  shift
  case $# in
  1)
   if $test -r "$1"; then
    dflt="$1"
```

```
  fi
  ;;
 esac
fi
;;
*)
 dflt="$kernel"
 ;;
esac
fn=f
rp='What is the name of your kernel?'
. ./getfile
kernel="$ans"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/kernel.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Filexp.U,v $
?RCS: Revision 3.0.1.2  1994/10/29  15:52:53  ram
?RCS: patch36: added ?F: line for metalint file checking
?RCS: patch36: added HOME to the ?T: line since metalint now checks ${HOME}
?RCS:
?RCS: Revision 3.0.1.1  1994/05/06  14:03:00  ram
?RCS: patch23: made sure error status from csh is propagated (WED)
?RCS:
?RCS: Revision 3.0  1993/08/18  12:04:53  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This unit produces a shell script which will expand filenames beginning
?X:
 with tildes.  The script is deleted at the end of Configure.
?X:
?MAKE:Filexp: startsh sed test expr eunicefix
?MAKE: -pick add $@ %<
?F:./filexp
?T:HOME LOGDIR dir me name failed
```

```
: set up shell script to do ~ expansion
cat >filexp <<EOSS
$startsh
: expand filename
?X:
?X: The case entries below escape the ~ as some shells have shown expansion
?X: of the ~ during here-doc processing.
?X:
case "\$1" in
\~/*|\~)
 echo \$1 | $sed "s|~|\${HOME-\$LOGDIR}|"
 ;;
\~*)
 if $test -f /bin/csh; then
  /bin/csh -f -c "glob \$1"
  failed=\$?
  echo ""
  exit \$failed
 else
  name=\`$expr x\$1 : '..\([^/]*\)'\`
  dir=\`$sed -n -e "/^\${name}:/{s/^[^:]*:[^:]*:[^:]*:[^:]*:[^:]*:[^:]*:\([^:]*\).*"\$"'/\1/" -e p -e q -e '}' </etc/passwd\`
  if $test ! -d "\$dir"; then
   me=\`basename \$0\`
   echo "\$me: can't locate home directory for: \$name" >&2
   exit 1
  fi
  case "\$1" in
  */*)
   echo \$dir/\`$expr x\$1 : '..[^/]*/\(.*\)'\`
   ;;
  *)
   echo \$dir
   ;;
  esac
 fi
 ;;
*)
 echo \$1
 ;;
esac
EOSS
chmod
 +x filexp
$eunicefix filexp

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Filexp.U
```

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

```
?RCS: $Id: siteprefix.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
?RCS:
?RCS: Copyright (c) 1999 Andy Dougherty
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: siteprefix.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
?RCS:
?MAKE:siteprefix siteprefixexp +oldsiteprefix: Getfile Loc Oldconfig cat package prefix
?MAKE: -pick add $@ %<
?S:siteprefix:
?S: This variable holds the full absolute path of the directory below
?S: which the user will install add-on packages.
?S: See INSTALL for usage and examples.
?S:.
?S:siteprefixexp:
?S: This variable holds the full absolute path of the
 directory below
?S: which the user will install add-on packages.  Derived from siteprefix.
?S:.
?S:oldsiteprefix:
?S: This variable is set non-null if the siteprefix was previously defined
?S: and gets set to a new value. Used internally by Configure only.
?S:.
: Set the siteprefix variables
$cat <<EOM

After $package is installed, you may wish to install various
add-on modules and utilities.  Typically, these add-ons will
be installed under $prefix with the rest
of this package.  However, you may wish to install such add-ons
elsewhere under a different prefix.

If you do not wish to put everything under a single prefix, that's
ok.  You will be prompted for the individual locations; this siteprefix
is only used to suggest the defaults.

The default should be fine for most people.

EOM
```

```
fn=d~+
rp='Installation prefix to use for add-on modules and utilities?'
: XXX Here might be another good place for an installstyle setting.
case "$siteprefix" in
'') dflt=$prefix ;;
*)  dflt=$siteprefix
 ;;
esac
. ./getfile
: XXX Prefixit unit does not yet support siteprefix and vendorprefix
oldsiteprefix=''
case "$siteprefix" in
'') ;;
*) case "$ans" in
 "$prefix") ;;
 *) oldsiteprefix="$prefix";;
 esac
 ;;
esac
siteprefix="$ans"
siteprefixexp="$ansexp"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/siteprefix.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: MailAuthor.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: Original Author: Graham Stoney <greyham@research.canon.oz.au>
?RCS:
?RCS: $Log: MailAuthor.U,v $
?RCS: Revision 3.0.1.5  1997/02/28  15:04:41  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0.1.4  1994/08/29  16:05:09  ram
?RCS: patch32: avoid message sending if they said no previously
?RCS:
?RCS: Revision 3.0.1.3  1993/10/16  13:47:30  ram
?RCS: patch12: now makes sure user-specified address is in Internet format
?RCS:
```

```
?RCS: Revision
 3.0.1.2  1993/09/13  15:48:49  ram
?RCS: patch10: reverted to original intent by the Author himself
?RCS:
?RCS: Revision 3.0.1.1  1993/08/27  14:38:38  ram
?RCS: patch7: now prompts user for its e-mail address
?RCS: patch7: no longer silent when mail has been sent
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:06  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?RCS:
?X:
?X: This unit asks the user to please send a message to the author.
?X: To force inclusion of this unit, you must add it's name to the
?X: dependancies on the MAKE line in your private copy of End.U.
?X: This allows a smart mailagent program to automatically let users know
?X: when their package is out of date, and to allow users to be notified of
?X: any future patches.
?X:
?MAKE:MailAuthor mailpatches notifypatches usermail: test cat mailer \
 package Myread patchlevel baserev rm rsrc Oldconfig Configdir
?MAKE: -pick wipe $@ %<
?S:mailpatches:
?S: Indicates whether the user would like future patches to be mailed
?S: directly
 to them.
?S:.
?S:notifypatches:
?S: Indicates whether the user would like notification of future patches
?S: mailed to them.
?S:.
?S:usermail:
?S: This variable is used internally by Configure to keep track of the
?S: user e-mail address, where notifications or patches should be sent.
?S: A '-' value means the return address will be extracted by parsing
?S: the mail headers.
?S:.
?T:opt mailpatches notifypatches atsh status
: notify author that his package is used
if $test -f ../.config/mailauthor &&
 cmp $rsrc/patchlevel.h ../.config/mailauthor >/dev/null 2>&1
then
 status="say that you're using $package";
 case "$mailpatches" in
 true) status='have patches mailed to you as they are issued';;
 esac
 case "$notifypatches" in
```

```
 true) status='be notified when new patches are issued';;
 esac
 $cat <<EOM

You have already sent the author of $package (<MAINTLOC>) mail to
$status. If you wish, you may modify
your previous request by sending a new mail with different options.

EOM
 rp='Should
 I send a status update to <MAINTLOC>?'
 dflt=n
else
 $cat <<EOM

If you are able to send mail to the Internet, the author of $package would
really appreciate you letting me send off a quick note, just to say that you've
tried it. The author is more likely to spend time maintaining $package if it's
known that many people are using it, and you can even ask to get sent new
patches automagically this way if you wish. To protect your privacy, all I'll
say in the mail is the version of $package that you're using.

EOM
 rp='Should I send mail to <MAINTLOC>?'
 dflt=y
?X: Ensure default is 'n' if question has been asked already, in case they
?X: run Configure -d next time and answered 'n' the first time. Therefore,
?X: an empty nomail will be created later on even if no mail is sent.
 $test -f ../.config/nomail && dflt=n
fi
. ./myread
case "$ans" in
[yY]*)
 echo " "
 echo "Great! Your cooperation is really appreciated."
 $cat <<EOM

Some braindead sites do not set a proper return
 address in the From: header of
their outgoing mail, making it impossible to reply to mail they generate.
If your site is broken in this way, write to your system administrator and get
it fixed!!! In the mean time, you can manually specify the Internet e-mail
address by which the author can get back to you, should there be a need to do
so. If manually specified, it should be something like "user@domain.top".
If your mail system generates addresses correctly, specify "none".

EOM
 case "$usermail" in
```

```
'-'|'') dflt=none;;
*) dflt="$usermail";;
esac
rp='Manually specify a return address to use:'
. ./myread
case "$ans" in
none|*@*.*)
 case "$ans" in
 none) usermail='-';;
 *) usermail="$ans";;
 esac
 ;;
*)
 echo "(Address does not look like an Internet one -- ignoring it.)"
?X:
?X: If we can't trust their mailer or their return address, it's highly
?X: suggested that they only register and don't ask to get anything from
?X: the author, since it's likely to bounce in null-land --
 RAM.
?X:
 usermail='-'
 mailpatches=false
 notifypatches=false
 ;;
esac
echo " "
opt="
rp='Would you like to have new patches automatically mailed to you?'
case "$mailpatches" in
true) dflt=y;;
*) dflt=n;;
esac
. ./myread
case "$ans" in
[yY]*) opt=' mailpatches'; mailpatches=true;;
*)
 mailpatches=false
 echo " "
 rp='Ok, would you like to simply be notified of new patches?'
 case "$notifypatches" in
 false) dflt=n;;
 *) dflt=y;;
 esac
 . ./myread
 echo " "
 case "$ans" in
 [yY]*) opt=' notifypatches'; notifypatches=true;;
 *)
```

```
  echo "Fine, I'll simply say that you've tried it then."
  notifypatches=false
  ;;
 esac
 ;;
esac
echo "Sending mail to <MAINTLOC>..." >&4
?X: Bizarre hack here. We can't just put @SH in the hereis lines below, because
?X: metaconfig will interpret it as a command, and there's no quoting mechanism.
?X: Do it via a variable instead.
atsh='@SH'
$mailer <MAINTLOC> <<EOM >/dev/null 2>&1
Subject: Command
Precedence: junk
To: <MAINTLOC>

$atsh
 package $usermail $package $baserev $patchlevel$opt
EOM
 $rm -f ../.config/mailauthor ../.config/nomail
 cp $rsrc/patchlevel.h ../.config/mailauthor
 ;;
*)
 case "$dflt" in
 "y")
  echo "Oh well, maybe next time."
  cp /dev/null ../.config/nomail
  ;;
 esac
 ;;
esac

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/MailAuthor.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: libc.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: libc.U,v $
?RCS: Revision 3.0.1.10  1997/02/28  15:56:48  ram
```

?RCS: patch61: replaced .a with $_a all over the place
?RCS: patch61: added support for HPUX-10 nm output
?RCS:
?RCS: Revision 3.0.1.9 1995/07/25 14:11:56 ram
?RCS: patch56: now knows about OS/2 platforms
?RCS:
?RCS: Revision 3.0.1.8 1995/05/12 12:20:47 ram
?RCS: patch54: made sure only most recent version of shared lib is picked
?RCS: patch54: final "nm -p" check now uses xscan and xrun
 like everybody
?RCS: patch54: can now grok Linux nm output with lead __IO (ADO)
?RCS: patch54: added support for Linux ELF output, using 'W' for alias (ADO)
?RCS:
?RCS: Revision 3.0.1.7 1994/10/29 16:23:40 ram
?RCS: patch36: now looks for shared libraries before anything else (ADO)
?RCS: patch36: added new nm output format (ADO)
?RCS:
?RCS: Revision 3.0.1.6 1994/08/29 16:28:10 ram
?RCS: patch32: added I-type symbols for nm output parsing on Linux
?RCS:
?RCS: Revision 3.0.1.5 1994/06/20 07:03:24 ram
?RCS: patch30: checks are now presented by succession of if/elif
?RCS: patch30: uniformized checks for shared objects with new so symbol
?RCS:
?RCS: Revision 3.0.1.4 1994/05/06 15:06:33 ram
?RCS: patch23: added shared library knowledge (ADO and WED)
?RCS:
?RCS: Revision 3.0.1.3 1994/01/24 14:12:17 ram
?RCS: patch16: can now export nm_extract as an internal-use only variable
?RCS:
?RCS: Revision 3.0.1.2 1993/09/13 16:09:03 ram
?RCS: patch10: added special handling for Apollo
 systems (WAD)
?RCS:
?RCS: Revision 3.0.1.1 1993/08/27 14:40:03 ram
?RCS: patch7: added entry for /usr/shlib/libc.so (OSF/1 machines)
?RCS:
?RCS: Revision 3.0 1993/08/18 12:08:57 ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:libc +nm_extract: echo n c rm test grep Getfile Myread Oldconfig Loc \
 sed libs incpath libpth ar runnm nm nm_opt nm_so_opt contains xlibpth \
 so _a _o osname trnl tr sort uniq sysroot
?MAKE: -pick add $@ %<
?S:libc:
?S: This variable contains the location of the C library.
?S:.
?S:nm_extract:

```
?S: This variable holds the name of the extraction command used to process
?S: the output of nm and yield the list of defined symbols. It is used
?S: internally by Configure.
?S:.
?T:thislib try libnames xxx xscan xrun thisname com tans file
?F:!libnames !libc.tmp !tmp.imp
?LINT:extern PASE
?LINT:extern libnames
?LINT:change nm_opt
?INIT:libnames=''
: Figure out where the libc is located
case "$runnm" in
true)
?X: indentation is wrong on purpose--RAM
:
 get list of predefined functions in a handy place
echo " "
case "$libc" in
'') libc=unknown
 case "$libs" in
 *-lc_s*) libc=`./loc libc_s$_a $libc $libpth`
 esac
 ;;
esac
case "$libs" in
'') ;;
*)  for thislib in $libs; do
 case "$thislib" in
 -lc|-lc_s)
  : Handle C library specially below.
  ;;
 -l*)
  thislib=`echo $thislib | $sed -e 's/^-l//'`
  if try=`./loc lib$thislib.$so.'*' X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc lib$thislib.$so X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc lib$thislib$_a X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc $thislib$_a X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc lib$thislib X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc $thislib X $libpth`; $test -f "$try"; then
   :
  elif try=`./loc Slib$thislib$_a X $xlibpth`; $test -f "$try"; then
   :
  else
```

```
  try=''
 fi
 libnames="$libnames $try"
 ;;
*) libnames="$libnames $thislib" ;;
 esac
 done
 ;;
esac
?X:
?X: Some systems (e.g. DG/UX) use
 "environmental" links, which make the test
?X: -f fail. Ditto for symbolic links. So in order to reliably check the
?X: existence of a file, we use test -r. It will still fail with DG/UX links
?X: though, but at least it will detect symbolic links. At some strategic
?X: points, we make use of (test -h), using a sub-shell in case builtin test
?X: does not implement the -h check for symbolic links. This makes it
?X: possible to preset libc in a hint file for instance and have it show up
?X: as-is in the question.
?X:
xxx=normal
case "$libc" in
unknown)
?X:
?X: The sed below transforms .so.9 .so.12 into something like .so.0009 .so.0012,
?X: then sorts on it to allow keeping .so.12 instead of .so.9 as the latest
?X: up-to-date library. The initial filename (before sed munging, saved in hold
?X: space via 'h') is appended via 'G' before sorting, then the leading munged
?X: part is removed after sorting. Nice efficient work from Tye McQueen.
?X: The initial blurfl is here to prevent the trailing
 pipe from producing an
?X: empty string, causing Configure to output all its set variables!
?X:
 set /lib/libc.$so
 for xxx in $libpth; do
  $test -r $1 || set $xxx/libc.$so
  : The messy sed command sorts on library version numbers.
  $test -r $1 || \
   set `echo blurfl; echo $xxx/libc.$so.[0-9]* | \
   tr ' ' $trnl | egrep -v '\.[A-Za-z]*$' | $sed -e '
    h
    s/[0-9][0-9]*/0000&/g
    s/0*\([0-9][0-9][0-9][0-9][0-9]\)/\1/g
    G
    s/\n/ /' | \
    $sort | $sed -e 's/^.* //'`
  eval set \$$#
 done
```

```
 $test -r $1 || set $sysroot/usr/ccs/lib/libc.$so
 $test -r $1 || set $sysroot/lib/libsys_s$_a
 ;;
*)
?X: ensure the test below for the (shared) C library will fail
 set blurfl
 ;;
esac
if $test -r "$1"; then
 echo "Your (shared) C library seems to be in $1."
 libc="$1"
elif $test -r /lib/libc && $test -r /lib/clib; then
?X:
?X: Apollo has its C library in /lib/clib AND /lib/libc
?X: not to mention its math library in /lib/syslib...
?X:
 echo "Your C library seems to be in both /lib/clib
 and /lib/libc."
 xxx=apollo
 libc='/lib/clib /lib/libc'
 if $test -r /lib/syslib; then
  echo "(Your math library is in /lib/syslib.)"
?X: Put syslib in libc -- not quite right, but won't hurt
  libc="$libc /lib/syslib"
 fi
elif $test -r "$libc" || (test -h "$libc") >/dev/null 2>&1; then
 echo "Your C library seems to be in $libc, as you said before."
?X: For mips, and...
elif $test -r $incpath/usr/lib/libc$_a; then
 libc=$incpath/usr/lib/libc$_a;
 echo "Your C library seems to be in $libc.  That's fine."
elif $test -r /lib/libc$_a; then
 libc=/lib/libc$_a;
 echo "Your C library seems to be in $libc.  You're normal."
else
 if tans=`./loc libc$_a blurfl/dyick $libpth`; $test -r "$tans"; then
  :
 elif tans=`./loc libc blurfl/dyick $libpth`; $test -r "$tans"; then
  libnames="$libnames "`./loc clib blurfl/dyick $libpth`
 elif tans=`./loc clib blurfl/dyick $libpth`; $test -r "$tans"; then
  :
 elif tans=`./loc Slibc$_a blurfl/dyick $xlibpth`; $test -r "$tans"; then
  :
 elif tans=`./loc
 Mlibc$_a blurfl/dyick $xlibpth`; $test -r "$tans"; then
  :
 else
  tans=`./loc Llibc$_a blurfl/dyick $xlibpth`
```

```
 fi
 if $test -r "$tans"; then
  echo "Your C library seems to be in $tans, of all places."
  libc=$tans
 else
  libc='blurfl'
 fi
fi
if $test $xxx = apollo -o -r "$libc" || (test -h "$libc") >/dev/null 2>&1; then
 dflt="$libc"
 cat <<EOM

If the guess above is wrong (which it might be if you're using a strange
compiler, or your machine supports multiple models), you can override it here.

EOM
else
 dflt=''
 echo $libpth | $tr ' ' $trnl | $sort | $uniq > libpath
 cat >&4 <<EOM
I can't seem to find your C library.  I've looked in the following places:

EOM
 $sed 's/^/ /' libpath
 cat <<EOM

None of these seems to contain your C library. I need to get its name...

EOM
fi
fn=f
rp='Where is your C library?'
. ./getfile
libc="$ans"

echo " "
echo $libc $libnames | $tr ' ' $trnl | $sort | $uniq > libnames
set X `cat libnames`
shift
xxx=files
case $# in 1) xxx=file; esac
echo
 "Extracting names from the following $xxx for later perusal:" >&4
echo " "
$sed 's/^/ /' libnames >&4
echo " "
$echo $n "This may take a while...$c" >&4
```

```
?X:
?X: Linux may need the special Dynamic option to nm for shared libraries.
?X: In general, this is stored in the nm_so_opt variable.
?X: Unfortunately, that option may be fatal on non-shared libraries.
?X:
for file in $*; do
 case $file in
 *$so*) $nm $nm_so_opt $nm_opt $file 2>/dev/null;;
 *) $nm $nm_opt $file 2>/dev/null;;
 esac
done >libc.tmp

$echo $n ".$c"
?X:
?X: To accelerate processing, we look at the correct 'sed' command
?X: by using a small subset of libc.tmp, i.e. fprintf function.
?X: When we know which sed command to use, do the name extraction
?X:
$grep fprintf libc.tmp > libc.ptf
?X:
?X: In order to enhance readability and save some space, we define
?X: some variables that will be "eval"ed.
?X:
xscan='eval "<libc.ptf $com >libc.list"; $echo $n ".$c" >&4'
xrun='eval "<libc.tmp $com >libc.list"; echo "done." >&4'
?X:
 BSD-like output, I and W types added for Linux
?X: Some versions of Linux include a leading __IO in the symbol name.
?X: HP-UX 10 reportedly has trailing spaces, though I'm surprised it has
?X: BSD-like output.  (AD).
?X: GNU extension: i is "indirect function"
xxx='[ADTSIWi]'
if com="$sed -n -e 's/__IO//' -e 's/^.* $xxx  *//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: SYSV-like output
elif com="$sed -n -e 's/^__*//' -e 's/^\([a-zA-Z_0-9$]*\).*xtern.*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e '/|UNDEF/d' -e '/FUNC..GL/s/^.*|__*//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.* D __*//p' -e 's/^.* D //p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
```

```
  eval $xrun
elif com="$sed -n -e 's/^_//' -e 's/^\([a-zA-Z_0-9]*\).*xtern.*text.*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$'
 libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.*|FUNC |GLOB .*|//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$grep '|' | $sed -n -e '/|COMMON/d' -e '/|DATA/d' \
    -e '/ file/d' -e 's/^\([^  ]*\).*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.*|FUNC |GLOB .*|//p' -e 's/^.*|FUNC |WEAK .*|//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: mips nm output (sysV)
elif com="$sed -n -e 's/^__//' -e '/|Undef/d' -e '/|Proc/s/ .*//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/^.*|Proc .*|Text *| *//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e '/Def. Text/s/.* \([^ ]*\)\$/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: OS/2
 nm output
elif com="$sed -n -e 's/^[-0-9a-f ]*_\(.*\)=.*/\1/p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
elif com="$sed -n -e 's/.*\.text n\ \ \ \.//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
?X: AIX nm output
elif com="sed -n -e 's/^__.*//' -e 's/[       ]*D[    ]*[0-9]*.*//p'";\
 eval $xscan;\
 $contains '^fprintf$' libc.list >/dev/null 2>&1; then
  eval $xrun
else
```

```
$nm -p $* 2>/dev/null >libc.tmp
$grep fprintf libc.tmp > libc.ptf
if com="$sed -n -e 's/^.* [ADTSIW]  *_[_.]*//p' -e 's/^.* [ADTSIW] //p'";\
 eval $xscan; $contains '^fprintf$' libc.list >/dev/null 2>&1
then
 nm_opt='-p'
 eval $xrun
else
 echo " "
 echo "$nm didn't seem to work right. Trying $ar instead..." >&4
 com="
 if $ar t $libc > libc.tmp && \
  $contains '^fprintf$' libc.tmp >/dev/null 2>&1
 then
  for thisname in $libnames $libc; do
   $ar t $thisname >>libc.tmp
  done
  $sed -e "s/\\$_o\$//" < libc.tmp > libc.list
  echo
 "Ok." >&4
 elif test "X$osname" = "Xos2" && $ar tv $libc > libc.tmp; then
?X: Repeat libc to extract forwarders to DLL entries too
  for thisname in $libnames $libc; do
   $ar tv $thisname >>libc.tmp
?X: Revision 50 of EMX has bug in ar: it will not extract forwarders
?X: to DLL entries.  Use emximp which will extract exactly them.
    emximp -o tmp.imp $thisname \
        2>/dev/null && \
        $sed -e 's/^\([_a-zA-Z0-9]*\) .*$/\1/p' \
        < tmp.imp >>libc.tmp
   $rm -f tmp.imp
  done
  $sed -e "s/\\$_o\$//" -e 's/^ \+//' < libc.tmp > libc.list
  echo "Ok." >&4
 else
  echo "$ar didn't seem to work right." >&4
  echo "Maybe this is a Cray...trying bld instead..." >&4
  if  bld t $libc | \
   $sed -e 's/.*\///' -e "s/\\$_o:.*\$//" > libc.list &&
   $test -s libc.list
  then
   for thisname in $libnames; do
    bld t $libnames | \
    $sed -e 's/.*\///' -e "s/\\$_o:.*\$//" >>libc.list
    $ar t $thisname >>libc.tmp
   done
   echo "Ok." >&4
  else
```

```
    echo
 "That didn't work either.  Giving up." >&4
    exit 1
   fi
  fi
 fi
fi
nm_extract="$com"
case "$PASE" in
define)
   echo " "
   echo "Since you are compiling for PASE, extracting more symbols from libc.a ...">&4
   dump -Tv /lib/libc.a | awk '$7 == "/unix" {print $5 " " $8}' | grep "^SV" | awk '{print $2}' >> libc.list
   ;;
*)  if $test -f /lib/syscalls.exp; then
 echo " "
 echo "Also extracting names from /lib/syscalls.exp for good ole AIX..." >&4
 $sed -n 's/^\([^  ]*\)[  ]*syscall[0-9]*[  ]*$/\1/p' \
  /lib/syscalls.exp >>libc.list
   fi
   ;;
esac
;;
esac
$rm -f libnames libpath

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/libc.U
No license file was found, but licenses were detected in source scan.

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?RCS:
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?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?X: This unit generates a $hasfield string that is used internally
?X: by Configure to check if this system has a field for a
?X: particular struct (of if this system has a particular struct!)
?X:
?X: To use it, say something like:
?X:  set d_statblocks stat st_blocks i_sysstat sys/stat.h
?X:  eval $hasfield
?X: Or, for more complicated sets of headers, do something like
?X: hdrs="$define sys/foo.h
?X:  $i_sysbar sys/bar.h
?X:  $i_syszot sys/zot.h
```

```
?X:  $i_zappa zappa.h"
?X: set d_statblocks stat st_blocks $hdrs
?X: eval $hasfield
?X:
?MAKE:Hasfield: Setvar rm_try test Compile
?MAKE: -pick add $@ %<
?T:varname struct field
?V:hasfield
: Define hasfield macro for Configure internal use
hasfield='varname=$1;
 struct=$2; field=$3; shift; shift; shift;
while $test $# -ge 2; do
 case "$1" in
 $define) echo "#include <$2>";;
 esac ;
   shift 2;
done > try.c;
echo "int main () { struct $struct foo; char* bar; bar = (char*)foo.$field; }" >> try.c;
set try;
if eval $compile; then
 val="$define";
else
 val="$undef";
fi;
set $varname;
eval $setvar;
$rm_try'
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/protos/Hasfield.U
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```
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: sysman.U,v $
?RCS: Revision 3.0.1.2  1994/06/20  07:08:43  ram
?RCS: patch30: now explicitly states that /usr/man/man1 is the default
?RCS: patch30: added /usr/local/man/man1 to the search list
?RCS:
?RCS: Revision 3.0.1.1  1993/09/13  16:13:50  ram
```

```
?RCS: patch10: added support for /local/man/man1 (WAD)
?RCS: patch10: added temporary syspath variable to cut down on line length
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:55  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:sysman: test
 Loc Oldconfig
?MAKE: -pick add $@ %<
?S:sysman:
?S: This variable holds the place where the manual is located on this
?S: system. It is not the place where the user wants to put his manual
?S: pages. Rather it is the place where Configure may look to find manual
?S: for unix commands (section 1 of the manual usually). See mansrc.
?S:.
?T:syspath
: determine where manual pages are on this system
echo " "
case "$sysman" in
")
 syspath='/usr/share/man/man1 /usr/man/man1'
 syspath="$syspath /usr/man/mann /usr/man/manl /usr/man/local/man1"
 syspath="$syspath /usr/man/u_man/man1 /usr/share/man/man1"
 syspath="$syspath /usr/catman/u_man/man1 /usr/man/l_man/man1"
 syspath="$syspath /usr/local/man/u_man/man1 /usr/local/man/l_man/man1"
 syspath="$syspath /usr/man/man.L /local/man/man1 /usr/local/man/man1"
 sysman=`./loc . /usr/man/man1 $syspath`
 ;;
esac
if $test -d "$sysman"; then
 echo "System manual is in $sysman." >&4
else
 echo "Could not find manual pages in source form." >&4
fi

Found
 in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/sysman.U
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?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?X: This unit generates a $hasstruct string that is used internally
```

```
?X: by Configure to check if this system has a field for a
?X: particular struct (of if this system has a particular struct!)
?X:
?X: To use it, say something like:
?X:  set d_statblocks stat i_sysstat sys/stat.h
?X:  eval $hasstruct
?X: Or, for more complicated sets of headers, do something like
?X: hdrs="$define sys/foo.h
?X:  $i_sysbar sys/bar.h
?X:  $i_syszot sys/zot.h
?X:  $i_zappa zappa.h"
?X: set d_statblocks stat $hdrs
?X: eval $hasstruct
?X:
?MAKE:Hasstruct: Setvar rm_try test Compile
?MAKE: -pick add $@ %<
?T:varname struct
?V:hasstruct
: Define hasstruct macro for Configure internal use
hasstruct='varname=$1; struct=$2; shift;
 shift;
while $test $# -ge 2; do
 case "$1" in
 $define) echo "#include <$2>";;
 esac ;
   shift 2;
done > try.c;
echo "int main () { struct $struct foo; }" >> try.c;
set try;
if eval $compile; then
 val="$define";
else
 val="$undef";
fi;
set $varname;
eval $setvar;
$rm_try'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/protos/Hasstruct.U
No license file was found, but licenses were detected in source scan.

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?RCS:
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```

```
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?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: sitescript.U,v $
?RCS:
?MAKE:sitescript sitescriptexp installsitescript : Getfile Oldconfig test \
 Setprefixvar sitebin siteprefix
?MAKE: -pick add $@ %<
?Y:TOP
?D:sitescript=''
?S:sitescript:
?S: This variable holds the name of the directory in which the user wants
?S: to put add-on publicly executable files for the package in question.  It
?S: is most often a local directory such as /usr/local/bin. Programs using
?S: this variable must be prepared to deal with ~name substitution.
?S: The standard
 distribution will put nothing in this directory.
?S: After perl has been installed, users may install their own local
?S: scripts in this directory with
?S:  MakeMaker Makefile.PL
?S: or equivalent.  See INSTALL for details.
?S:.
?D:sitescriptexp=''
?S:sitescriptexp:
?S: This is the same as the sitescript variable, but is filename expanded at
?S: configuration time, for use in your makefiles.
?S:.
?D:installsitescript=''
?S:installsitescript:
?S: This variable is usually the same as sitescriptexp, unless you are on
?S: a system running AFS, in which case they may differ slightly. You
?S: should always use this variable within your makefiles for portability.
?S:.
?LINT:change prefixvar
?LINT:set installsitescript
?LINT:set sitescript
?LINT:set sitescriptexp
: determine where add-on public executable scripts go
case "$sitescript" in
'') dflt=$siteprefix/script
 $test -d $dflt || dflt=$sitebin ;;
*)  dflt="$sitescript" ;;
esac
fn=d~+
rp='Pathname where add-on public executable scripts
 should be installed?'
. ./getfile
```

```
prefixvar=sitescript
. ./setprefixvar
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/sitescript.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: h_sysfile.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: h_sysfile.U,v $
?RCS: Revision 3.0  1993/08/18  12:08:13  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:h_sysfile: Nothing
?MAKE: -pick add $@ %<
?S:h_sysfile:
?S: This is variable gets set in various places to tell i_sys_file that
?S: <sys/file.h> should be included.
?S:.
: Initialize h_sysfile
h_sysfile=false
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/h_sysfile.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: Instruct.U,v 3.0.1.3 1997/02/28 15:02:55 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: Instruct.U,v $
?RCS: Revision 3.0.1.3  1997/02/28  15:02:55  ram
?RCS: patch61: logname / whoami sequence rewritten to use case
?RCS:
```

```
?RCS: Revision 3.0.1.2  1995/02/15  14:11:34  ram
?RCS: patch51: author name now appears at the end of the paragraph (WED)
?RCS:
?RCS: Revision 3.0.1.1  1995/01/11  15:12:05  ram
?RCS: patch45: now documents the & escape to turn -d on at the read prompt
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:04  ram
?RCS: Baseline for
 dist 3.0 netwide release.
?RCS:
?X:
?X: This unit spew out the directions that we want everyone to read.  I try to
?X: keep the first "pagefull" much less than a page since they don't know it
?X: isn't going to go shooting off the top of the screen, and we don't want
?X: to panic them yet.
?X:
?MAKE:Instruct: Myread Configdir Devel contains
?MAKE: -pick wipe $@ %<
?T:user needman firsttime
: general instructions
needman=true
firsttime=true
user=`(logname) 2>/dev/null`
case "$user" in
") user=`whoami 2>&1`;;
esac
if $contains "^$user\$" ../.config/instruct >/dev/null 2>&1; then
 firsttime=false
 echo " "
 rp='Would you like to see the instructions?'
 dflt=n
 . ./myread
 case "$ans" in
 [yY]*) ;;
 *) needman=false;;
 esac
fi
if $needman; then
 cat <<EOH

This installation shell script will examine your system and ask you questions
to determine how the <PACKAGENAME> package should be installed. If you get
stuck on a question, you may use a ! shell escape to start a subshell or
execute a
 command.  Many of the questions will have default answers in square
brackets; typing carriage return will give you the default.

On some of the questions which ask for file or directory names you are allowed
```

to use the ~name construct to specify the login directory belonging to "name",
even if you don't have a shell which knows about that. Questions where this is
allowed will be marked "(~name ok)".

EOH
 rp="
 dflt='Type carriage return to continue'
 . ./myread
 cat <<'EOH'

The prompter used in this script allows you to use shell variables and
backticks in your answers. You may use $1, $2, etc... to refer to the words
in the default answer, as if the default line was a set of arguments given to a
script shell. This means you may also use $* to repeat the whole default line,
so you do not have to re-type everything to add something to the default.

Every time there is a substitution, you will have to confirm. If there is an
error (e.g. an unmatched backtick), the default answer
 will remain unchanged
and you will be prompted again.

If you are in a hurry, you may run 'Configure -d'. This will bypass nearly all
the questions and use the computed defaults (or the previous answers if there
was already a config.sh file). Type 'Configure -h' for a list of options.
You may also start interactively and then answer '& -d' at any prompt to turn
on the non-interactive behaviour for the remainder of the execution.

EOH
 . ./myread
 cat <<EOH

Much effort has been expended to ensure that this shell script will run on any
Unix system. If despite that it blows up on yours, your best bet is to edit
Configure and run it again. If you can't run Configure for some reason,
you'll have to generate a config.sh file by hand. Whatever problems you
have, let me (<MAINTLOC>) know how I blew it.

This installation script affects things in two ways:

1) it may do direct variable substitutions on some of the files included
  in this kit.
2) it builds a config.h file for inclusion in
 C programs. You may edit
  any of these files as the need arises after running this script.

If you make a mistake on a question, there is no easy way to back up to it
currently. The easiest thing to do is to edit config.sh and rerun all the SH
files. Configure will offer to let you do this before it runs the SH files.

```
EOH
?X: In case they played with the prompter...
 dflt='Type carriage return to continue'
 . ./myread
 case "$firsttime" in
 true) echo $user >>../.config/instruct;;
 esac
fi

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/modified/Instruct.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1999 Jarkko Hietaniemi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?MAKE:siteman1dir siteman1direxp installsiteman1dir: Getfile \
 Setprefixvar prefix siteprefix man1dir sed
?MAKE: -pick add $@ %<
?Y:TOP
?D:siteman1dir="
?S:siteman1dir:
?S: This variable contains the name of the directory in which site-specific
?S: manual source pages are to be put.  It is the responsibility of the
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S: The standard distribution will put nothing in this directory.
?S: After perl
 has been installed, users may install their own local
?S: man1 pages in this directory with
?S:  MakeMaker Makefile.PL
?S: or equivalent.  See INSTALL for details.
?S:.
?D:siteman1direxp="
?S:siteman1direxp:
?S: This variable is the same as the siteman1dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installsiteman1dir="
?S:installsiteman1dir:
```

```
?S: This variable is really the same as siteman1direxp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: man1direxp only points to the read-only access location. For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installsiteman1dir
?LINT:set siteman1dir
?LINT:set siteman1direxp
: determine where add-on manual pages go
case "$siteman1dir" in
'') dflt=`echo $man1dir | $sed "s#^$prefix#$siteprefix#"` ;;
*) dflt=$siteman1dir ;;
esac
case "$dflt" in
'|' ') dflt=none ;;
esac
fn=dn+~
rp='Pathname
 where the site-specific manual pages should be installed?'
. ./getfile
prefixvar=siteman1dir
. ./setprefixvar

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/siteman1dir.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id: Hasproto.U $
?RCS:
?RCS: Copyright (c) 1998 Andy Dougherty
?RCS:
?RCS: You may distribute under the terms of either the GNU General Public
?RCS: License or the Artistic License, as specified in the README file.
?RCS:
?X: This unit generates a $hasproto string that is used internally
?X: by Configure to check if this system has a prototype for a
?X: particular function
?X:
?X: To use it, say something like:
?X:  set d_getnetent_proto getnetent $i_netdb netdb.h
?X:  eval $hasproto
?X: Or, for more complicated sets of headers, do something like
?X: hdrs="$define sys/types.h
?X:  $i_systime sys/time.h
?X:  $i_sysselct sys/select.h
?X:  $i_netdb netdb.h"
?X: set d_getnetent_proto getnetent $hdrs
```

```
?X: eval $hasproto
?X:
?X: There is also an 'escape' hatch built in.  If you have a pair
?X: of args   'literal 'stuff' then 'stuff' gets included literally
?X: into the test program.  See Protochk.U for more details.
?X:
?MAKE:Hasproto:
 Setvar cppstdin cppflags cppminus contains rm_try test
?MAKE: -pick add $@ %<
?T:func varname
?F:!try.c
?V:hasproto
: Define hasproto macro for Configure internal use
hasproto='varname=$1; func=$2; shift; shift;
while $test $# -ge 2; do
 case "$1" in
 $define) echo "#include <$2>";;
 literal) echo "$2" ;;
 esac ;
   shift 2;
done > try.c;
$cppstdin $cppflags $cppminus < try.c > tryout.c 2>/dev/null;
if $contains "$func.*(" tryout.c >/dev/null 2>&1; then
 echo "$func() prototype found.";
 val="$define";
else
 echo "$func() prototype NOT found.";
 val="$undef";
fi;
set $varname;
eval $setvar;
$rm_try tryout.c'

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/protos/Hasproto.U
No license file was found, but licenses were detected in source scan.

?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: patchlevel.U,v $
```

```
?RCS: Revision 3.0.1.1  1997/02/28  16:18:41  ram
?RCS: patch61: added support for src.U
?RCS:
?RCS: Revision 3.0  1993/08/18  12:09:31  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?MAKE:patchlevel: package baserev test rsrc
?MAKE: -pick add $@ %<
?T:Revision
?S:patchlevel:
?S: The patchlevel level of this package.
?S: The value of patchlevel comes from the patchlevel.h file.
?S:.
: get the patchlevel
echo " "
echo "Getting the current patchlevel..." >&4
if $test -r
 $rsrc/patchlevel.h;then
 patchlevel=`awk \
  '/^#[  ]*define[  ][  ]*PATCHLEVEL/ {print $3}' \
  < $rsrc/patchlevel.h`
else
 patchlevel=0
fi
echo "(You have $package $baserev PL$patchlevel.)"
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/patchlevel.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id$
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: Init.U,v $
?RCS: Revision 3.0.1.1  1994/10/31  09:45:59  ram
?RCS: patch44: removed Options from MAKE to prevent Init overrides
?RCS: patch44: option processing now done after Myinit thanks to new Begin.U
?RCS: patch44: moved "Beginning of configuration questions" to Begin.U
?RCS: patch44: moved signal trapping instruction to Begin.U as well
?RCS:
?RCS: Revision 3.0  1993/08/18  12:05:02  ram
```

```
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
?X: This file initializes certain default variables
 used by Configure.  They
?X: may be overridden or added to by definitions in Myinit.U.
?X:
?MAKE:Init eunicefix _exe: Null
?MAKE: -pick add $@ %<
?MAKE: -pick weed $@ ./Init
?S:eunicefix:
?S: When running under Eunice this variable contains a command which will
?S: convert a shell script to the proper form of text file for it to be
?S: executable by the shell.  On other systems it is a no-op.
?S:.
?S:_exe (exe_ext):
?S: This variable defines the extension used for executable files.
?S: For unix it is empty.  Other possible values include '.exe'.
?S: DJGPP, Cygwin and OS/2 use '.exe'.  Stratus VOS uses '.pm'.
?S: On operating systems which do not require a specific extension
?S: for executable files, this variable is empty.
?S:.
?V:define undef smallmach:rmlist
?X:
?X: Throughout the units, one may make use of $define and $undef to reference
?X: a defined symbol or an undefined one. There is no need to add them in
?X: the dependency line since this unit makes them visible via ?V:, and
?X:
 everyone inherits from those symbols since by convention Init.U is the
?X: root dependency.
?X:
?T: DJGPP
: Initialize wide constants
define='define'
undef='undef'
smallmach='pdp11 i8086 z8000 i80286 iAPX286'
rmlist=''

: We must find out about Eunice early
eunicefix=':'
if test -f /etc/unixtovms; then
 eunicefix=/etc/unixtovms
fi
if test -f /etc/unixtovms.exe; then
 eunicefix=/etc/unixtovms.exe
fi

: Set executable suffix now -- needed before hints available
```

```
if test -f "/libs/version.library"; then
 : Amiga OS
  _exe=""
elif test -f "/system/gnu_library/bin/ar.pm"; then
 : Stratus VOS
 _exe=".pm"
elif test -n "$DJGPP"; then
 : DOS DJGPP
  _exe=".exe"
elif test -d c:/. ; then
 : OS/2 or cygwin
 _exe=".exe"
else
 : All other UNIX systems
 _exe=""
fi
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/Init.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: install.U 1 2006-08-24 12:32:52Z rmanfredi $
?RCS:
?RCS: Copyright (c) 1991-1997, 2004-2006, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic Licence,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic Licence; a copy of which may be found at the root
?RCS: of the source tree for dist 4.0.
?RCS:
?RCS: $Log: install.U,v $
?RCS: Revision 3.0.1.2  1995/09/25  09:16:37  ram
?RCS: patch59: all possible install programs are now looked for
?RCS:
?RCS: Revision 3.0.1.1  1995/01/11  15:30:41  ram
?RCS: patch45: created
?RCS:
?MAKE:install installdir: Loc Oldconfig Getfile cat test startsh rm +cc \
 eunicefix package contains mkdir echo n c
?MAKE: -pick add $@ %<
?S:install:
?S: This variable contains the name of an install program that can accept
?S: BSD-style arguments.
 It must correctly support -c, -s, and -m at least.
?S: It is a fully qualified pathname when found. If you have a local
?S: install.SH file at the root directory of your package, it is assumed to
?S: be the default script emulating a BSD install and the variable will be
```

```
?S: set to ./install. Otherwise, it is set to plain 'install', relying on
?S: the user's PATH to perform miracles.
?S:.
?S:installdir:
?S: This variable contains the name of a program that can install nested
?S: directories. Often set to 'mkdir -p', it can also be 'install -d' if
?S: you have such a beast and lack the former. If you have an install.SH
?S: file at the root directory of your package, it will be used in last
?S: resort, setting the variable to './install -d'. Otherwise, it is set to
?S: plain 'mkdir', and cross your fingers!
?S:.
?T:dir file tryit prog creatdir either
?F:!tryinst
: locate a BSD compatible install program
echo " "
echo "Looking for a BSD-compatible install program..." >&4
@if installdir
creatdir="
@end
case
 "$install" in
")
 tryit="
 for dir in $pth; do
  for file in ginstall installbsd scoinst install; do
   if $test -f $dir/$file; then
    tryit="$tryit $dir/$file"
   fi
  done
 done
 $cat >try.c <<EOC
int main()
{
 printf("OK\n");
 exit(0);
}
EOC
 if $cc -o try try.c >/dev/null 2>&1; then
  cp try try.ns
  strip try >/dev/null 2>&1
 else
  echo "(I can't seem to compile a trivial C program -- bypassing.)"
  echo "try" >try
  cp try try.ns
 fi
 $cat >tryinst <<EOS
$startsh
$rm -rf foo d
```

```
@if installdir
\$1 -d foo/bar
@end
$mkdir d
\$1 -c -m 764 try.ns d
\$1 -c -s -m 642 try.ns d/try
EOS
 chmod +x tryinst
 $eunicefix tryinst
 dflt=''
 either=''
 for prog in $tryit; do
  $echo $n "Checking $prog... $c"
  ./tryinst $prog >/dev/null 2>&1
@if installdir
  if $test -d foo/bar; then
   creatdir="$prog -d"
  fi
@end
  (ls -l d/try >try.ls; ls -l d/try.ns >tryno.ls) 2>/dev/null
  if (cmp -s d/try try && cmp -s d/try.ns try.ns && \
   $contains 'rwxrw-r--' tryno.ls &&
 \
   $contains 'rw-r---w-' try.ls) >/dev/null 2>&1
  then
   dflt="$prog"
   echo "ok, that will do."
   break
  fi
  echo "not good$either."
  either=' either'
  $rm -f try*.ls
 done
 $rm -rf foo d tryinst try try*.ls try.*
 case "$dflt" in
 '')
@if {test -f ../install.SH}
  echo "Hopefully, $package comes with its own install script!"
  dflt='./install'
@else
  dflt='install'
@end
  ;;
 esac
 ;;
*) dflt="$install";;
esac
$cat <<EOM
```

```
I will be requiring a BSD-compatible install program (one that allows
options like -s to strip executables or -m to specify a file mode) to
install $package.

If the question below contains a fully qualified default path, then it
is probably ok. If it is an unqualified name such as 'install', then it
means I was unable to find out a good install program I could use. If
@if {test -f ../install.SH}
you know of one, please tell me about it. If the default is './install',
then I shall be using the install script supplied with $package.
@else
you know of one,
 please tell me about it.
@end

EOM
@if {test -f ../install.SH}
fn='/fe~(install,./install)'
@else
fn='/fe~(install)'
@end
rp='Which install program shall I use?'
. ./getfile
install="$ans"

@if installdir
: how can we create nested directories?
echo " "
echo "Ok, let's see how we can create nested directories..." >&4
case "$installdir" in
")
?X: First time, maybe we already found out a working one in $creatdir above...
?X: Prefer "mkdir -p" because of bugs in GNU install when not running as root
 $mkdir -p foo/bar >/dev/null 2>&1
 if $test -d foo/bar; then
  echo "Great, we can build them using 'mkdir -p'."
  creatdir='mkdir -p'
 else
  case "$creatdir" in
  ")
   if eval "$install -d foo/bar"; $test -d foo/bar; then
    creatdir="install -d"
    echo "It looks like '$creatdir' will do it for us."
   fi
   ;;
  *)
   eval "$creatdir foo/bar" >/dev/null 2>&1
```

```
  if $test -d foo/bar; then
   echo "Ah! We can use '$creatdir' to do just that."
  else
   creatdir="
  fi
  ;;
 esac
fi
$rm
-rf foo
case "$creatdir" in
")
 echo "Heck! Another ancient system lacking the comfort of modern ones!"
@if {test -f ../install.SH}
 echo "You can thank $package for bringing you its own install script!"
 installdir='./install -d'
@else
 echo "We have no choice but to use plain old 'mkdir' -- wish me luck!"
 installdir=mkdir
@end
 ;;
*) installdir="$creatdir";;
esac
;;
*) echo "As you already told me, '$installdir' should work.";;
esac

@end
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/dist/U/install.U
No license file was found, but licenses were detected in source scan.

```
?RCS: $Id: End.U,v 3.0 1993/08/18 12:04:51 ram Exp $
?RCS:
?RCS: Copyright (c) 1991-1993, Raphael Manfredi
?RCS:
?RCS: You may redistribute only under the terms of the Artistic License,
?RCS: as specified in the README file that comes with the distribution.
?RCS: You may reuse parts of this distribution only within the terms of
?RCS: that same Artistic License; a copy of which may be found at the root
?RCS: of the source tree for dist 3.0.
?RCS:
?RCS: $Log: End.U,v $
?RCS: Revision 3.0  1993/08/18  12:04:51  ram
?RCS: Baseline for dist 3.0 netwide release.
?RCS:
?X:
```

```
?X: This unit serves as the goal which forces make to choose all the units that
?X: ask questions.  The $W on the ?MAKE: line is the list of all symbols wanted.
?X: To force any unit to be included, copy this unit to your private U directory
?X: and add the name of the unit desired to the ?MAKE: dependency line.
?X:
?MAKE:End perllibs: $W cppstdin gzip zip
 libs usedl osname osvers
?MAKE: -pick add $@ %<
?S:perllibs:
?S: The list of libraries needed by Perl only (any libraries needed
?S: by extensions only will by dropped, if using dynamic loading).
?S:.
?INIT:perllibs="
?LINT:use $W
?LINT:use gzip zip
?LINT:change cppstdin
: Remove libraries needed only for extensions
: The appropriate ext/Foo/Makefile.PL will add them back in, if necessary.
: The exception is SunOS 4.x, which needs them.
case "${osname}X${osvers}" in
sunos*X4*)
   perllibs="$libs"
   ;;
*) case "$usedl" in
   $define|true|[yY]*)
     set X `echo " $libs " | sed -e 's@ -lndbm @ @' -e 's@ -lgdbm @ @' -e 's@ -lgdbm_compat @ @' -e 's@ -ldbm @
@' -e 's@ -ldb @ @'`
     shift
     perllibs="$*"
     ;;
   *) perllibs="$libs"
     ;;
   esac
   ;;
esac

?X: If the user has the cppstdin wrapper, perl.c will try to call
?X: CPPSTDIN, but that will point to a location in the build
?X: directory, not the installed version!.  Here, we'll just strip the
?X: name down to 'cppstdin',
 and rely on the fact that perl.c will
?X: then call SCRIPTDIR/cppstdin, but local things like 'make depend'
?X: will continue to work.
: Remove build directory name from cppstdin so it can be used from
: either the present location or the final installed location.
echo " "
: Get out of the UU directory to get correct path name.
cd ..
```

```
case "$cppstdin" in
`pwd`/cppstdin)
 echo "Stripping down cppstdin path name"
 cppstdin=cppstdin
 ;;
esac
cd UU

: end of configuration questions
echo " "
echo "End of configuration questions."
echo " "
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/End.U
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```
?RCS: $Id: vendorhtml1dir.U,v 1.1 1999/07/08 18:32:57 doughera Exp doughera $
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?RCS:
?RCS: $Log: vendorhtml1dir.U,v $
?RCS: Revision 1.1  1999/07/08 18:32:57  doughera
?RCS: Initial revision
?RCS:
?MAKE:vendorhtml1dir vendorhtml1direxp installvendorhtml1dir: html1dir Getfile \
 Setprefixvar Oldconfig Prefixit test vendorprefix prefix sed
?MAKE: -pick add $@ %<
?Y:TOP
?S:vendorhtml1dir:
?S: This variable contains the name of the directory for html
?S: pages.  It may have a ~ on the front.
?S: The standard distribution will put nothing in this
 directory.
?S: Vendors who distribute perl may wish to place their own
?S: html pages in this directory with
?S:  MakeMaker Makefile.PL INSTALLDIRS=vendor
?S: or equivalent.  See INSTALL for details.
?S:.
?S:vendorhtml1direxp:
?S: This variable is the ~name expanded version of vendorhtml1dir, so that you
?S: may use it directly in Makefiles or shell scripts.
```

```
?S:.
?D:installvendorhtml1dir="
?S:installvendorhtml1dir:
?S: This variable is really the same as vendorhtml1direxp but may differ on
?S: those systems using AFS. For extra portability, only this variable
?S: should be used in makefiles.
?S:.
?LINT:change prefixvar
?LINT:set installvendorhtml1dir
: Set the vendorhtml1dir variables
case "$vendorprefix" in
") vendorhtml1dir="
 vendorhtml1direxp="
 ;;
*) : determine where vendor-supplied html pages go.
 : There is no standard location, so try to copy the previously-selected
 : directory structure for the core html pages.
 : XXX Better default suggestions would be welcome.
 case "$vendorhtml1dir"
 in
 ") dflt=`echo "$html1dir" | $sed "s#^$prefix#$vendorprefix#"` ;;
 *) dflt=$vendorhtml1dir ;;
 esac
 case "$dflt" in
 "|' ') dflt=none ;;
 esac
 fn=dn+~
 rp='Pathname for the vendor-supplied html pages?'
 . ./getfile
 vendorhtml1dir="$ans"
 vendorhtml1direxp="$ansexp"
 ;;
esac
: Use ' ' for none so value is preserved next time through Configure
$test X"$vendorhtml1dir" = "X" && vendorhtml1dir=' '
prefixvar=vendorhtml1dir
. ./installprefix
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/installdirs/vendorhtml1dir.U
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?X:
?X: Useless unit dropped. Use randfunc instead.
?X:
?LINT:empty

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/compline/randbits.U
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?RCS:
?RCS: $Log: man1dir.U,v $
?RCS: Revision 3.2 1999/07/08 20:57:21 doughera
?RCS: Used installprefix.
?RCS:
?RCS: Revision 3.1 1999/07/08 20:52:19 doughera
?RCS: Updated for perl5.005_5x
?RCS:
?RCS: Revision 3.0.1.1 1997/02/28 16:10:29 ram
?RCS: patch61: created
?RCS:
?X: This was originally specific to perl5. Since perl5 has man pages that
?X: go in both man1/ and man3/ directories, we need both man1dir
?X: and
 man3dir. This unit is basically dist's mansrc.U with
?X: man1 used instead of man everywhere.
?X:
?MAKE:man1dir man1direxp man1ext installman1dir: cat nroff Loc Oldconfig \
 spackage test Getfile Setprefixvar Prefixit Prefixup sysman Myread \
 prefixexp
?MAKE: -pick add $@ %<
?Y:TOP
?D:man1dir="
?S:man1dir:
?S: This variable contains the name of the directory in which manual
?S: source pages are to be put. It is the responsibility of the

```
?S: Makefile.SH to get the value of this into the proper command.
?S: You must be prepared to do the ~name expansion yourself.
?S:.
?D:man1direxp="
?S:man1direxp:
?S: This variable is the same as the man1dir variable, but is filename
?S: expanded at configuration time, for convenient use in makefiles.
?S:.
?D:installman1dir="
?S:installman1dir:
?S: This variable is really the same as man1direxp, unless you are using
?S: AFS in which case it points to the read/write location whereas
?S: man1direxp only points to the read-only access location.
 For extra
?S: portability, you should only use this variable within your makefiles.
?S:.
?S:man1ext:
?S: This variable contains the extension that the manual page should
?S: have: one of 'n', 'l', or '1'.  The Makefile must supply the '.'.
?S: See man1dir.
?S:.
?T:lookpath
?LINT:change prefixvar
?LINT:set man1direxp
: determine where manual pages go
set man1dir man1dir none
eval $prefixit
$cat <<EOM

$spackage has manual pages available in source form.
EOM
case "$nroff" in
nroff)
 echo "However, you don't have nroff, so they're probably useless to you."
 case "$man1dir" in
 ") man1dir="none";;
 esac;;
esac
echo "If you don't want the manual sources installed, answer 'none'."
case "$man1dir" in
' ') dflt=none
 ;;
")
 lookpath="$prefixexp/share/man/man1"
 lookpath="$lookpath $prefixexp/man/man1 $prefixexp/man/l_man/man1"
 lookpath="$lookpath $prefixexp/man/p_man/man1"
 lookpath="$lookpath $prefixexp/man/u_man/man1"
 lookpath="$lookpath $prefixexp/man/man.1"
```

```
?X: Experience has shown people
 expect man1dir to be under prefix,
?X: so we now always put it there.  Users who want other behavior
?X: can answer interactively or use a command line option.
?X: Does user have System V-style man paths.
 case "$sysman" in
 */?_man*) dflt=`./loc . $prefixexp/l_man/man1 $lookpath` ;;
 *) dflt=`./loc . $prefixexp/man/man1 $lookpath` ;;
 esac
 set dflt
 eval $prefixup
 ;;
*)  dflt="$man1dir"
 ;;
esac
echo " "
fn=dn+~
rp="Where do the main $spackage manual pages (source) go?"
. ./getfile
if $test "X$man1direxp" != "X$ansexp"; then
 installman1dir="
fi
prefixvar=man1dir
. ./setprefixvar

case "$man1dir" in
") man1dir=' '
 installman1dir="";;
esac

: What suffix to use on installed man pages

case "$man1dir" in
' ')
 man1ext='0'
 ;;
*)
 rp="What suffix should be used for the main $spackage man pages?"
 case "$man1ext" in
 ") case "$man1dir" in
  *1)  dflt=1 ;;
  *1p) dflt=1p ;;
  *1pm) dflt=1pm ;;
  *l) dflt=l;;
  *n) dflt=n;;
  *o) dflt=o;;
  *p) dflt=p;;
  *C) dflt=C;;
```

```
 *L) dflt=L;;
 *L1)
dflt=L1;;
 *) dflt=1;;
 esac
 ;;
*) dflt="$man1ext";;
esac
. ./myread
man1ext="$ans"
;;
esac
```

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?RCS: of the source tree for dist 3.0.
?RCS:
?MAKE:full_ar: ar
?MAKE: -pick add $@ %<
?S:full_ar:
?S: This variable contains the full pathname to 'ar', whether or
?S: not the user has specified 'portability'.  This is only used
?S: in the Makefile.SH.
?S:.
: Store the full pathname to the ar program for use in the C program
: Respect a hint or command line value for full_ar.
case "$full_ar" in
") full_ar=$ar ;;
esac
```

Found in path(s):
* /perl-5-34-0-orig-regen-configure-1-tar-xz/metaconfig-5.34.0/U/perl/Loc_ar.U

1.88 jython-standalone 2.7.4

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File: aclocal.m4 (only for ICU4C)
Section: pkg.m4 - Macros to locate and utilise pkg-config.

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1.91 libfontconfig 2.13.1-4.2ubuntu5

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1.93 libfreetype 2.11.1+dfsg-1ubuntu0.3

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/***
*

```
*  grbatch.c  Batch processing driver.
*
*  This driver maintains the image in memory without displaying it,
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*
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*
*****************************************************************/
```

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* /freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/batch/grbatch.c
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/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/beos/grbeos.cpp/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/grswizzle.c#include <stdlib.h>
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/mac/grmac.c/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/meson.build#
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/win32/grwin32.c/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/win32/grwin32.h/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/x11/grx11.c/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/graph/x11/grx11.h/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/mac/codewarrior/ftlint.prj
 mtsl/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/mac/codewarrior/ftview.prj mtsl/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/mac/codewarrior/ftview.prj
mtsl/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/mac/getargv.c/***
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/meson.build#
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/src/ftinspect/maingui.cpp//

maingui.cpp
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/src/ftinspect/meson.build#
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/src/md5.c/*
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/src/md5.h/*
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/src/mlgetopt.c/*
/opt/cola/permits/2651515278_1759162120.4791622/0/freetype-2-11-1-dfsg-orig-ft2demos-tar-xz/ft2demos-2.11.1/src/mlgetopt.h/*

Found
in path(s):
*

1.94 libxdata 2:1.7.5-1ubuntu0.3

1.94.1 Available under license :

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1.100 sysv-init 3.01-1ubuntu1

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cmd/krb5/iprop/iprop.x
cmd/krb5/iprop/iprop_hdr.h
cmd/krb5/kadmin/server/ipropd_svc.c
cmd/krb5/kproplog/kproplog.c
cmd/krb5/slave/kpropd_rpc.c

lib/gss_mechs/mech_krb5/et/kdb5_err.c
lib/gss_mechs/mech_spnego/mech/gssapiP_spnego.h
lib/gss_mechs/mech_spnego/mech/spnego_mech.c
lib/krb5/kadm5/kadm_host_srv_names.c
lib/krb5/kdb/kdb_convert.c
lib/krb5/kdb/kdb_hdr.h
lib/krb5/kdb/kdb_log.c
lib/krb5/kdb/kdb_log.h
lib/libgss/g_accept_sec_context.c
lib/libgss/g_acquire_cred.c
lib/libgss/g_canon_name.c
lib/libgss/g_compare_name.c
lib/libgss/g_context_time.c
lib/libgss/g_delete_sec_context.c
lib/libgss/g_dsp_name.c
lib/libgss/g_dsp_status.c
lib/libgss/g_dup_name.c
lib/libgss/g_exp_sec_context.c
lib/libgss/g_export_name.c
lib/libgss/g_glue.c
lib/libgss/g_imp_name.c
lib/libgss/g_imp_sec_context.c
lib/libgss/g_init_sec_context.c
lib/libgss/g_initialize.c
lib/libgss/g_inquire_context.c
lib/libgss/g_inquire_cred.c
lib/libgss/g_inquire_names.c
lib/libgss/g_process_context.c
lib/libgss/g_rel_buffer.c
lib/libgss/g_rel_cred.c
lib/libgss/g_rel_name.c
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lib/libgss/g_sign.c
lib/libgss/g_store_cred.c
lib/libgss/g_unseal.c
lib/libgss/g_userok.c
lib/libgss/g_utils.c
lib/libgss/g_verify.c
lib/libgss/gssd_pname_to_uid.c
uts/common/gssapi/include/gssapi_err_generic.h
uts/common/gssapi/include/mechglueP.h

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lib/gssapi/mechglue/g_acquire_cred.c
lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c
lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c
lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c
lib/gssapi/mechglue/g_store_cred.c
lib/gssapi/mechglue/g_unseal.c
lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c
lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c

lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
kprop/kpropd_rpc.c
kprop/kproplog.c

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1.104 ssri 10.0.6

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1.105 @npmcli/fs 3.1.1

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1.107 kerberos 1.19.2-2ubuntu0.7

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lib/krb5/kdb/kdb_hdr.h
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"src/lib/gssapi", including the following files:

lib/gssapi/generic/gssapi_err_generic.et
lib/gssapi/mechglue/g_accept_sec_context.c
lib/gssapi/mechglue/g_acquire_cred.c
lib/gssapi/mechglue/g_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
lib/gssapi/mechglue/g_context_time.c
lib/gssapi/mechglue/g_delete_sec_context.c
lib/gssapi/mechglue/g_dsp_name.c
lib/gssapi/mechglue/g_dsp_status.c
lib/gssapi/mechglue/g_dup_name.c
lib/gssapi/mechglue/g_exp_sec_context.c
lib/gssapi/mechglue/g_export_name.c
lib/gssapi/mechglue/g_glue.c
lib/gssapi/mechglue/g_imp_name.c
lib/gssapi/mechglue/g_imp_sec_context.c
lib/gssapi/mechglue/g_init_sec_context.c
lib/gssapi/mechglue/g_initialize.c
lib/gssapi/mechglue/g_inquire_context.c
lib/gssapi/mechglue/g_inquire_cred.c
lib/gssapi/mechglue/g_inquire_names.c
lib/gssapi/mechglue/g_process_context.c
lib/gssapi/mechglue/g_rel_buffer.c
lib/gssapi/mechglue/g_rel_cred.c
lib/gssapi/mechglue/g_rel_name.c
lib/gssapi/mechglue/g_rel_oid_set.c
lib/gssapi/mechglue/g_seal.c
lib/gssapi/mechglue/g_sign.c
lib/gssapi/mechglue/g_store_cred.c
lib/gssapi/mechglue/g_unseal.c
lib/gssapi/mechglue/g_userok.c
lib/gssapi/mechglue/g_utils.c
lib/gssapi/mechglue/g_verify.c
lib/gssapi/mechglue/gssd_pname_to_uid.c
lib/gssapi/mechglue/mglueP.h
lib/gssapi/mechglue/oid_ops.c

lib/gssapi/spnego/gssapiP_spnego.h
lib/gssapi/spnego/spnego_mech.c

and the initial implementation of incremental propagation, including
the following new or changed files:

include/iprop_hdr.h
kadmin/server/ipropd_svc.c
lib/kdb/iprop.x
lib/kdb/kdb_convert.c
lib/kdb/kdb_log.c
lib/kdb/kdb_log.h
lib/krb5/error_tables/kdb5_err.et
kprop/kpropd_rpc.c
kprop/kproplog.c

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* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

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* java.sun.security.ssl

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 org.apache.tomcat:tomcat-jasper
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org.eclipse.jetty.toolchain:jetty-schemas

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1.124 jol-core 0.9

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1.126 ncurses 6.3-2ubuntu0.1

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1.127 glob 10.4.2

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1.128 debianutils 5.5-1ubuntu2

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*
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*
* Debian run-parts program
* Copyright (C) 1996 Jeff Noxon <jeff@router.patch.net>,
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* /debianutils-5-5-orig-tar-xz/debianutils-5.5/po4a/de/add-shell.8
* /debianutils-5-5-orig-tar-xz/debianutils-5.5/po4a/de/savelog.8
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1.129 tar 6.2.1

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1.130 brotli 1.0.9-2build6

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1.131 bctls-fips 2.0.19

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public static final ProtocolName WEBRTC_CONFIDENTIAL = asUtf8Encoding("c-webrtc");

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1.132 jersey-entity-filtering 2.34

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<signature of Ty Coon>, 1 April 1989
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/ReferenceCountUpdater.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/Hidden.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/svm/package-info.java

* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/ObjectPool.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/svm/PlatformDependent0Substitution.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/HashingStrategy.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/DefaultPriorityQueue.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/LongCounter.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/AsyncMapping.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/collection/ByteCollections.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/ObjectUtil.java
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 /netty-common-4-1-110-final-sources-jar/io/netty/util/collection/LongCollections.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/collection/IntObjectMap.java
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<inceptionYear>2013</inceptionYear>

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</licenses>

<scm>
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 <connection>scm:git:https://github.com/JCTools/JCTools</connection>
 <tag>HEAD</tag>
</scm>

<developers>
 <developer>
  <url>https://github.com/nitsanw</url>
 </developer>
 <developer>
```

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  <url>https://github.com/mjpt777</url>
 </developer>
 <developer>
  <url>https://github.com/RichardWarburton</url>
 </developer>
 <developer>
  <url>https://github.com/kay</url>
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  <url>https://github.com/franz1981</url>
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 <java.test.version>1.8</java.test.version>

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 <hamcrest.version>1.3</hamcrest.version>
 <junit.version>4.12</junit.version>
 <guava-testlib.version>21.0</guava-testlib.version>
</properties>
</project>

Found
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* /netty-common-4-1-110-final-sources-jar/META-INF/maven/org.jctools/jctools-core/pom.xml
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/SystemPropertyUtil.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/concurrent/EventExecutorGroup.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/AbstractConstant.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/package-info.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/AttributeKey.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/concurrent/FailedFuture.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/concurrent/SingleThreadEventExecutor.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/logging/JdkLoggerFactory.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/package-info.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/NetUtil.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/StringUtil.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/Attribute.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/logging/InternalLogLevel.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/HashedWheelTimer.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/Signal.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/PlatformDependent.java

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* /netty-common-4-1-110-final-sources-jar/io/netty/util/concurrent/FastThreadLocalRunnable.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/Cleaner.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/MpmcUnboundedXaddChunk.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/maps/NonBlockingHashMapLong.java
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/netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/atomic/SequencedAtomicReferenceArrayQueue.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/MessagePassingQueue.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/MpscBlockingConsumerArrayQueue.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/ConcurrentSequencedCircularArrayQueue.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/atomic/AtomicReferenceArrayQueue.java
* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/maps/ConcurrentAutoTable.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/internal/shaded/org/jctools/queues/SpscChunkedArrayQueue.java
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* /netty-common-4-1-110-final-sources-jar/io/netty/util/concurrent/ScheduledFutureTask.java
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This gmp package was built for Debian by

 Steve M. Robbins <smr@debian.org>
 Philipp Matthias Hahn <pmhahn@debian.org>

from sources obtained at http://gmplib.org/ .

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1.138 libtasn 4.18.0

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When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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the work with the complete corresponding
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b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate
properly with a modified version of the library, if
the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

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Java UUID generator library has been written by Tatu Saloranta (tatu.saloranta@iki.fi)

Other developers who have contributed code are:

* Eric Bie contributed extensive unit test suite which has helped ensure high implementation
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bzip2/libbzip2 version 1.0.6 of 6 September 2010

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and valid for as
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Version 3, 29 June 2007

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<!-- Creator : groff version 1.20.1 -->
<!-- CreationDate: Fri Jan 14 19:57:50 2011 -->
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

```
<html>
<head>
<meta name="generator" content="groff -Thtml, see www.gnu.org">
<meta http-equiv="Content-Type" content="text/html; charset=US-ASCII">
<meta name="Content-Style" content="text/css">
<link rel="stylesheet" type="text/css" href="texi2tr.css" />
<title>GNU Modula-2</title>
</head>

<body>
 <!-- site wide top running header menu -->

 <ul id="overview">
  <li class="home">
   HOME_HREF
  </li>
  <li class="release">
   12_HREF
  </li>

  <li>
   <a href="news.html" title="News">News</a>
  </li>
  <li>
   <a href="development.html" title="Development">Development</a>
  </li>
  <li>
   <a href="community.html" title="Community">Community</a>
  </li>
</ul>

<div id="header">
  <h1>
   <span style="display:inline-block; vertical-align:middle">
<img
src="200px-Heckert_GNU_white.png" alt="Heckert_GNU_white.png">
   </span>
   <span style="display:inline-block; vertical-align:middle; font-size: 50px">
GNU Modula-2
   </span>
  </h1>

  <!-- homepage tab menu -->

  <div id="tabmenu">
   <ul id="tab">
<li><a href="about.html"><span>About</span></a></li>
<li><a href="download.html"><span>Download</span></a></li>
```

```
 <li><a href="release.html"><span>Latest Release</span></a></li>
 <li class="selected"><a href="license.html"><span>License</span></a></li>
 <li><a href="platforms.html"><span>Platforms</span></a></li>
 <li><a href="users.html"><span>Users</span></a></li>
    </ul>
  </div>
 </div>

<div id="page">
 <div class="plain">
  <h2>The home of the GNU Modula-2 compiler</h2>
  <p>The compiler is held under the GNU Public Licence v3.</p>
  <p>The ISO and PIM libraries are under the GPL v3.1 with GCC runtime extensions.  Copies of the
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 </div>
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1.147 bson4jackson 2.7.0

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1.148 ini 4.1.3

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1.149 libpng 1.6.37-3build5

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1.152 jetty-xml 9.4.18.v20190429

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* javax.websocket:javax.websocket-api

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* java.sun.security.ssl

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org.ow2.asm:asm-commons
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 org.apache.tomcat:tomcat-util-scan
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org.eclipse.jetty.toolchain:jetty-schemas

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A. HISTORY OF THE SOFTWARE
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Python was created in the early 1990s by Guido van Rossum at Stichting
Mathematisch Centrum (CWI, see http://www.cwi.nl) in the Netherlands
as a successor of a language called ABC. Guido remains Python's
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for
National Research Initiatives (CNRI, see http://www.cnri.reston.va.us)
in Reston, Virginia where he released several versions of the
software.

In May 2000, Guido and the Python core development team moved to
BeOpen.com to form the BeOpen PythonLabs team. In October of the same
year, the PythonLabs team moved to Digital Creations (now Zope
Corporation, see http://www.zope.com). In 2001, the Python Software
Foundation (PSF, see http://www.python.org/psf/) was formed, a
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All Python releases are Open Source (see http://www.opensource.org for
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Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no

1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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2.1.2	2002	PSF	yes	
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
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2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
2.5	2.4	2006	PSF	yes
2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
2.6.1	2.6	2008	PSF	yes
2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
2.7	2.6	2010	PSF	yes

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In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see http://www.cnri.reston.va.us) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see http://www.zope.com). In 2001, the Python Software Foundation (PSF, see http://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member
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2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
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2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
3.0	2.6	2008	PSF	yes
3.0.1	3.0	2009	PSF	yes
3.1	3.0.1	2009	PSF	yes
3.1.1	3.1	2009	PSF	yes
3.1.2	3.1	2010	PSF	yes
3.2	3.1	2010	PSF	yes

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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
 * javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
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module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
are hosted at github and both modified and original are under GPL v2 with
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http://openjdk.java.net/legal/gplv2+ce.html

OW2

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org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

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org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
 org.apache.tomcat:tomcat-el-api
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
 org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-el-api

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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1.164 go-urn 1.2.4

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1.165 sed 4.8-1ubuntu2

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The IJG distribution formerly included code to read and write GIF files.
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/* inffast.h -- header to use inffast.c
* Copyright (C) 1995-2003, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inffast.h

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

Not copyrighted -- provided to the public domain

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zlib_how.html
No license file was found, but licenses were detected in source scan.

/* unzip.c -- IO for uncompress .zip files using zlib
  Version 1.1, February 14h, 2010
  part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

        Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

        Modifications of Unzip for Zip64
        Copyright (C) 2007-2008 Even Rouault

        Modifications for Zip64 support on both zip and unzip
        Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

        For more info read MiniZip_info.txt

Decryption code comes from crypt.c by Info-ZIP but has been greatly reduced in terms of
compatibility with older software. The following is from the original crypt.c.
Code woven in by Terry Thorsen 1/2003.

Copyright (c) 1990-2000 Info-ZIP. All rights reserved.

See the accompanying
file LICENSE, version 2000-Apr-09 or later
(the contents of which are also included in zip.h) for terms of use.
If, for some reason, all these files are missing, the Info-ZIP license
also may be found at: ftp://ftp.info-zip.org/pub/infozip/license.html

      crypt.c (full version) by Info-ZIP.   Last revised: [see crypt.h]

The encryption/decryption parts of this source code (as opposed to the
non-echoing password parts) were originally written in Europe. The
whole source package can be freely distributed, including from the USA.
(Prior to January 2000, re-export from the US was a violation of US law.)

      This encryption code is a direct transcription of the algorithm from
Roger Schlafly, described by Phil Katz in the file appnote.txt. This
file (appnote.txt) is distributed with the PKZIP program (even in the
version without encryption capabilities).

Changes in unzip.c

2007-2008 - Even Rouault - Addition of cpl_unzGetCurrentFileZStreamPos
2007-2008 - Even Rouault - Decoration of symbol names unz* -> cpl_unz*
2007-2008 - Even Rouault - Remove old C style function prototypes
2007-2008 - Even Rouault - Add unzip support for ZIP64

Copyright (C) 2007-2008 Even Rouault

Oct-2009 - Mathias Svensson - Removed cpl_* from symbol names (Even Rouault added them but since this is now moved to a new project (minizip64) I renamed them again).
Oct-2009 - Mathias Svensson - Fixed problem if uncompressed size was > 4G and compressed size was <4G
should only read the compressed/uncompressed size from the Zip64 format if
the size from normal header was 0xFFFFFFFF
Oct-2009 - Mathias Svensson - Applied some bug fixes from paches recived from Gilles Vollant
Oct-2009 - Mathias Svensson - Applied support to unzip files with compression mathod
BZIP2 (bzip2 lib is required)
Patch created by Daniel Borca

Jan-2010 - back to unzip and minizip 1.0 name scheme, with compatibility layer

Copyright (C) 1998 - 2010 Gilles Vollant, Even Rouault, Mathias Svensson

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/unzip.c
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Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zlib.3
No license file was found, but licenses were detected in source scan.

For conditions of distribution and use, see copyright notice in zlib.h

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/old/Makefile.emx
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/old/os2/Makefile.os2
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/msdos/Makefile.dj2
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/msdos/Makefile.emx

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

/* inflate.c -- zlib decompression
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inflate.c
No license file was found, but licenses were detected in source scan.

/* infback.c -- inflate using a call-back interface
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/infback.c
No license file was found, but licenses were detected in source scan.

/* gzlog.h
Copyright (C) 2004, 2008, 2012 Mark Adler, all rights reserved
version 2.2, 14 Aug 2012

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3. This notice may not be removed or altered from any source
distribution.

Mark Adler madler@alumni.caltech.edu
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzlog.h
No license file was found, but licenses were detected in source scan.

/* uncompr.c -- decompress a memory buffer
* Copyright (C) 1995-2003, 2010, 2014, 2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/uncompr.c
No license file was found, but licenses were detected in source scan.

/* inflate.h -- internal inflate state definition
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inflate.h
No license file was found, but licenses were detected in source scan.

/* zip.h -- IO on .zip files using zlib
Version 1.1, February 14h, 2010
part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

Modifications for Zip64 support
Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

For more info read MiniZip_info.txt

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Changes

See header of zip.h

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/zip.h
No license file was found, but licenses were detected in source scan.

/*
* gzlog.c
* Copyright (C) 2004, 2008, 2012, 2016 Mark Adler, all rights reserved
* For conditions of distribution and use, see copyright notice in gzlog.h
* version 2.2, 14 Aug 2012
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzlog.c
No license file was found, but licenses were detected in source scan.

/* gzjoin -- command to join gzip files into one gzip file

Copyright (C) 2004, 2005, 2012 Mark Adler, all rights reserved
version 1.2, 14 Aug 2012

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Mark Adler   madler@alumni.caltech.edu

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzjoin.c
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ZLIB DATA COMPRESSION LIBRARY

zlib 1.2.11 is a general purpose data compression library. All the code is
thread safe. The data format used by the zlib library is described by RFCs
(Request for Comments) 1950 to 1952 in the files
http://tools.ietf.org/html/rfc1950 (zlib format), rfc1951 (deflate format) and
rfc1952 (gzip format).

All functions of the compression library are documented in the file zlib.h
(volunteer to write man pages welcome, contact zlib@gzip.org). A usage example
of the library is given in the file test/example.c which also tests that
the library is working correctly. Another example is given in the file
test/minigzip.c. The compression library itself is composed of all source
files in the root directory.

To compile all files and run the test program, follow the instructions given at
the top of Makefile.in. In short "./configure; make test", and if that goes
well, "make install" should work
for most flavors of Unix. For Windows, use
one of the special makefiles in win32/ or contrib/vstudio/ . For VMS, use
make_vms.com.

Questions about zlib should be sent to <zlib@gzip.org>, or to Gilles Vollant
<info@winimage.com> for the Windows DLL version. The zlib home page is
http://zlib.net/ . Before reporting a problem, please check this site to
verify that you have the latest version of zlib; otherwise get the latest
version and check whether the problem still exists or not.

PLEASE read the zlib FAQ http://zlib.net/zlib_faq.html before asking for help.

Mark Nelson <markn@ieee.org> wrote an article about zlib for the Jan. 1997
issue of Dr. Dobb's Journal; a copy of the article is available at
http://marknelson.us/1997/01/01/zlib-engine/ .

The changes made in version 1.2.11 are documented in the file ChangeLog.

Unsupported third party contributions are provided in directory contrib/ .

zlib is available in Java using the java.util.zip package, documented at
http://java.sun.com/developer/technicalArticles/Programming/compression/
.

A Perl interface to zlib written by Paul Marquess <pmqs@cpan.org> is available at CPAN (Comprehensive Perl Archive Network) sites, including http://search.cpan.org/~pmqs/IO-Compress-Zlib/ .

A Python interface to zlib written by A.M. Kuchling <amk@amk.ca> is available in Python 1.5 and later versions, see http://docs.python.org/library/zlib.html .

zlib is built into tcl: http://wiki.tcl.tk/4610 .

An experimental package to read and write files in .zip format, written on top of zlib by Gilles Vollant <info@winimage.com>, is available in the contrib/minizip directory of zlib.

Notes for some targets:

- For Windows DLL versions, please see win32/DLL_FAQ.txt

- For 64-bit Irix, deflate.c must be compiled without any optimization. With -O, one libpng test fails. The test works in 32 bit mode (with the -n32 compiler flag). The compiler bug has been reported to SGI.

- zlib doesn't work with gcc 2.6.3 on a DEC 3000/300LX under OSF/1 2.1 it works when compiled with cc.

- On Digital Unix 4.0D (formely OSF/1) on AlphaServer, the cc option -std1 is necessary to get gzprintf working correctly. This is done by configure.

- zlib doesn't work on HP-UX 9.05 with some versions of /bin/cc. It works with other compilers. Use "make test" to check your compiler.

- gzdopen is not supported on RISCOS or BEOS.

- For PalmOs, see http://palmzlib.sourceforge.net/

Acknowledgments:

The deflate format used by zlib was defined by Phil Katz. The deflate and zlib specifications were written by L. Peter Deutsch. Thanks to all the people who reported problems and suggested various improvements in zlib; they are too numerous to cite here.

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Jean-loup Gailly   Mark Adler
jloup@gzip.org   madler@alumni.caltech.edu

If you use the zlib library in a product, we would appreciate *not* receiving
lengthy legal documents to sign. The sources are provided for free but without
warranty of any kind. The library has been entirely written by Jean-loup
Gailly and Mark Adler; it does not include
third-party code.

If you redistribute modified sources, we would appreciate that you include in
the file ChangeLog history information documenting your changes. Please read
the FAQ for more information on the distribution of modified source versions.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/README
No license file was found, but licenses were detected in source scan.

/* fitblk.c: example of fitting compressed output to a specified size
  Not copyrighted -- provided to the public domain
  Version 1.1 25 November 2004 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/fitblk.c
No license file was found, but licenses were detected in source scan.

/* gzread.c -- zlib functions for reading gzip files
* Copyright (C) 2004, 2005, 2010, 2011, 2012, 2013, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzread.c
No license file was found, but licenses were detected in source scan.

/* inftrees.h -- header to use inftrees.c
* Copyright (C) 1995-2005, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inftrees.h
No license file was found, but licenses were detected in source scan.

/* zlib.h -- interface of the 'zlib' general purpose compression library
 version 1.2.11, January 15th, 2017

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 The data format used by the zlib library is described by RFCs (Request for
 Comments) 1950 to 1952 in the files http://tools.ietf.org/html/rfc1950
 (zlib format), rfc1951 (deflate format) and rfc1952 (gzip format).
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zlib.h
No license file was found, but licenses were detected in source scan.

/* deflate.c -- compress data using the deflation algorithm

* Copyright (C) 1995-2017 Jean-loup Gailly and Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/deflate.c
No license file was found, but licenses were detected in source scan.

/* zconf.h -- configuration of the zlib compression library
* Copyright (C) 1995-2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h.in
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h.cmakein
No license file was found, but licenses were detected in source scan.

/* deflate.h -- internal compression state
* Copyright (C) 1995-2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/deflate.h
No license file was found, but licenses were detected in source scan.

/* minigzip.c -- simulate gzip using the zlib compression library
* Copyright (C) 1995-2006, 2010, 2011, 2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/minigzip.c
No license file was found, but licenses were detected in source scan.

/* gzlib.c -- zlib functions common to reading and writing gzip files
* Copyright (C) 2004-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzlib.c
No license file was found, but licenses were detected in source scan.

/* infcover.c -- test zlib's inflate routines with full code coverage
* Copyright (C) 2011, 2016 Mark Adler

* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/infcover.c
No license file was found, but licenses were detected in source scan.

/* inftrees.c -- generate Huffman trees for efficient decoding
* Copyright (C) 1995-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inftrees.c
No license file was found, but licenses were detected in source scan.

/* zutil.c -- target dependent utility functions for the compression library
* Copyright (C) 1995-2017 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zutil.c
No license file was found, but licenses were detected in source scan.

/* example.c -- usage example of the zlib compression library
* Copyright (C) 1995-2006, 2011, 2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/example.c
No license file was found, but licenses were detected in source scan.

/*
 Additional tools for Minizip
 Code: Xavier Roche '2004
 License: Same as ZLIB (www.gzip.org)
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/mztools.h
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/mztools.c
No license file was found, but licenses were detected in source scan.

/* trees.c -- output deflated data using Huffman coding
* Copyright (C) 1995-2017 Jean-loup Gailly
* detect_data_type() function provided freely by Cosmin Truta, 2006

* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/trees.c
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MiniZip - Copyright (c) 1998-2010 - by Gilles Vollant - version 1.1 64 bits from Mathias Svensson

Introduction

MiniZip 1.1 is built from MiniZip 1.0 by Gilles Vollant (http://www.winimage.com/zLibDll/minizip.html)

When adding ZIP64 support into minizip it would result into risk of breaking compatibility with minizip 1.0.
All possible work was done for compatibility.

Background

When adding ZIP64 support Mathias Svensson found that Even Rouault have added ZIP64
support for unzip.c into minizip for a open source project called gdal (http://www.gdal.org/)

That was used as a starting point. And after that ZIP64 support was added to zip.c
some refactoring and code cleanup was also done.

Changed from MiniZip 1.0 to MiniZip 1.1
---
* Added ZIP64 support for unzip (by Even Rouault)
* Added ZIP64 support for zip (by Mathias Svensson
)
* Reverted some changed that Even Rouault did.
* Bunch of patches received from Gulles Vollant that he received for MiniZip from various users.
* Added unzip patch for BZIP Compression method (patch create by Daniel Borca)
* Added BZIP Compress method for zip
* Did some refactoring and code cleanup

Credits

Gilles Vollant - Original MiniZip author
Even Rouault - ZIP64 unzip Support
Daniel Borca - BZip Compression method support in unzip
Mathias Svensson - ZIP64 zip support
Mathias Svensson - BZip Compression method support in zip

Resources

ZipLayout http://result42.com/projects/ZipFileLayout
Command line tool for Windows that shows the layout and information of the headers in a zip archive.
Used when debugging and validating the creation of zip files using MiniZip64

ZIP App Note http://www.pkware.com/documents/casestudies/APPNOTE.TXT
Zip File specification

Notes.
* To be able to use BZip compression method in
zip64.c or unzip64.c the BZIP2 lib is needed and HAVE_BZIP2 need to be defined.

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Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/MiniZip64_info.txt
No license file was found, but licenses were detected in source scan.

/* compress.c -- compress a memory buffer
* Copyright (C) 1995-2005, 2014, 2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/compress.c

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

/* gzclose.c -- zlib gzclose() function
* Copyright (C) 2004, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzclose.c
No license file was found, but licenses were detected in source scan.

/* unzip.h -- IO for uncompress .zip files using zlib
Version 1.1, February 14h, 2010
part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

Modifications of Unzip for Zip64
Copyright (C) 2007-2008 Even Rouault

Modifications for Zip64 support on both zip and unzip
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For more info read MiniZip_info.txt

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Changes

See header of unzip64.c

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/unzip.h
No license file was found, but licenses were detected in source scan.

/* zran.c -- example of zlib/gzip stream indexing and random access
* Copyright (C) 2005, 2012 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
  Version 1.1 29 Sep 2012 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zran.c
No license file was found, but licenses were detected in source scan.

/* inffast.c -- fast decoding
* Copyright (C) 1995-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inffast.c
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/* crc32.c -- compute the CRC-32 of a data stream
* Copyright (C) 1995-2006, 2010, 2011, 2012, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*
* Thanks to Rodney Brown <rbrown64@csc.com.au> for his contribution of faster
* CRC methods: exclusive-oring 32 bits of data at a time, and pre-computing
* tables for updating the shift register in one step with three exclusive-ors
* instead of four steps with four exclusive-ors. This results in about a
* factor of two increase in speed on a Power PC G4 (PPC7455) using gcc -O3.
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/crc32.c
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/* adler32.c -- compute the Adler-32 checksum of a data stream
* Copyright (C) 1995-2011, 2016 Mark Adler
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*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/adler32.c
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/* zutil.h -- internal interface and configuration of the compression library
* Copyright (C) 1995-2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zutil.h
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/* gzguts.h -- zlib internal header definitions for gz* operations
* Copyright (C) 2004, 2005, 2010, 2011, 2012, 2013, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzguts.h
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/* zpipe.c: example of proper use of zlib's inflate() and deflate()
  Not copyrighted -- provided to the public domain
  Version 1.4 11 December 2005 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zpipe.c
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/* gzappend -- command to append to a gzip file

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 version 1.2, 11 Oct 2012

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Mark Adler madler@alumni.caltech.edu
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzappend.c
No license file was found, but licenses were detected in source scan.

Frequently Asked Questions about zlib

If your question is not there, please check the zlib home page
http://zlib.net/ which may have more recent information.
The lastest zlib FAQ is at http://zlib.net/zlib_faq.html

1. Is zlib Y2K-compliant?

Yes. zlib doesn't handle dates.

2. Where can I get a Windows DLL version?

The zlib sources can be compiled without change to produce a DLL. See the
file win32/DLL_FAQ.txt in the zlib distribution. Pointers to the
precompiled DLL are found in the zlib web site at http://zlib.net/ .

3. Where can I get a Visual Basic interface to zlib?

See
* http://marknelson.us/1997/01/01/zlib-engine/
* win32/DLL_FAQ.txt in the zlib distribution

4. compress() returns Z_BUF_ERROR.

Make sure that before the call of compress(), the length of the compressed
buffer is equal to the available size of the compressed buffer and not
zero. For Visual
Basic, check that this parameter is passed by reference
("as any"), not by value ("as long").

5. deflate() or inflate() returns Z_BUF_ERROR.

Before making the call, make sure that avail_in and avail_out are not zero.
When setting the parameter flush equal to Z_FINISH, also make sure that
avail_out is big enough to allow processing all pending input. Note that a

Z_BUF_ERROR is not fatal--another call to deflate() or inflate() can be made with more input or output space. A Z_BUF_ERROR may in fact be unavoidable depending on how the functions are used, since it is not possible to tell whether or not there is more output pending when strm.avail_out returns with zero. See http://zlib.net/zlib_how.html for a heavily annotated example.

6. Where's the zlib documentation (man pages, etc.)?

It's in zlib.h . Examples of zlib usage are in the files test/example.c and test/minigzip.c, with more in examples/ .

7. Why don't you use GNU autoconf or libtool or ...?

Because we would like to keep zlib as a very small and simple package. zlib is rather portable and doesn't need much configuration.

8. I found a bug in zlib.

Most of the time, such problems are due to an incorrect usage of zlib. Please try to reproduce the problem with a small program and send the corresponding source to us at zlib@gzip.org . Do not send multi-megabyte data files without prior agreement.

9. Why do I get "undefined reference to gzputc"?

If "make test" produces something like

example.o(.text+0x154): undefined reference to `gzputc'

check that you don't have old files libz.* in /usr/lib, /usr/local/lib or /usr/X11R6/lib. Remove any old versions, then do "make install".

10. I need a Delphi interface to zlib.

See the contrib/delphi directory in the zlib distribution.

11. Can zlib handle .zip archives?

Not by itself, no. See the directory contrib/minizip in the zlib distribution.

12. Can zlib handle .Z files?

No, sorry. You have to spawn an uncompress or gunzip subprocess, or adapt the code of uncompress on your own.

13. How can I make a Unix shared library?

By default a shared (and a static) library is built for Unix. So:

```
make distclean
./configure
make
```

14. How do I install a shared zlib library on Unix?

After the above, then:

```
make install
```

However, many flavors of Unix come with a shared zlib already installed. Before going to the trouble of compiling a shared version of zlib and trying to install it, you may want to check if it's already there! If you can #include <zlib.h>, it's there. The -lz option will probably link to it. You can check the version at the top of zlib.h or with the ZLIB_VERSION symbol defined in zlib.h .

15. I have a question about OttoPDF.

We are not the authors of OttoPDF. The real author is on the OttoPDF web site: Joel Hainley, jhainley@myndkryme.com.

16.
Can zlib decode Flate data in an Adobe PDF file?

Yes. See http://www.pdflib.com/ . To modify PDF forms, see http://sourceforge.net/projects/acroformtool/ .

17. Why am I getting this "register_frame_info not found" error on Solaris?

After installing zlib 1.1.4 on Solaris 2.6, running applications using zlib generates an error such as:

```
ld.so.1: rpm: fatal: relocation error: file /usr/local/lib/libz.so:
symbol __register_frame_info: referenced symbol not found
```

The symbol __register_frame_info is not part of zlib, it is generated by the C compiler (cc or gcc). You must recompile applications using zlib which have this problem. This problem is specific to Solaris. See http://www.sunfreeware.com for Solaris versions of zlib and applications using zlib.

18. Why does gzip give an error on a file I make with compress/deflate?

The compress and deflate functions produce data in the zlib format, which is different and incompatible with the gzip format. The gz* functions in zlib on the other hand use the gzip format. Both the zlib and gzip formats use the same compressed data format internally, but have different headers and trailers around the compressed data.

19. Ok, so why are there two different formats?

The gzip format was designed to retain the directory information about a single file, such as the name and last modification date. The zlib format on the other hand was designed for in-memory and communication channel applications, and has a much more compact header and trailer and uses a faster integrity check than gzip.

20. Well that's nice, but how do I make a gzip file in memory?

You can request that deflate write the gzip format instead of the zlib format using deflateInit2(). You can also request that inflate decode the gzip format using inflateInit2(). Read zlib.h for more details.

21. Is zlib thread-safe?

Yes. However any library routines that zlib uses and any application-provided memory allocation routines must also be thread-safe. zlib's gz* functions use stdio library routines, and most of zlib's functions use the library memory allocation routines by default. zlib's *Init* functions allow for the application to provide custom memory allocation routines.

Of course, you should only operate on any given zlib or gzip stream from a single thread at a time.

22. Can I use zlib in my commercial application?

Yes. Please read the license in zlib.h.

23. Is zlib under the GNU license?

No. Please read the license in zlib.h.

24. The license says that altered source versions must be "plainly marked". So what exactly do I need to do to meet that requirement?

You need to change the ZLIB_VERSION and ZLIB_VERNUM #defines in zlib.h. In particular, the final version number needs to be changed to "f", and an identification string should be appended to ZLIB_VERSION. Version numbers

x.x.x.f are reserved for modifications to zlib by others than the zlib maintainers. For example, if the version of the base zlib you are altering is "1.2.3.4", then in zlib.h you should change ZLIB_VERNUM to 0x123f, and ZLIB_VERSION to something like "1.2.3.f-zachary-mods-v3". You can also update the version strings in deflate.c and inftrees.c.

For altered source distributions, you should also note the origin and nature of the changes in zlib.h, as well as in ChangeLog and README, along with the dates of the alterations. The origin should include at least your name (or your company's name), and an email address to contact for help or issues with the library.

Note that distributing a compiled zlib library along with zlib.h and zconf.h is also a source distribution, and so you should change ZLIB_VERSION and ZLIB_VERNUM and note the origin and nature of the changes in zlib.h as you would for a full source distribution.

25.
Will zlib work on a big-endian or little-endian architecture, and can I exchange compressed data between them?

Yes and yes.

26. Will zlib work on a 64-bit machine?

Yes. It has been tested on 64-bit machines, and has no dependence on any data types being limited to 32-bits in length. If you have any difficulties, please provide a complete problem report to zlib@gzip.org

27. Will zlib decompress data from the PKWare Data Compression Library?

No. The PKWare DCL uses a completely different compressed data format than does PKZIP and zlib. However, you can look in zlib's contrib/blast directory for a possible solution to your problem.

28. Can I access data randomly in a compressed stream?

No, not without some preparation. If when compressing you periodically use Z_FULL_FLUSH, carefully write all the pending data at those points, and keep an index of those locations, then you can start decompression at those points. You have to be
careful to not use Z_FULL_FLUSH too often, since it can significantly degrade compression. Alternatively, you can scan a deflate stream once to generate an index, and then use that index for random access. See examples/zran.c .

29. Does zlib work on MVS, OS/390, CICS, etc.?

It has in the past, but we have not heard of any recent evidence. There were working ports of zlib 1.1.4 to MVS, but those links no longer work. If you know of recent, successful applications of zlib on these operating systems, please let us know. Thanks.

30. Is there some simpler, easier to read version of inflate I can look at to understand the deflate format?

First off, you should read RFC 1951. Second, yes. Look in zlib's contrib/puff directory.

31. Does zlib infringe on any patents?

As far as we know, no. In fact, that was originally the whole point behind zlib. Look here for some more information:

http://www.gzip.org/#faq11

32. Can zlib work
with greater than 4 GB of data?

Yes. inflate() and deflate() will process any amount of data correctly. Each call of inflate() or deflate() is limited to input and output chunks of the maximum value that can be stored in the compiler's "unsigned int" type, but there is no limit to the number of chunks. Note however that the strm.total_in and strm_total_out counters may be limited to 4 GB. These counters are provided as a convenience and are not used internally by inflate() or deflate(). The application can easily set up its own counters updated after each call of inflate() or deflate() to count beyond 4 GB. compress() and uncompress() may be limited to 4 GB, since they operate in a single call. gzseek() and gztell() may be limited to 4 GB depending on how zlib is compiled. See the zlibCompileFlags() function in zlib.h.

The word "may" appears several times above since there is a 4 GB limit only if the compiler's "long" type is
32 bits. If the compiler's "long" type is
64 bits, then the limit is 16 exabytes.

33. Does zlib have any security vulnerabilities?

The only one that we are aware of is potentially in gzprintf(). If zlib is compiled to use sprintf() or vsprintf(), then there is no protection against a buffer overflow of an 8K string space (or other value as set by gzbuffer()), other than the caller of gzprintf() assuring that the output will not exceed 8K. On the other hand, if zlib is compiled to use snprintf() or vsnprintf(), which should normally be the case, then there is no vulnerability. The ./configure script will display warnings if an insecure variation of sprintf() will be used by gzprintf(). Also the

zlibCompileFlags() function will return information on what variant of sprintf() is used by gzprintf().

If you don't have snprintf() or vsnprintf() and would like one, you can find a portable implementation here:

http://www.ijs.si/software/snprintf/

Note that you should be using the most recent version of zlib. Versions 1.1.3 and before were subject to a double-free vulnerability, and versions 1.2.1 and 1.2.2 were subject to an access exception when decompressing invalid compressed data.

34. Is there a Java version of zlib?

Probably what you want is to use zlib in Java. zlib is already included as part of the Java SDK in the java.util.zip package. If you really want a version of zlib written in the Java language, look on the zlib home page for links: http://zlib.net/ .

35. I get this or that compiler or source-code scanner warning when I crank it up to maximally-pedantic. Can't you guys write proper code?

Many years ago, we gave up attempting to avoid warnings on every compiler in the universe. It just got to be a waste of time, and some compilers were downright silly as well as contradicted each other. So now, we simply make sure that the code always
works.

36. Valgrind (or some similar memory access checker) says that deflate is performing a conditional jump that depends on an uninitialized value. Isn't that a bug?

No. That is intentional for performance reasons, and the output of deflate is not affected. This only started showing up recently since zlib 1.2.x uses malloc() by default for allocations, whereas earlier versions used calloc(), which zeros out the allocated memory. Even though the code was correct, versions 1.2.4 and later was changed to not stimulate these checkers.

37. Will zlib read the (insert any ancient or arcane format here) compressed data format?

Probably not. Look in the comp.compression FAQ for pointers to various formats and associated software.

38. How can I encrypt/decrypt zip files with zlib?

zlib doesn't support encryption. The original PKZIP encryption is very weak and can be broken with freely available programs. To get strong encryption,
use GnuPG, http://www.gnupg.org/ , which already includes zlib compression. For PKZIP compatible "encryption", look at http://www.info-zip.org/

39. What's the difference between the "gzip" and "deflate" HTTP 1.1 encodings?

"gzip" is the gzip format, and "deflate" is the zlib format. They should probably have called the second one "zlib" instead to avoid confusion with the raw deflate compressed data format. While the HTTP 1.1 RFC 2616 correctly points to the zlib specification in RFC 1950 for the "deflate" transfer encoding, there have been reports of servers and browsers that incorrectly produce or expect raw deflate data per the deflate specification in RFC 1951, most notably Microsoft. So even though the "deflate" transfer encoding using the zlib format would be the more efficient approach (and in fact exactly what the zlib format was designed for), using the "gzip" transfer encoding is probably more reliable due to an
unfortunate choice of name on the part of the HTTP 1.1 authors.

Bottom line: use the gzip format for HTTP 1.1 encoding.

40. Does zlib support the new "Deflate64" format introduced by PKWare?

No. PKWare has apparently decided to keep that format proprietary, since they have not documented it as they have previous compression formats. In any case, the compression improvements are so modest compared to other more modern approaches, that it's not worth the effort to implement.

41. I'm having a problem with the zip functions in zlib, can you help?

There are no zip functions in zlib. You are probably using minizip by Giles Vollant, which is found in the contrib directory of zlib. It is not part of zlib. In fact none of the stuff in contrib is part of zlib. The files in there are not supported by the zlib authors. You need to contact the authors of the respective contribution for help.

42. The match.asm code in contrib is under the GNU General Public License.
Since it's part of zlib, doesn't that mean that all of zlib falls under the GNU GPL?

No. The files in contrib are not part of zlib. They were contributed by other authors and are provided as a convenience to the user within the zlib distribution. Each item in contrib has its own license.

43. Is zlib subject to export controls? What is its ECCN?

zlib is not subject to export controls, and so is classified as EAR99.

44. Can you please sign these lengthy legal documents and fax them back to us
so that we can use your software in our product?

No. Go away. Shoo.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/FAQ

1.174 commons-pool 2.11.1

1.174.1 Available under license :

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1.178 expiringmap 0.5.8

1.179 npmcli-promise-spawn 7.0.2

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1.180 ca-certificates 20240203~22.04.1

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1.181 lsb 11.1.0ubuntu4

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code or patches to this implementation of sudo since I began
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Ackeret, Matt

Adler, Mark
Allbery, Russ
Anderson, Jamie
Andrew, Nick
Andric, Dimitry
Barron, Danny
Bates, Tom
Behan, Zdenk
Bellis, Ray
Benali, Elias
Beverly, Jamie
Boardman, Spider
Bos, Sander
Bostley, P.J.
Bowes, Keith
Boyce, Keith Garry
Brantley, Michael
Braun, Rob
Bezina, Pavel
Brooks, Piete
Brown, Jerry
Burr, Michael E
Burton, Ross
Bussjaeger, Andreas
Calvin, Gary
Campbell, Aaron
Chazelas, Stephane
Cheloha, Scott
ek, Vtzslav
Coleman, Chris
Corzine, Deven T.
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Edgington, Ben
Esipovich, Marc
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Faigon, Ariel
Farrell, Brian
Fobes, Steve
Frysinger, Mike
G., Daniel Richard
Gailly, Jean-loup
Gelman, Stephen
Gerraty, Simon J.

Graber, Stephane
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Hayman, Randy M.
Henke, Joachim
Hideaki, Yoshifuji
Hieb, Dave
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Hoover, Adam
Hunter, Michael T.
Hutchings, Ben
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Jackson, Brian
Jackson, John R.
Jackson, Richard L., Jr.
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Jepeway, Chris
Jorge, Joel Pele
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Juhani, Timo
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Kadow, Kevin
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Knoble, Jim
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Libby, Kendall
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McIntyre, Jason
MacKenzie, David J.
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Makey, Jeff
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Manner, Rbert
Marchionna, Michael D.
Markham, Paul
Martinian, Emin
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Michael, David
Miller, Todd C.
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Richards, Matt
Rossum, Guido van
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Rowe, William A., Jr.
Roy, Alain
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Warburton, John
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Zolnowsky, John

The following people have worked to translate sudo into other languages as part of the Translation Project, see https://translationproject.org for more details.

Albuquerque, Pedro
Blttermann, Mario
Bogusz, Jakub
Buo-ren, Lin
Casagrande, Milo
Castro, Felipe
Cho, Seong-ho
Chornoivan, Yuri
Diguez, Francisco

Fontenelle, Rafael
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Uranga, Mikel Olasagasti
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1.185 socks-proxy-agent 8.0.4

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1.186 @npmcli/config 8.3.4

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1.187 pcre2 10.39-3ubuntu0.1

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1.188 cmd-shim 6.0.3

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1.189 selinux 3.3-1build2

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1.190 libffi 3.4.2-4

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1.191 dash 0.5.11+git20210903+057cd650a4ed-3build1

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1.192 protobuf-java 3.25.5

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Found in path(s):
* /protobuf-java-3-25-5-jar/google/protobuf/type.proto
* /protobuf-java-3-25-5-jar/google/protobuf/struct.proto
* /protobuf-java-3-25-5-jar/google/protobuf/timestamp.proto
* /protobuf-java-3-25-5-jar/google/protobuf/api.proto
* /protobuf-java-3-25-5-jar/google/protobuf/empty.proto
*
 /protobuf-java-3-25-5-jar/google/protobuf/source_context.proto
* /protobuf-java-3-25-5-jar/google/protobuf/wrappers.proto
* /protobuf-java-3-25-5-jar/google/protobuf/duration.proto
* /protobuf-java-3-25-5-jar/google/protobuf/field_mask.proto
* /protobuf-java-3-25-5-jar/google/protobuf/any.proto
* /protobuf-java-3-25-5-jar/google/protobuf/descriptor.proto
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Manifest-Version: 1.0
Created-By: mergejars
Automatic-Module-Name: com.google.protobuf
Bnd-LastModified: 1726689439980
Bundle-Description: Core Protocol Buffers library. Protocol Buffers are
a way of encoding structured data in an efficient yet extensible format
.
Bundle-DocURL: https://developers.google.com/protocol-buffers/
Bundle-License: https://opensource.org/licenses/BSD-3-Clause
Bundle-ManifestVersion: 2
Bundle-Name: Protocol Buffers [Core]
Bundle-SymbolicName: com.google.protobuf
Bundle-Version: 3.25.5
Export-Package: com.google.protobuf;version="3.25.5",com.google.protobuf

.compiler;version="3.25.5";uses:="com.google.protobuf"
Import-Package: com.google.protobuf;version="[3.25,4)",sun.misc;resoluti
on:=optional
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"
Tool: Bnd-6.4.0.202211291949
Target-Label: //java/core:lite_runtime_only

Found in path(s):
* /protobuf-java-3-25-5-jar/META-INF/MANIFEST.MF

1.193 ansi-regex 5.0.1

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1.194 libxrender 1:0.9.10-1build4

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1.195 html5lib 1.0.1

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1.196 pekko-stream_3 1.0.2

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1.197 grep 3.7-1build1

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1.207 zstd 1.4.8+dfsg-3build1

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1.209 jsr305 3.0.2

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#ifndef _BASENAME_LGPL_H
#define _BASENAME_LGPL_H

#include <stddef.h>

#ifndef DOUBLE_SLASH_IS_DISTINCT_ROOT
define DOUBLE_SLASH_IS_DISTINCT_ROOT 0

```
#endif

#ifdef __cplusplus
extern "C" {
#endif


/*
 Return the address of the last file name component of FILENAME.
  If FILENAME has some trailing slash(es), they are considered to be
  part of the last component.
  If FILENAME has no relative file name components because it is a file
  system root, return the empty string.
  Examples:
          FILENAME      RESULT
          "foo.c"       "foo.c"
          "foo/bar.c"   "bar.c"
          "/foo/bar.c"  "bar.c"
          "foo/bar/"    "bar/"
          "foo/bar//"   "bar//"
          "/"           ""
          "//"          ""
          ""            ""
  The return value is a tail of the given FILENAME; do NOT free() it!  */

/* This function was traditionally called 'basename', but we avoid this
  function name because
    * Various platforms have different functions in their libc.
      In particular, the glibc basename(), defined in <string.h>, does
      not consider trailing slashes to be part of the component:
          FILENAME
      RESULT
          "foo/bar/"    ""
          "foo/bar//"   ""
    * The 'basename' command eliminates trailing slashes and for a root
      produces a non-empty result:
          FILENAME      RESULT
          "foo/bar/"    "bar"
          "foo/bar//"   "bar"
          "/"           "/"
          "//"          "/"
*/
extern char *last_component (char const *filename) _GL_ATTRIBUTE_PURE;

/* Return the length of the basename FILENAME.
  Typically FILENAME is the value returned by base_name or last_component.
  Act like strlen (FILENAME), except omit all trailing slashes.  */
extern size_t base_len (char const *filename) _GL_ATTRIBUTE_PURE;
```

```
#ifdef __cplusplus
} /* extern "C" */
#endif

#endif /* _BASENAME_LGPL_H */
```

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version 0.1
##
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1.215 jersey-media-json-jackson 2.34

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analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

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Stempel analyzer (stempel) includes BSD-licensed software developed
by the Egothor project http://egothor.sf.net/, created by Leo Galambos, Martin Kvapil,
and Edmond Nolan.

The Polish analyzer (stempel) comes with a default
stopword list that is BSD-licensed created by the Carrot2 project. The file resides
in stempel/src/resources/org/apache/lucene/analysis/pl/stopwords.txt.
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The SmartChineseAnalyzer source code (smartcn) was
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Servlet-api.jar and javax.servlet-*.jar are under the CDDL license, the original
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==
Kuromoji Japanese Morphological Analyzer - Apache Lucene Integration

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which can be obtained from

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or

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 mecab-ko-dic-2.0.3-20170922

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 https://bitbucket.org/eunjeon/mecab-ko-dic/downloads/mecab-ko-dic-2.0.3-20170922.tar.gz

1.219 libpkit 0.24.0-6build1

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1.221 @pkgjs/parseargs 0.11.0

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1.222 bouncy-castle 1.78.1

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/**
* Contains the polynomial classes used in the NTRU round 3 algorithm.
*
*
* This implementation is based on the C reference implementation submitted for the round 3 NIST PQC competition,
* released under CC0-1.0 license.
*
*
* NIST submission files
* License of reference implementation
*/

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/**
* SPHINCS-256 signer.

```
* <p>
* This implementation is heavily based on the reference implementation in SUPERCOP, the main difference being the digests used
* for message hashing and tree construction are now configurable (within limits...) and that the implementation produces
* detached signatures.
* </p>
* <p>
* The SPHINCS reference implementation is public domain, as per the statement in the second last paragraph of
* section 1 in https://eprint.iacr.org/2014/795.pdf
* </p>
*/
```

Found in path(s):
* /bcprov-jdk18on-1-78-1-sources-jar/org/bouncycastle/pqc/crypto/sphincs/SPHINCS256Signer.java
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```
/**
* Poly1305 message authentication code, designed by D. J. Bernstein.
* <p>
* Poly1305 computes a 128-bit (16 bytes) authenticator, using a 128 bit nonce and a 256 bit key
* consisting of a 128 bit key applied to an underlying cipher, and a 128 bit key (with 106
* effective key bits) used in the authenticator.
* <p>
* The polynomial calculation in this implementation is adapted from the public domain <a
* href="https://github.com/floodyberry/poly1305-donna">poly1305-donna-unrolled</a> C implementation
* by Andrew M (@floodyberry).
* @see Poly1305KeyGenerator
*/
```

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* /bcprov-jdk18on-1-78-1-sources-jar/org/bouncycastle/crypto/macs/Poly1305.java
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```
/**
   * Magic value for proprietary OpenSSH private key.
   **/
```

Found in path(s):
* /bcprov-jdk18on-1-78-1-sources-jar/org/bouncycastle/crypto/util/OpenSSHPrivateKeyUtil.java
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```
/**
* The NTRU algorithm based on the round 3 submission of the NIST post-quantum cryptography. For the old NTRU, see
* {@link org.bouncycastle.pqc.legacy.crypto.ntru}.
*
* <p>
```

```
* This implementation is based on the C reference implementation submitted for the round 3 NIST PQC competition,
* released under CC0-1.0 license.
* </p>
*
* <p><a href="https://csrc.nist.gov/CSRC/media/Projects/post-quantum-cryptography/documents/round-3/submissions/NTRU-Round3.zip">NIST submission files</a></p>
* <p><a href="https://github.com/jschanck/ntru/blob/master/LICENSE">License of reference implementation</a></p>
*
* @see <a href="https://csrc.nist.gov/Projects/post-quantum-cryptography/round-3-submissions">NIST round 3 PQC submissions page</a>
* @see <a href="https://ntru.org/">NTRU website</a>
* @see <a href="https://ntru.org/f/ntru-20190330.pdf">NTRU specification</a>
*/
```

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* /bcprov-jdk18on-1-78-1-sources-jar/org/bouncycastle/pqc/crypto/ntru/package-info.java
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```
public DomainParameters(BigInteger p, BigInteger g, BigInteger q, BigInteger j,
```

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* /bcprov-jdk18on-1-78-1-sources-jar/org/bouncycastle/asn1/x9/DomainParameters.java
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```
/**
* An implementation of <a href="https://tools.ietf.org/html/rfc7253">RFC 7253 on The OCB
* Authenticated-Encryption Algorithm</a>. For those still concerned about the original patents
* around this, please see:
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```

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* /bcprov-jdk18on-1-78-1-sources-jar/org/bouncycastle/crypto/modes/OCBBlockCipher.java

1.223 maglev-kvstore-sdk-go-sdk 0.0.18

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/opt/cola/permits/2701641570_1763565452.632809/0/maglev-kvstore-sdk-zip/maglev-kvstore-sdk/go-sdk/errors.go/* ----------
/opt/cola/permits/2701641570_1763565452.632809/0/maglev-kvstore-sdk-zip/maglev-kvstore-sdk/go-sdk/models.go/* ----------
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/* ----------
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* /maglev-kvstore-sdk-zip/maglev-kvstore-sdk/go-sdk/connection.go

1.224 fastest-levenshtein 1.0.16

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1.225 color-name 1.1.4

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1.226 libnpmhook 10.0.5

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1.227 commons-collections 3.2.2

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1.228 promise-call-limit 3.0.1

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1.229 adduser 3.118ubuntu5

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1.230 pflag 1.0.5

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1.232 spdx-expression-parse 3.0.1

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1.233 go-playground-locales 0.14.1

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1.234 spdx-correct 3.2.0

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1.235 jersey-server 2.34

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1.236 aws-sdk-go-v2 v1.34.28

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    {"shape":"AuthorizationException"},
    {"shape":"AccessDeniedException"},
    {"shape":"RateLimitExceededException"}
  ]
},
"TagResource":{
  "name":"TagResource",
  "http":{
    "method":"POST",
    "requestUri":"/"
  },
  "input":{"shape":"TagResourceRequest"},
  "output":{"shape":"TagResourceResponse"},
  "errors":[
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    {"shape":"ServerInternalException"},
    {"shape":"AuthorizationException"},
     {"shape":"AccessDeniedException"},
    {"shape":"RateLimitExceededException"}
  ]
},
"UntagResource":{
  "name":"UntagResource",
  "http":{
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  "input":{"shape":"UntagResourceRequest"},
  "output":{"shape":"UntagResourceResponse"},
  "errors":[
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    {"shape":"ServerInternalException"},
    {"shape":"AuthorizationException"},
    {"shape":"AccessDeniedException"},
    {"shape":"RateLimitExceededException"}
  ]
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  "http":{
    "method":"POST",
    "requestUri":"/"
  },
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    "input":{"shape":"UpdateLicenseConfigurationRequest"},
    "output":{"shape":"UpdateLicenseConfigurationResponse"},
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      {"shape":"ServerInternalException"},

{"shape":"AuthorizationException"},
      {"shape":"AccessDeniedException"},
      {"shape":"RateLimitExceededException"}
    ]
  },
  "UpdateLicenseSpecificationsForResource":{
    "name":"UpdateLicenseSpecificationsForResource",
    "http":{
      "method":"POST",
      "requestUri":"/"
    },
    "input":{"shape":"UpdateLicenseSpecificationsForResourceRequest"},
    "output":{"shape":"UpdateLicenseSpecificationsForResourceResponse"},
    "errors":[
      {"shape":"InvalidParameterValueException"},
      {"shape":"InvalidResourceStateException"},
      {"shape":"LicenseUsageException"},
      {"shape":"ServerInternalException"},
      {"shape":"AuthorizationException"},
      {"shape":"AccessDeniedException"},
      {"shape":"RateLimitExceededException"}
    ]
  },
  "UpdateServiceSettings":{
    "name":"UpdateServiceSettings",
    "http":{
      "method":"POST",
      "requestUri":"/"
    },
    "input":{"shape":"UpdateServiceSettingsRequest"},
     "output":{"shape":"UpdateServiceSettingsResponse"},
    "errors":[
      {"shape":"InvalidParameterValueException"},
      {"shape":"ServerInternalException"},
      {"shape":"AuthorizationException"},
      {"shape":"AccessDeniedException"},
      {"shape":"RateLimitExceededException"}
    ]
  }
},
"shapes":{
  "AccessDeniedException":{
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  "type":"structure",
  "members":{
    "Message":{"shape":"Message"}
  },
  "exception":true
},
"AuthorizationException":{
  "type":"structure",
  "members":{
    "Message":{"shape":"Message"}
  },
  "exception":true
},
"AutomatedDiscoveryInformation":{
  "type":"structure",
  "members":{
    "LastRunTime":{"shape":"DateTime"}
  }
},
"Boolean":{"type":"boolean"},
"BoxBoolean":{"type":"boolean"},
"BoxInteger":{"type":"integer"},
"BoxLong":{"type":"long"},
"ConsumedLicenseSummary":{
  "type":"structure",

 "members":{
    "ResourceType":{"shape":"ResourceType"},
    "ConsumedLicenses":{"shape":"BoxLong"}
  }
},
"ConsumedLicenseSummaryList":{
  "type":"list",
  "member":{"shape":"ConsumedLicenseSummary"}
},
"CreateLicenseConfigurationRequest":{
  "type":"structure",
  "required":[
    "Name",
    "LicenseCountingType"
  ],
  "members":{
    "Name":{"shape":"String"},
    "Description":{"shape":"String"},
    "LicenseCountingType":{"shape":"LicenseCountingType"},
    "LicenseCount":{"shape":"BoxLong"},
    "LicenseCountHardLimit":{"shape":"BoxBoolean"},
    "LicenseRules":{"shape":"StringList"},
```

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    "Tags":{"shape":"TagList"},
    "ProductInformationList":{"shape":"ProductInformationList"}
   }
  },
  "CreateLicenseConfigurationResponse":{
   "type":"structure",
   "members":{
    "LicenseConfigurationArn":{"shape":"String"}
   }
  },
  "DateTime":{"type":"timestamp"},

 "DeleteLicenseConfigurationRequest":{
   "type":"structure",
   "required":["LicenseConfigurationArn"],
   "members":{
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   }
  },
  "DeleteLicenseConfigurationResponse":{
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   }
  },
  "FailedDependencyException":{
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   "members":{
    "Message":{"shape":"Message"}
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   "exception":true
  },
  "Filter":{
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    "Name":{"shape":"FilterName"},
    "Values":{"shape":"FilterValues"}
   }
  },
  "FilterLimitExceededException":{
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    "Message":{"shape":"Message"}
   },
   "exception":true
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  "FilterName":{"type":"string"},
  "FilterValue":{"type":"string"},
  "FilterValues":{
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  "type":"list",
  "member":{"shape":"FilterValue"}
},
"Filters":{
  "type":"list",
  "member":{"shape":"Filter"}
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"GetLicenseConfigurationRequest":{
  "type":"structure",
  "required":["LicenseConfigurationArn"],
  "members":{
    "LicenseConfigurationArn":{"shape":"String"}
  }
},
"GetLicenseConfigurationResponse":{
  "type":"structure",
  "members":{
    "LicenseConfigurationId":{"shape":"String"},
    "LicenseConfigurationArn":{"shape":"String"},
    "Name":{"shape":"String"},
    "Description":{"shape":"String"},
    "LicenseCountingType":{"shape":"LicenseCountingType"},
    "LicenseRules":{"shape":"StringList"},
    "LicenseCount":{"shape":"BoxLong"},
    "LicenseCountHardLimit":{"shape":"BoxBoolean"},
    "ConsumedLicenses":{"shape":"BoxLong"},
    "Status":{"shape":"String"},
    "OwnerAccountId":{"shape":"String"},
    "ConsumedLicenseSummaryList":{"shape":"ConsumedLicenseSummaryList"},
    "ManagedResourceSummaryList":{"shape":"ManagedResourceSummaryList"},
    "Tags":{"shape":"TagList"},
     "ProductInformationList":{"shape":"ProductInformationList"},
    "AutomatedDiscoveryInformation":{"shape":"AutomatedDiscoveryInformation"}
  }
},
"GetServiceSettingsRequest":{
  "type":"structure",
  "members":{
  }
},
"GetServiceSettingsResponse":{
  "type":"structure",
  "members":{
    "S3BucketArn":{"shape":"String"},
    "SnsTopicArn":{"shape":"String"},
    "OrganizationConfiguration":{"shape":"OrganizationConfiguration"},
    "EnableCrossAccountsDiscovery":{"shape":"BoxBoolean"},
    "LicenseManagerResourceShareArn":{"shape":"String"}
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  }
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"InvalidParameterValueException":{
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  "members":{
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  },
  "exception":true,
  "synthetic":true
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"InvalidResourceStateException":{
  "type":"structure",
  "members":{
    "Message":{"shape":"Message"}
  },
  "exception":true
},
"InventoryFilter":{
   "type":"structure",
  "required":[
    "Name",
    "Condition"
  ],
  "members":{
    "Name":{"shape":"String"},
    "Condition":{"shape":"InventoryFilterCondition"},
    "Value":{"shape":"String"}
  }
},
"InventoryFilterCondition":{
  "type":"string",
  "enum":[
    "EQUALS",
    "NOT_EQUALS",
    "BEGINS_WITH",
    "CONTAINS"
  ]
},
"InventoryFilterList":{
  "type":"list",
  "member":{"shape":"InventoryFilter"}
},
"LicenseConfiguration":{
  "type":"structure",
  "members":{
    "LicenseConfigurationId":{"shape":"String"},
    "LicenseConfigurationArn":{"shape":"String"},
    "Name":{"shape":"String"},
```

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    "Description":{"shape":"String"},
    "LicenseCountingType":{"shape":"LicenseCountingType"},
    "LicenseRules":{"shape":"StringList"},
    "LicenseCount":{"shape":"BoxLong"},
    "LicenseCountHardLimit":{"shape":"BoxBoolean"},
    "ConsumedLicenses":{"shape":"BoxLong"},
     "Status":{"shape":"String"},
    "OwnerAccountId":{"shape":"String"},
    "ConsumedLicenseSummaryList":{"shape":"ConsumedLicenseSummaryList"},
    "ManagedResourceSummaryList":{"shape":"ManagedResourceSummaryList"},
    "ProductInformationList":{"shape":"ProductInformationList"},
    "AutomatedDiscoveryInformation":{"shape":"AutomatedDiscoveryInformation"}
  }
},
"LicenseConfigurationAssociation":{
  "type":"structure",
  "members":{
    "ResourceArn":{"shape":"String"},
    "ResourceType":{"shape":"ResourceType"},
    "ResourceOwnerId":{"shape":"String"},
    "AssociationTime":{"shape":"DateTime"}
  }
},
"LicenseConfigurationAssociations":{
  "type":"list",
  "member":{"shape":"LicenseConfigurationAssociation"}
},
"LicenseConfigurationStatus":{
  "type":"string",
  "enum":[
    "AVAILABLE",
    "DISABLED"
  ]
},
"LicenseConfigurationUsage":{
   "type":"structure",
  "members":{
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    "ResourceType":{"shape":"ResourceType"},
    "ResourceStatus":{"shape":"String"},
    "ResourceOwnerId":{"shape":"String"},
    "AssociationTime":{"shape":"DateTime"},
    "ConsumedLicenses":{"shape":"BoxLong"}
  }
},
"LicenseConfigurationUsageList":{
  "type":"list",
  "member":{"shape":"LicenseConfigurationUsage"}
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},
"LicenseConfigurations":{
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  "member":{"shape":"LicenseConfiguration"}
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"LicenseCountingType":{
  "type":"string",
  "enum":[
    "vCPU",
    "Instance",
    "Core",
    "Socket"
  ]
},
"LicenseOperationFailure":{
  "type":"structure",
  "members":{
    "ResourceArn":{"shape":"String"},
    "ResourceType":{"shape":"ResourceType"},
    "ErrorMessage":{"shape":"String"},
    "FailureTime":{"shape":"DateTime"},
    "OperationName":{"shape":"String"},
     "ResourceOwnerId":{"shape":"String"},
    "OperationRequestedBy":{"shape":"String"},
    "MetadataList":{"shape":"MetadataList"}
  }
},
"LicenseOperationFailureList":{
  "type":"list",
  "member":{"shape":"LicenseOperationFailure"}
},
"LicenseSpecification":{
  "type":"structure",
  "required":["LicenseConfigurationArn"],
  "members":{
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  }
},
"LicenseSpecifications":{
  "type":"list",
  "member":{"shape":"LicenseSpecification"}
},
"LicenseUsageException":{
  "type":"structure",
  "members":{
    "Message":{"shape":"Message"}
  },
  "exception":true
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},
"ListAssociationsForLicenseConfigurationRequest":{
  "type":"structure",
  "required":["LicenseConfigurationArn"],
  "members":{
    "LicenseConfigurationArn":{"shape":"String"},
    "MaxResults":{"shape":"BoxInteger"},
    "NextToken":{"shape":"String"}
   }
},
"ListAssociationsForLicenseConfigurationResponse":{
  "type":"structure",
  "members":{
    "LicenseConfigurationAssociations":{"shape":"LicenseConfigurationAssociations"},
    "NextToken":{"shape":"String"}
  }
},
"ListFailuresForLicenseConfigurationOperationsRequest":{
  "type":"structure",
  "required":["LicenseConfigurationArn"],
  "members":{
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    "MaxResults":{"shape":"BoxInteger"},
    "NextToken":{"shape":"String"}
  }
},
"ListFailuresForLicenseConfigurationOperationsResponse":{
  "type":"structure",
  "members":{
    "LicenseOperationFailureList":{"shape":"LicenseOperationFailureList"},
    "NextToken":{"shape":"String"}
  }
},
"ListLicenseConfigurationsRequest":{
  "type":"structure",
  "members":{
    "LicenseConfigurationArns":{"shape":"StringList"},
    "MaxResults":{"shape":"BoxInteger"},
     "NextToken":{"shape":"String"},
    "Filters":{"shape":"Filters"}
  }
},
"ListLicenseConfigurationsResponse":{
  "type":"structure",
  "members":{
    "LicenseConfigurations":{"shape":"LicenseConfigurations"},
    "NextToken":{"shape":"String"}
  }
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},
"ListLicenseSpecificationsForResourceRequest":{
  "type":"structure",
  "required":["ResourceArn"],
  "members":{
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    "MaxResults":{"shape":"BoxInteger"},
    "NextToken":{"shape":"String"}
  }
},
"ListLicenseSpecificationsForResourceResponse":{
  "type":"structure",
  "members":{
    "LicenseSpecifications":{"shape":"LicenseSpecifications"},
    "NextToken":{"shape":"String"}
  }
},
"ListResourceInventoryRequest":{
  "type":"structure",
  "members":{
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    "NextToken":{"shape":"String"},
    "Filters":{"shape":"InventoryFilterList"}
   }
},
"ListResourceInventoryResponse":{
  "type":"structure",
  "members":{
    "ResourceInventoryList":{"shape":"ResourceInventoryList"},
    "NextToken":{"shape":"String"}
  }
},
"ListTagsForResourceRequest":{
  "type":"structure",
  "required":["ResourceArn"],
  "members":{
    "ResourceArn":{"shape":"String"}
  }
},
"ListTagsForResourceResponse":{
  "type":"structure",
  "members":{
    "Tags":{"shape":"TagList"}
  }
},
"ListUsageForLicenseConfigurationRequest":{
  "type":"structure",
  "required":["LicenseConfigurationArn"],
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    "MaxResults":{"shape":"BoxInteger"},
    "NextToken":{"shape":"String"},
    "Filters":{"shape":"Filters"}
  }
},
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  "members":{
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     "NextToken":{"shape":"String"}
  }
},
"ManagedResourceSummary":{
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  "members":{
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    "AssociationCount":{"shape":"BoxLong"}
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"ManagedResourceSummaryList":{
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  "member":{"shape":"ManagedResourceSummary"}
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"Message":{"type":"string"},
"Metadata":{
  "type":"structure",
  "members":{
    "Name":{"shape":"String"},
    "Value":{"shape":"String"}
  }
},
"MetadataList":{
  "type":"list",
  "member":{"shape":"Metadata"}
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"OrganizationConfiguration":{
  "type":"structure",
  "required":["EnableIntegration"],
  "members":{
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  }
},
"ProductInformation":{
  "type":"structure",
  "required":[
    "ResourceType",
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    "ProductInformationFilterList"
  ],
  "members":{
    "ResourceType":{"shape":"String"},
    "ProductInformationFilterList":{"shape":"ProductInformationFilterList"}
  }
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  "required":[
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    "ProductInformationFilterValue",
    "ProductInformationFilterComparator"
  ],
  "members":{
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    "ProductInformationFilterValue":{"shape":"StringList"},
    "ProductInformationFilterComparator":{"shape":"String"}
  }
},
"ProductInformationFilterList":{
  "type":"list",
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},
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  "type":"list",
  "member":{"shape":"ProductInformation"}
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"RateLimitExceededException":{
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  "members":{
    "Message":{"shape":"Message"}
  },
  "exception":true
},
"ResourceInventory":{
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    "ResourceType":{"shape":"ResourceType"},
    "ResourceArn":{"shape":"String"},
    "Platform":{"shape":"String"},
    "PlatformVersion":{"shape":"String"},
    "ResourceOwningAccountId":{"shape":"String"}
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},
"ResourceInventoryList":{
  "type":"list",
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  "exception":true
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"ResourceType":{
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  "enum":[
    "EC2_INSTANCE",
    "EC2_HOST",
    "EC2_AMI",
    "RDS",
    "SYSTEMS_MANAGER_MANAGED_INSTANCE"
  ]
},
"ServerInternalException":{
  "type":"structure",
  "members":{
    "Message":{"shape":"Message"}
  },
  "exception":true,
  "fault":true
},
"String":{"type":"string"},
"StringList":{
  "type":"list",
   "member":{"shape":"String"}
},
"Tag":{
  "type":"structure",
  "members":{
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    "Value":{"shape":"String"}
  }
},
"TagKeyList":{
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  "member":{"shape":"String"}
},
"TagList":{
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  "member":{"shape":"Tag"}
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"TagResourceRequest":{
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    "ResourceArn",
    "Tags"
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  "members":{
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    "Tags":{"shape":"TagList"}
  }
},
"TagResourceResponse":{
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  "members":{
  }
},
"UntagResourceRequest":{
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  "required":[
    "ResourceArn",
    "TagKeys"
  ],
  "members":{
    "ResourceArn":{"shape":"String"},
    "TagKeys":{"shape":"TagKeyList"}
  }
},
"UntagResourceResponse":{
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  "members":{
  }
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    "LicenseRules":{"shape":"StringList"},
    "LicenseCount":{"shape":"BoxLong"},
    "LicenseCountHardLimit":{"shape":"BoxBoolean"},
    "Name":{"shape":"String"},
    "Description":{"shape":"String"},
    "ProductInformationList":{"shape":"ProductInformationList"}
  }
},
"UpdateLicenseConfigurationResponse":{
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  "members":{
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```
    }
  },
  "UpdateLicenseSpecificationsForResourceRequest":{
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    "required":["ResourceArn"],
    "members":{
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      "AddLicenseSpecifications":{"shape":"LicenseSpecifications"},
      "RemoveLicenseSpecifications":{"shape":"LicenseSpecifications"}
    }
  },
  "UpdateLicenseSpecificationsForResourceResponse":{
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    "members":{
    }
  },
  "UpdateServiceSettingsRequest":{
    "type":"structure",
    "members":{
      "S3BucketArn":{"shape":"String"},
      "SnsTopicArn":{"shape":"String"},
      "OrganizationConfiguration":{"shape":"OrganizationConfiguration"},
      "EnableCrossAccountsDiscovery":{"shape":"BoxBoolean"}
    }
  },
  "UpdateServiceSettingsResponse":{
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    "members":{
    }
  }
 }
}
{
 "version": "1.0",
 "examples": {
 }
}
```

AWS SDK for Go

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comment syntax for the file format. We also recommend that a
file or class name and description of purpose be included on the
same "printed page" as the copyright notice for easier
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{
"version": "2.0",
"service": "<fullname> AWS License Manager </fullname> AWS License Manager makes it easier to manage licenses from software vendors across multiple AWS accounts and on-premises servers. ",
"operations": {
"CreateLicenseConfiguration": " Creates a license configuration. A license configuration is an abstraction of a customer license agreement that can be consumed and enforced by License Manager. Components include specifications for the license type (licensing by instance, socket, CPU, or vCPU), allowed tenancy (shared tenancy, Dedicated Instance, Dedicated Host, or all of these), license affinity to host (how long a license must be associated with a host), and the number of licenses purchased and used. ",

```
  "DeleteLicenseConfiguration": "<p>Deletes the specified license configuration.</p> <p>You cannot delete a license configuration that is in use.</p>",
  "GetLicenseConfiguration": "<p>Gets detailed information about the specified license configuration.</p>",
  "GetServiceSettings": "<p>Gets the License Manager settings for the current Region.</p>",
  "ListAssociationsForLicenseConfiguration": "<p>Lists the resource associations for the specified license configuration.</p> <p>Resource associations need not consume licenses from a license configuration. For example, an AMI or a stopped instance might not consume a license (depending on the license rules).</p>",
  "ListFailuresForLicenseConfigurationOperations": "<p>Lists the license configuration operations that failed.</p>",
  "ListLicenseConfigurations": "<p>Lists the license configurations for your account.</p>",
  "ListLicenseSpecificationsForResource": "<p>Describes the license configurations for the specified resource.</p>",
  "ListResourceInventory": "<p>Lists resources managed using Systems Manager inventory.</p>",
  "ListTagsForResource": "<p>Lists the tags for the specified license configuration.</p>",
  "ListUsageForLicenseConfiguration": "<p>Lists all license usage records for a license configuration, displaying license consumption details by resource at a selected point in time. Use this action to audit the current license consumption for any license inventory and configuration.</p>",
  "TagResource": "<p>Adds the specified tags to the specified license configuration.</p>",
  "UntagResource": "<p>Removes the specified tags from the specified license configuration.</p>",
  "UpdateLicenseConfiguration": "<p>Modifies the attributes of an existing license configuration.</p>",
  "UpdateLicenseSpecificationsForResource": "<p>Adds or removes the specified license configurations for the specified AWS resource.</p> <p>You can update the license specifications of AMIs, instances, and hosts. You cannot update the license specifications for launch templates and AWS CloudFormation templates, as they send license configurations to the operation that creates the resource.</p>",
  "UpdateServiceSettings": "<p>Updates License Manager settings for the current Region.</p>"
 },
 "shapes": {
  "AccessDeniedException": {
   "base": "<p>Access to resource denied.</p>",
   "refs": {
   }
  },
  "AuthorizationException": {
   "base": "<p>The AWS user account does not have permission to perform the action. Check the IAM policy associated with this account.</p>",
   "refs": {
   }
  },
  "AutomatedDiscoveryInformation": {
   "base": "<p>Describes automated discovery.</p>",
   "refs": {
    "GetLicenseConfigurationResponse$AutomatedDiscoveryInformation": "<p>Automated discovery information.</p>",
    "LicenseConfiguration$AutomatedDiscoveryInformation": "<p>Automated discovery information.</p>"
   }
```

```
  },
  "Boolean": {
    "base": null,
    "refs": {
      "OrganizationConfiguration$EnableIntegration": "<p>Enables AWS Organization integration.</p>"
    }
  },
  "BoxBoolean": {
    "base": null,
    "refs": {
      "CreateLicenseConfigurationRequest$LicenseCountHardLimit":
 "<p>Indicates whether hard or soft license enforcement is used. Exceeding a hard limit blocks the launch of new instances.</p>",
      "GetLicenseConfigurationResponse$LicenseCountHardLimit": "<p>Sets the number of available licenses as a hard limit.</p>",
      "GetServiceSettingsResponse$EnableCrossAccountsDiscovery": "<p>Indicates whether cross-account discovery has been enabled.</p>",
      "LicenseConfiguration$LicenseCountHardLimit": "<p>Number of available licenses as a hard limit.</p>",
      "UpdateLicenseConfigurationRequest$LicenseCountHardLimit": "<p>New hard limit of the number of available licenses.</p>",
      "UpdateServiceSettingsRequest$EnableCrossAccountsDiscovery": "<p>Activates cross-account discovery.</p>"
    }
  },
  "BoxInteger": {
    "base": null,
    "refs": {
      "ListAssociationsForLicenseConfigurationRequest$MaxResults": "<p>Maximum number of results to return in a single call.</p>",
      "ListFailuresForLicenseConfigurationOperationsRequest$MaxResults":
 "<p>Maximum number of results to return in a single call.</p>",
      "ListLicenseConfigurationsRequest$MaxResults": "<p>Maximum number of results to return in a single call.</p>",
      "ListLicenseSpecificationsForResourceRequest$MaxResults": "<p>Maximum number of results to return in a single call.</p>",
      "ListResourceInventoryRequest$MaxResults": "<p>Maximum number of results to return in a single call.</p>",
      "ListUsageForLicenseConfigurationRequest$MaxResults": "<p>Maximum number of results to return in a single call.</p>"
    }
  },
  "BoxLong": {
    "base": null,
    "refs": {
      "ConsumedLicenseSummary$ConsumedLicenses": "<p>Number of licenses consumed by the resource.</p>",
      "CreateLicenseConfigurationRequest$LicenseCount": "<p>Number of licenses managed by the license configuration.</p>",
      "GetLicenseConfigurationResponse$LicenseCount": "<p>Number of available licenses.</p>",
```

```
      "GetLicenseConfigurationResponse$ConsumedLicenses": "<p>Number of licenses assigned to resources.</p>",
      "LicenseConfiguration$LicenseCount": "<p>Number of licenses managed by the license configuration.</p>",
      "LicenseConfiguration$ConsumedLicenses": "<p>Number of licenses consumed. </p>",
      "LicenseConfigurationUsage$ConsumedLicenses": "<p>Number of licenses consumed by the resource.</p>",
      "ManagedResourceSummary$AssociationCount": "<p>Number of resources associated with licenses.</p>",
      "UpdateLicenseConfigurationRequest$LicenseCount": "<p>New number of licenses managed by the license configuration.</p>"
    }
  },
  "ConsumedLicenseSummary": {
    "base": "<p>Details about license consumption.</p>",
    "refs": {
      "ConsumedLicenseSummaryList$member": null
    }
  },
  "ConsumedLicenseSummaryList": {
    "base": null,
    "refs": {
      "GetLicenseConfigurationResponse$ConsumedLicenseSummaryList": "<p>Summaries of the licenses consumed by resources.</p>",
      "LicenseConfiguration$ConsumedLicenseSummaryList": "<p>Summaries for licenses consumed by various resources.</p>"
    }
  },
  "CreateLicenseConfigurationRequest": {
    "base": null,
    "refs": {
    }
  },
  "CreateLicenseConfigurationResponse": {
    "base": null,
    "refs": {
    }
  },
  "DateTime": {
    "base": null,
    "refs": {
      "AutomatedDiscoveryInformation$LastRunTime": "<p>Time that automated discovery last ran.</p>",
      "LicenseConfigurationAssociation$AssociationTime": "<p>Time when the license configuration was associated with the resource.</p>",
      "LicenseConfigurationUsage$AssociationTime": "<p>Time when the license configuration was initially associated with the resource.</p>",
      "LicenseOperationFailure$FailureTime": "<p>Failure time.</p>"
    }
  },
  "DeleteLicenseConfigurationRequest": {
    "base": null,
```

```
    "refs": {
    }
  },
  "DeleteLicenseConfigurationResponse":
{
    "base": null,
    "refs": {
    }
  },
  "FailedDependencyException": {
    "base": "<p>A dependency required to run the API is missing.</p>",
    "refs": {
    }
  },
  "Filter": {
    "base": "<p>A filter name and value pair that is used to return more specific results from a describe operation.
Filters can be used to match a set of resources by specific criteria, such as tags, attributes, or IDs.</p>",
    "refs": {
      "Filters$member": null
    }
  },
  "FilterLimitExceededException": {
    "base": "<p>The request uses too many filters or too many filter values.</p>",
    "refs": {
    }
  },
  "FilterName": {
    "base": null,
    "refs": {
      "Filter$Name": "<p>Name of the filter. Filter names are case-sensitive.</p>"
    }
  },
  "FilterValue": {
    "base": null,
    "refs": {
      "FilterValues$member": null
    }
  },
  "FilterValues": {
    "base": null,
    "refs":
{
      "Filter$Values": "<p>Filter values. Filter values are case-sensitive.</p>"
    }
  },
  "Filters": {
    "base": null,
    "refs": {
```

"ListLicenseConfigurationsRequest$Filters": " Filters to scope the results. The following filters and logical operators are supported: <ul> <code>licenseCountingType</code> - The dimension on which licenses are counted. Possible values are <code>vCPU</code> | <code>Instance</code> | <code>Core</code> | <code>Socket</code>. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>.   <code>enforceLicenseCount</code> - A Boolean value that indicates whether hard license enforcement is used. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>.   <code>usagelimitExceeded</code> - A Boolean value that indicates whether the available licenses have been exceeded. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>. ",

"ListUsageForLicenseConfigurationRequest$Filters": " Filters to scope the results. The following filters and logical operators are supported: <ul> <code>resourceArn</code> - The ARN of the license configuration resource. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>.   <code>resourceType</code> - The resource type (EC2_INSTANCE | EC2_HOST | EC2_AMI | SYSTEMS_MANAGER_MANAGED_INSTANCE). Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>.   <code>resourceAccount</code> - The ID of the account that owns the resource. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>. "
}
},
"GetLicenseConfigurationRequest": {
"base": null,
"refs": {
}
},
"GetLicenseConfigurationResponse": {
"base": null,
"refs": {
}
},
"GetServiceSettingsRequest": {
"base": null,
"refs": {
}
},
"GetServiceSettingsResponse":
{
"base": null,
"refs": {
}
},
"InvalidParameterValueException": {
"base": " One or more parameter values are not valid. ",
"refs": {
}
},
"InvalidResourceStateException": {
"base": " License Manager cannot allocate a license to a resource because of its state. For example, you cannot allocate a license to an instance in the process of shutting down. ",

```
    "refs": {
    }
  },
  "InventoryFilter": {
    "base": "<p>An inventory filter.</p>",
    "refs": {
      "InventoryFilterList$member": null
    }
  },
  "InventoryFilterCondition": {
    "base": null,
    "refs": {
      "InventoryFilter$Condition": "<p>Condition of the filter.</p>"
    }
  },
  "InventoryFilterList": {
    "base": null,
    "refs": {
      "ListResourceInventoryRequest$Filters": "<p>Filters to scope the results. The following filters and logical operators are supported:</p> <ul> <li> <p> <code>account_id</code>
 - The ID of the AWS account that owns the resource. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>.</p> </li> <li> <p> <code>application_name</code> - The name of the application. Logical operators are <code>EQUALS</code> | <code>BEGINS_WITH</code>.</p> </li> <li> <p> <code>license_included</code> - The type of license included. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>. Possible values are <code>sql-server-enterprise</code> | <code>sql-server-standard</code> | <code>sql-server-web</code> | <code>windows-server-datacenter</code>.</p> </li> <li> <p> <code>platform</code> - The platform of the resource. Logical operators are <code>EQUALS</code> | <code>BEGINS_WITH</code>.</p> </li> <li> <p> <code>resource_id</code> - The ID of the resource. Logical operators are <code>EQUALS</code> | <code>NOT_EQUALS</code>.</p> </li> </ul>"
    }
  },
  "LicenseConfiguration": {
    "base": "<p>A license configuration is an abstraction
 of a customer license agreement that can be consumed and enforced by License Manager. Components include specifications for the license type (licensing by instance, socket, CPU, or vCPU), allowed tenancy (shared tenancy, Dedicated Instance, Dedicated Host, or all of these), host affinity (how long a VM must be associated with a host), and the number of licenses purchased and used.</p>",
    "refs": {
      "LicenseConfigurations$member": null
    }
  },
  "LicenseConfigurationAssociation": {
    "base": "<p>Describes an association with a license configuration.</p>",
    "refs": {
      "LicenseConfigurationAssociations$member": null
    }
  },
  "LicenseConfigurationAssociations": {
```

```
    "base": null,
    "refs": {
      "ListAssociationsForLicenseConfigurationResponse$LicenseConfigurationAssociations": "<p>Information about the associations for the license configuration.</p>"
    }
  },
  "LicenseConfigurationStatus": {
    "base": null,

    "refs": {
      "UpdateLicenseConfigurationRequest$LicenseConfigurationStatus": "<p>New status of the license configuration.</p>"
    }
  },
  "LicenseConfigurationUsage": {
    "base": "<p>Details about the usage of a resource associated with a license configuration.</p>",
    "refs": {
      "LicenseConfigurationUsageList$member": null
    }
  },
  "LicenseConfigurationUsageList": {
    "base": null,
    "refs": {
      "ListUsageForLicenseConfigurationResponse$LicenseConfigurationUsageList": "<p>Information about the license configurations.</p>"
    }
  },
  "LicenseConfigurations": {
    "base": null,
    "refs": {
      "ListLicenseConfigurationsResponse$LicenseConfigurations": "<p>Information about the license configurations.</p>"
    }
  },
  "LicenseCountingType": {
    "base": null,
    "refs": {
      "CreateLicenseConfigurationRequest$LicenseCountingType": "<p>Dimension used to track the license inventory.</p>",
      "GetLicenseConfigurationResponse$LicenseCountingType": "<p>Dimension on which the licenses are counted.</p>",
      "LicenseConfiguration$LicenseCountingType": "<p>Dimension to use to track the license inventory.</p>"
    }
  },
  "LicenseOperationFailure": {
    "base": "<p>Describes the failure of a license operation.</p>",
    "refs": {
      "LicenseOperationFailureList$member": null
```

```
    }
  },
  "LicenseOperationFailureList": {
    "base": null,
    "refs": {
      "ListFailuresForLicenseConfigurationOperationsResponse$LicenseOperationFailureList": "<p>License configuration operations that failed.</p>"
    }
  },
  "LicenseSpecification": {
    "base": "<p>Details for associating a license configuration with a resource.</p>",
    "refs": {
      "LicenseSpecifications$member": null
    }
  },
  "LicenseSpecifications": {
    "base": null,
    "refs": {
      "ListLicenseSpecificationsForResourceResponse$LicenseSpecifications": "<p>License configurations associated with a resource.</p>",
      "UpdateLicenseSpecificationsForResourceRequest$AddLicenseSpecifications": "<p>ARNs of the license configurations to add.</p>",
      "UpdateLicenseSpecificationsForResourceRequest$RemoveLicenseSpecifications": "<p>ARNs of the license configurations to remove.</p>"
    }
  },
  "LicenseUsageException": {
    "base": "<p>You do not have enough licenses available to support a new resource launch.</p>",
    "refs": {
    }
  },
  "ListAssociationsForLicenseConfigurationRequest": {
    "base": null,
    "refs": {
    }
  },
  "ListAssociationsForLicenseConfigurationResponse": {
    "base": null,
    "refs": {
    }
  },
  "ListFailuresForLicenseConfigurationOperationsRequest": {
    "base": null,
    "refs": {
    }
  },
  "ListFailuresForLicenseConfigurationOperationsResponse": {
    "base": null,
```

```
    "refs": {
    }
  },
  "ListLicenseConfigurationsRequest": {
    "base":
null,
    "refs": {
    }
  },
  "ListLicenseConfigurationsResponse": {
    "base": null,
    "refs": {
    }
  },
  "ListLicenseSpecificationsForResourceRequest": {
    "base": null,
    "refs": {
    }
  },
  "ListLicenseSpecificationsForResourceResponse": {
    "base": null,
    "refs": {
    }
  },
  "ListResourceInventoryRequest": {
    "base": null,
    "refs": {
    }
  },
  "ListResourceInventoryResponse": {
    "base": null,
    "refs": {
    }
  },
  "ListTagsForResourceRequest": {
    "base": null,
    "refs": {
    }
  },
  "ListTagsForResourceResponse": {
    "base": null,
    "refs": {
    }
  },
  "ListUsageForLicenseConfigurationRequest": {
    "base": null,
    "refs": {
    }
```

```
  },
  "ListUsageForLicenseConfigurationResponse": {
    "base": null,
    "refs": {
    }
  },
  "ManagedResourceSummary": {
    "base": "<p>Summary information about a managed resource.</p>",
     "refs": {
      "ManagedResourceSummaryList$member": null
    }
  },
  "ManagedResourceSummaryList": {
    "base": null,
    "refs": {
      "GetLicenseConfigurationResponse$ManagedResourceSummaryList": "<p>Summaries of the managed resources.</p>",
      "LicenseConfiguration$ManagedResourceSummaryList": "<p>Summaries for managed resources.</p>"
    }
  },
  "Message": {
    "base": null,
    "refs": {
      "AccessDeniedException$Message": null,
      "AuthorizationException$Message": null,
      "FailedDependencyException$Message": null,
      "FilterLimitExceededException$Message": null,
      "InvalidParameterValueException$Message": null,
      "InvalidResourceStateException$Message": null,
      "LicenseUsageException$Message": null,
      "RateLimitExceededException$Message": null,
      "ResourceLimitExceededException$Message": null,
      "ServerInternalException$Message": null
    }
  },
  "Metadata": {
    "base":
 "<p>Reserved.</p>",
    "refs": {
      "MetadataList$member": null
    }
  },
  "MetadataList": {
    "base": null,
    "refs": {
      "LicenseOperationFailure$MetadataList": "<p>Reserved.</p>"
    }
  },
```

```
  "OrganizationConfiguration": {
    "base": "<p>Configuration information for AWS Organizations.</p>",
    "refs": {
      "GetServiceSettingsResponse$OrganizationConfiguration": "<p>Indicates whether AWS Organizations has been integrated with License Manager for cross-account discovery.</p>",
      "UpdateServiceSettingsRequest$OrganizationConfiguration": "<p>Enables integration with AWS Organizations for cross-account discovery.</p>"
    }
  },
  "ProductInformation": {
    "base": "<p>Describes product information for a license configuration.</p>",
    "refs": {
      "ProductInformationList$member": null
    }
  },
  "ProductInformationFilter": {
    "base": "<p>Describes product information filters.</p>",
    "refs": {

      "ProductInformationFilterList$member": null
    }
  },
  "ProductInformationFilterList": {
    "base": null,
    "refs": {
      "ProductInformation$ProductInformationFilterList": "<p>Product information filters.</p> <p>The following filters and logical operators are supported when the resource type is <code>SSM_MANAGED</code>:</p> <ul> <li> <p> <code>Application Name</code> - The name of the application. Logical operator is <code>EQUALS</code>.</p> </li> <li> <p> <code>Application Publisher</code> - The publisher of the application. Logical operator is <code>EQUALS</code>.</p> </li> <li> <p> <code>Application Version</code> - The version of the application. Logical operator is <code>EQUALS</code>.</p> </li> <li> <p> <code>Platform Name</code> - The name of the platform. Logical operator is <code>EQUALS</code>.</p> </li> <li> <p> <code>Platform Type</code> - The platform type. Logical operator is <code>EQUALS</code>.</p> </li> <li> <p> <code>License Included</code> - The
 type of license included. Logical operators are <code>EQUALS</code> and <code>NOT_EQUALS</code>. Possible values are: <code>sql-server-enterprise</code> | <code>sql-server-standard</code> | <code>sql-server-web</code> | <code>windows-server-datacenter</code>.</p> </li> </ul> <p>The following filters and logical operators are supported when the resource type is <code>RDS</code>:</p> <ul> <li> <p> <code>Engine Edition</code> - The edition of the database engine. Logical operator is <code>EQUALS</code>. Possible values are: <code>oracle-ee</code> | <code>oracle-se</code> | <code>oracle-se1</code> | <code>oracle-se2</code>.</p> </li> <li> <p> <code>License Pack</code> - The license pack. Logical operator is <code>EQUALS</code>. Possible values are: <code>data guard</code> | <code>diagnostic pack sqlt</code> | <code>tuning pack sqlt</code> | <code>ols</code> | <code>olap</code>.</p> </li> </ul>"
    }
  },
  "ProductInformationList": {
    "base": null,
    "refs": {
```

```
      "CreateLicenseConfigurationRequest$ProductInformationList":
"<p>Product information.</p>",
      "GetLicenseConfigurationResponse$ProductInformationList": "<p>Product information.</p>",
      "LicenseConfiguration$ProductInformationList": "<p>Product information.</p>",
      "UpdateLicenseConfigurationRequest$ProductInformationList": "<p>New product information.</p>"
    }
  },
  "RateLimitExceededException": {
    "base": "<p>Too many requests have been submitted. Try again after a brief wait.</p>",
    "refs": {
    }
  },
  "ResourceInventory": {
    "base": "<p>Details about a resource.</p>",
    "refs": {
      "ResourceInventoryList$member": null
    }
  },
  "ResourceInventoryList": {
    "base": null,
    "refs": {
      "ListResourceInventoryResponse$ResourceInventoryList": "<p>Information about the resources.</p>"
    }
  },
  "ResourceLimitExceededException": {
    "base": "<p>Your resource limits have been exceeded.</p>",
    "refs":
{
    }
  },
  "ResourceType": {
    "base": null,
    "refs": {
      "ConsumedLicenseSummary$ResourceType": "<p>Resource type of the resource consuming a license.</p>",
      "LicenseConfigurationAssociation$ResourceType": "<p>Type of server resource.</p>",
      "LicenseConfigurationUsage$ResourceType": "<p>Type of resource.</p>",
      "LicenseOperationFailure$ResourceType": "<p>Resource type.</p>",
      "ManagedResourceSummary$ResourceType": "<p>Type of resource associated with a license.</p>",
      "ResourceInventory$ResourceType": "<p>Type of resource.</p>"
    }
  },
  "ServerInternalException": {
    "base": "<p>The server experienced an internal error. Try again.</p>",
    "refs": {
    }
  },
  "String": {
    "base": null,
```

```
  "refs": {
    "CreateLicenseConfigurationRequest$Name": "<p>Name of the license configuration.</p>",
    "CreateLicenseConfigurationRequest$Description": "<p>Description of the license configuration.</p>",
    "CreateLicenseConfigurationResponse$LicenseConfigurationArn": "<p>Amazon Resource Name (ARN) of the license configuration.</p>",
    "DeleteLicenseConfigurationRequest$LicenseConfigurationArn": "<p>ID of the license configuration.</p>",
    "GetLicenseConfigurationRequest$LicenseConfigurationArn": "<p>Amazon Resource Name (ARN) of the license configuration.</p>",
    "GetLicenseConfigurationResponse$LicenseConfigurationId": "<p>Unique ID for the license configuration.</p>",
    "GetLicenseConfigurationResponse$LicenseConfigurationArn": "<p>Amazon Resource Name (ARN) of the license configuration.</p>",
    "GetLicenseConfigurationResponse$Name": "<p>Name of the license configuration.</p>",
    "GetLicenseConfigurationResponse$Description": "<p>Description of the license configuration.</p>",
    "GetLicenseConfigurationResponse$Status": "<p>License configuration status.</p>",
    "GetLicenseConfigurationResponse$OwnerAccountId": "<p>Account ID of the owner of the license configuration.</p>",
    "GetServiceSettingsResponse$S3BucketArn": "<p>Regional S3 bucket path for storing reports, license trail event data, discovery data, and so on.</p>",
    "GetServiceSettingsResponse$SnsTopicArn": "<p>SNS topic configured to receive notifications from License Manager.</p>",
    "GetServiceSettingsResponse$LicenseManagerResourceShareArn": "<p>Amazon Resource Name (ARN) of the AWS resource share. The License Manager master account will provide member accounts with access to this share.</p>",
    "InventoryFilter$Name": "<p>Name of the filter.</p>",
    "InventoryFilter$Value": "<p>Value of the filter.</p>",
    "LicenseConfiguration$LicenseConfigurationId": "<p>Unique ID of the license configuration.</p>",
    "LicenseConfiguration$LicenseConfigurationArn": "<p>Amazon Resource Name (ARN) of the license configuration.</p>",
    "LicenseConfiguration$Name": "<p>Name of the license configuration.</p>",
    "LicenseConfiguration$Description": "<p>Description of the license configuration.</p>",
    "LicenseConfiguration$Status": "<p>Status of the license configuration.</p>",
    "LicenseConfiguration$OwnerAccountId": "<p>Account ID of the license configuration's owner.</p>",
    "LicenseConfigurationAssociation$ResourceArn": "<p>Amazon Resource Name (ARN) of the resource.</p>",
    "LicenseConfigurationAssociation$ResourceOwnerId": "<p>ID of the AWS account that owns the resource consuming licenses.</p>",
    "LicenseConfigurationUsage$ResourceArn": "<p>Amazon Resource Name (ARN) of the resource.</p>",
    "LicenseConfigurationUsage$ResourceStatus": "<p>Status of the resource.</p>",
    "LicenseConfigurationUsage$ResourceOwnerId": "<p>ID of the account that owns the resource.</p>",
    "LicenseOperationFailure$ResourceArn": "<p>Amazon Resource Name (ARN) of the resource.</p>",
    "LicenseOperationFailure$ErrorMessage": "<p>Error message.</p>",
    "LicenseOperationFailure$OperationName": "<p>Name of the operation.</p>",
    "LicenseOperationFailure$ResourceOwnerId": "<p>ID of the AWS account that owns the resource.</p>",
    "LicenseOperationFailure$OperationRequestedBy": "<p>The requester is \"License Manager Automated Discovery\".</p>",
    "LicenseSpecification$LicenseConfigurationArn": "<p>Amazon Resource Name (ARN) of the license configuration.</p>",
    "ListAssociationsForLicenseConfigurationRequest$LicenseConfigurationArn": "<p>Amazon Resource Name
```

(ARN) of a license configuration. ",
"ListAssociationsForLicenseConfigurationRequest$NextToken": " Token for the next set of results. ",
"ListAssociationsForLicenseConfigurationResponse$NextToken": " Token for the next set of results. ",
"ListFailuresForLicenseConfigurationOperationsRequest$LicenseConfigurationArn": " Amazon Resource Name of the license configuration. ",
"ListFailuresForLicenseConfigurationOperationsRequest$NextToken": " Token for the next set of results. ",
"ListFailuresForLicenseConfigurationOperationsResponse$NextToken": " Token for the next set of results. ",
"ListLicenseConfigurationsRequest$NextToken": " Token for the next set of results. ",
"ListLicenseConfigurationsResponse$NextToken": " Token for the next set of results. ",
"ListLicenseSpecificationsForResourceRequest$ResourceArn": " Amazon Resource Name (ARN) of a resource that has an associated license configuration. ",
"ListLicenseSpecificationsForResourceRequest$NextToken": " Token for the next set of results. ",
"ListLicenseSpecificationsForResourceResponse$NextToken": " Token for the next set of results. ",
"ListResourceInventoryRequest$NextToken": " Token for the next set of results. ",
"ListResourceInventoryResponse$NextToken": " Token for the next set of results. ",
"ListTagsForResourceRequest$ResourceArn": " Amazon Resource Name (ARN) of the license configuration. ",
"ListUsageForLicenseConfigurationRequest$LicenseConfigurationArn": " Amazon Resource Name (ARN) of the license configuration. ",
"ListUsageForLicenseConfigurationRequest$NextToken": " Token for the next set of results. ",
"ListUsageForLicenseConfigurationResponse$NextToken": " Token for the next set of results. ",
"Metadata$Name": " Reserved. ",
"Metadata$Value": " Reserved. ",
"ProductInformation$ResourceType": " Resource type. The possible values are <code>SSM_MANAGED</code> | <code>RDS</code>. ",
"ProductInformationFilter$ProductInformationFilterName": " Filter name. ",
"ProductInformationFilter$ProductInformationFilterComparator": " Logical operator. ",
"ResourceInventory$ResourceId": " ID of the resource. ",
"ResourceInventory$ResourceArn": " Amazon Resource Name (ARN) of the resource. ",
"ResourceInventory$Platform": " Platform of the resource. ",
"ResourceInventory$PlatformVersion": " Platform version of the resource in the inventory. ",
"ResourceInventory$ResourceOwningAccountId": " ID of the account that owns the resource. ",
"StringList$member": null,
"Tag$Key": " Tag key. ",
"Tag$Value": " Tag value. ",
"TagKeyList$member": null,
"TagResourceRequest$ResourceArn": " Amazon Resource Name (ARN) of the license configuration. ",
"UntagResourceRequest$ResourceArn": " Amazon Resource Name (ARN) of the license configuration. ",
"UpdateLicenseConfigurationRequest$LicenseConfigurationArn": " Amazon Resource Name (ARN) of the license configuration. ",
"UpdateLicenseConfigurationRequest$Name": " New name of the license configuration. ",
"UpdateLicenseConfigurationRequest$Description": " New description of the license configuration. ",
"UpdateLicenseSpecificationsForResourceRequest$ResourceArn": " Amazon Resource Name (ARN) of the

AWS resource. ",
"UpdateServiceSettingsRequest$S3BucketArn": " Amazon Resource Name (ARN) of the Amazon S3 bucket where the License Manager information is stored. ",
"UpdateServiceSettingsRequest$SnsTopicArn": " Amazon Resource Name (ARN) of the Amazon SNS topic used for License Manager alerts. "
}
},
"StringList": {
"base": null,
"refs": {
"CreateLicenseConfigurationRequest$LicenseRules": " License rules. The syntax is #name=value (for example, #allowedTenancy=EC2-DedicatedHost). The available rules vary by dimension, as follows.   <code>Cores</code> dimension: <code>allowedTenancy</code> | <code>licenseAffinityToHost</code> | <code>maximumCores</code> | <code>minimumCores</code>   <code>Instances</code> dimension: <code>allowedTenancy</code> | <code>maximumCores</code>
| <code>minimumCores</code> | <code>maximumSockets</code> | <code>minimumSockets</code> | <code>maximumVcpus</code> | <code>minimumVcpus</code>   <code>Sockets</code> dimension: <code>allowedTenancy</code> | <code>licenseAffinityToHost</code> | <code>maximumSockets</code> | <code>minimumSockets</code>   <code>vCPUs</code> dimension: <code>allowedTenancy</code> | <code>honorVcpuOptimization</code> | <code>maximumVcpus</code> | <code>minimumVcpus</code>   The unit for <code>licenseAffinityToHost</code> is days and the range is 1 to 180. The possible values for <code>allowedTenancy</code> are <code>EC2-Default</code>, <code>EC2-DedicatedHost</code>, and <code>EC2-DedicatedInstance</code>. The possible values for <code>honorVcpuOptimization</code> are <code>True</code> and <code>False</code>. ",
"GetLicenseConfigurationResponse$LicenseRules": " License rules. ",
"LicenseConfiguration$LicenseRules":
" License rules. ",
"ListLicenseConfigurationsRequest$LicenseConfigurationArns": " Amazon Resource Names (ARN) of the license configurations. ",
"ProductInformationFilter$ProductInformationFilterValue": " Filter value. ",
"UpdateLicenseConfigurationRequest$LicenseRules": " New license rule. The only rule that you can add after you create a license configuration is licenseAffinityToHost. "
}
},
"Tag": {
"base": " Details about a tag for a license configuration. ",
"refs": {
"TagList$member": null
}
},
"TagKeyList": {
"base": null,
"refs": {
"UntagResourceRequest$TagKeys": " Keys identifying the tags to remove. "
}
},
"TagList": {

```
  "base": null,
  "refs": {
    "CreateLicenseConfigurationRequest$Tags": "<p>Tags to add to the license configuration.</p>",
    "GetLicenseConfigurationResponse$Tags": "<p>Tags for the license configuration.</p>",
     "ListTagsForResourceResponse$Tags": "<p>Information about the tags.</p>",
    "TagResourceRequest$Tags": "<p>One or more tags.</p>"
  }
},
"TagResourceRequest": {
  "base": null,
  "refs": {
  }
},
"TagResourceResponse": {
  "base": null,
  "refs": {
  }
},
"UntagResourceRequest": {
  "base": null,
  "refs": {
  }
},
"UntagResourceResponse": {
  "base": null,
  "refs": {
  }
},
"UpdateLicenseConfigurationRequest": {
  "base": null,
  "refs": {
  }
},
"UpdateLicenseConfigurationResponse": {
  "base": null,
  "refs": {
  }
},
"UpdateLicenseSpecificationsForResourceRequest": {
  "base": null,
  "refs": {
  }
},
"UpdateLicenseSpecificationsForResourceResponse": {
  "base": null,
  "refs": {
  }
},
```

```
  "UpdateServiceSettingsRequest": {
    "base": null,
    "refs": {
    }
  },
  "UpdateServiceSettingsResponse":
{
    "base": null,
    "refs": {
    }
  }
 }
}
{
 "pagination": {
 }
}
```


1.237 mitchellh-mapstructure 1.5.0

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1.238 http-cache-semantics 4.1.1

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1.239 apt 2.4.14

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1.240 jetty-util 9.4.18.v20190429

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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
artifacts may be included in the distribution or downloaded when ALPN
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* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
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http://openjdk.java.net/legal/gplv2+ce.html

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org.ow2.asm:asm-commons
org.ow2.asm:asm

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org.apache.taglibs:taglibs-standard-impl

MortBay

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org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
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 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
 org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-el-api

Mortbay

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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Source Code
The project maintains the following source code repositories:

* https://github.com/eclipse-ee4j/jersey

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1.243 commons-lang3 3.18.0

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1.244 pam 1.4.0-11ubuntu2.6

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Written by: Philip Hazel
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A. HISTORY OF THE SOFTWARE
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see http://www.cwi.nl) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see http://www.cnri.reston.va.us) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see https://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

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Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes

1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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1.258 base-passwd 3.5.52build1

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1.259 proc-log 4.2.0

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1.261 xerces-j 11.0.27-1

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## CUP Parser Generator for Java v 0.11b

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Ext headers       GL/glext.h            Khronos
                  GL/glxext.h           Khronos
                  GL/wglext.h           Khronos
                  KHR/khrplatform.h     Khronos

**************************************************************************
```

---
include/GL/gl.h :

Mesa 3-D
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include/GL/wglxext.h :

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== Authors ==

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## ASM Bytecode Manipulation Framework v6.0

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* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/LineReaderImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/console/impl/SystemRegistryImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/Less.java
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* /jline-3-22-0-sources-9-jar/org/jline/terminal/MouseEvent.java
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* /jline-3-22-0-sources-9-jar/org/jline/keymap/KeyMap.java
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* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/osx/OsXNativePty.java
* /jline-3-22-0-sources-9-jar/org/jline/widget/AutosuggestionWidgets.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/Signals.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/linux/LinuxNativePty.java
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* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/JnaNativePty.java
*
 /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/freebsd/CLibrary.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/JansiNativePty.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/win/JnaWinSysTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/linux/CLibrary.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/solaris/CLibrary.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/ReaderUtils.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/EndOfFileException.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/Display.java
* /jline-3-22-0-sources-9-jar/org/jline/console/CmdLine.java
* /jline-3-22-0-sources-9-jar/org/jline/console/CommandRegistry.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/osx/CLibrary.java
* /jline-3-22-0-sources-9-jar/org/jline/console/impl/AbstractCommandRegistry.java
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#
class = org.jline.terminal.impl.exec.ExecTerminalProvider

Found in path(s):
* /jline-3-22-0-sources-9-jar/META-INF/services/org/jline/terminal/provider/exec
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Found in path(s):
* /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlockingInputStream.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/Colors.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleFactory.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlockingReader.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/Terminal.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/PosixSysTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlockingReaderImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/History.java
* /jline-3-22-0-sources-9-jar/org/jline/keymap/BindingReader.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/CompletingParsedLine.java
*
 /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/LineDisciplineTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/win/Kernel32.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/AttributedStringBuilder.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleExpression.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlockingInputStreamImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/Completer.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/ParsedLine.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/InputRC.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlocking.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/DumbTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/Curses.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/StyleResolver.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/NfaMatcher.java

* /jline-3-22-0-sources-9-jar/org/jline/reader/MaskingCallback.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/Timeout.java
*
 /jline-3-22-0-sources-9-jar/org/jline/terminal/Size.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/completer/FileNameCompleter.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/ExternalTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/PosixPtyTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/KillRing.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleSource.java
* /jline-3-22-0-sources-9-jar/org/jline/style/Styler.java
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Found in path(s):
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleBundle.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jna/win/JnaWinConsoleWriter.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/telnet/Telnet.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/osx/OsXNativePty.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleColor.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/WriterOutputStream.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/ssh/ShellFactoryImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/solaris/SolarisNativePty.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/PumpReader.java
*
 /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlockingPumpReader.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/NonBlockingPumpInputStream.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/ssh/ShellCommand.java
* /jline-3-22-0-sources-9-jar/org/jline/style/InterpolationHelper.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleBundleInvocationHandler.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyledWriter.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/AbstractWindowsConsoleWriter.java
* /jline-3-22-0-sources-9-jar/org/jline/style/NopStyleSource.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/ssh/Ssh.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/freebsd/FreeBsdNativePty.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/SimpleMaskingCallback.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/Buffer.java
* /jline-3-22-0-sources-9-jar/org/jline/style/StyleResolver.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/win/JansiWinConsoleWriter.java
*

/jline-3-22-0-sources-9-jar/org/jline/style/MemoryStyleSource.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/BufferImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/linux/LinuxNativePty.java
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* /jline-3-22-0-sources-9-jar/org/jline/reader/EOFError.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/SyntaxError.java
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* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/AbstractWindowsTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/completer/StringsCompleter.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/InfoCmp.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/ConfigurationPath.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/Status.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/Tmux.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/Editor.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/AbstractPty.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/Candidate.java

* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/completer/ArgumentCompleter.java
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auto_left_margin, bw, bw
auto_right_margin, am, am
back_color_erase, bce, ut
can_change, ccc, cc
ceol_standout_glitch, xhp, xs
col_addr_glitch, xhpa, YA
cpi_changes_res, cpix, YF
cr_cancels_micro_mode, crxm, YB
dest_tabs_magic_smso, xt, xt
eat_newline_glitch, xenl, xn
erase_overstrike, eo, eo
generic_type, gn, gn
hard_copy, hc, hc
hard_cursor, chts, HC
has_meta_key, km, km
has_print_wheel, daisy, YC
has_status_line, hs, hs
hue_lightness_saturation, hls, hl
insert_null_glitch, in, in
lpi_changes_res, lpix, YG
memory_above, da, da
memory_below, db, db
move_insert_mode, mir, mi
move_standout_mode, msgr, ms
needs_xon_xoff, nxon, nx
no_esc_ctlc, xsb, xb
no_pad_char, npc,
 NP
non_dest_scroll_region, ndscr, ND
non_rev_rmcup, nrrmc, NR
over_strike, os, os
prtr_silent, mc5i, 5i
row_addr_glitch, xvpa, YD
semi_auto_right_margin, sam, YE
status_line_esc_ok, eslok, es
tilde_glitch, hz, hz

transparent_underline, ul, ul
xon_xoff, xon, xo
columns, cols, co
init_tabs, it, it
label_height, lh, lh
label_width, lw, lw
lines, lines, li
lines_of_memory, lm, lm
magic_cookie_glitch, xmc, sg
max_attributes, ma, ma
max_colors, colors, Co
max_pairs, pairs, pa
maximum_windows, wnum, MW
no_color_video, ncv, NC
num_labels, nlab, Nl
padding_baud_rate, pb, pb
virtual_terminal, vt, vt
width_status_line, wsl, ws
bit_image_entwining, bitwin, Yo
bit_image_type, bitype, Yp
buffer_capacity, bufsz, Ya
buttons, btns, BT
dot_horz_spacing, spinh, Yc
dot_vert_spacing, spinv, Yb
max_micro_address, maddr, Yd
max_micro_jump, mjump, Ye
micro_col_size, mcs, Yf
micro_line_size, mls, Yg
number_of_pins, npins, Yh
output_res_char, orc, Yi
output_res_horz_inch, orhi, Yk
output_res_line, orl, Yj
output_res_vert_inch,
orvi, Yl
print_rate, cps, Ym
wide_char_size, widcs, Yn
acs_chars, acsc, ac
back_tab, cbt, bt
bell, bel, bl
carriage_return, cr, cr
change_char_pitch, cpi, ZA
change_line_pitch, lpi, ZB
change_res_horz, chr, ZC
change_res_vert, cvr, ZD
change_scroll_region, csr, cs
char_padding, rmp, rP
clear_all_tabs, tbc, ct
clear_margins, mgc, MC

clear_screen, clear, cl
clr_bol, el1, cb
clr_eol, el, ce
clr_eos, ed, cd
column_address, hpa, ch
command_character, cmdch, CC
create_window, cwin, CW
cursor_address, cup, cm
cursor_down, cud1, do
cursor_home, home, ho
cursor_invisible, civis, vi
cursor_left, cub1, le
cursor_mem_address, mrcup, CM
cursor_normal, cnorm, ve
cursor_right, cuf1, nd
cursor_to_ll, ll, ll
cursor_up, cuu1, up
cursor_visible, cvvis, vs
define_char, defc, ZE
delete_character, dch1, dc
delete_line, dl1, dl
dial_phone, dial, DI
dis_status_line, dsl, ds
display_clock, dclk, DK
down_half_line, hd, hd
ena_acs, enacs, eA
enter_alt_charset_mode, smacs, as
enter_am_mode, smam,
SA
enter_blink_mode, blink, mb
enter_bold_mode, bold, md
enter_ca_mode, smcup, ti
enter_delete_mode, smdc, dm
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enter_doublewide_mode, swidm, ZF
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enter_leftward_mode, slm, ZI
enter_micro_mode, smicm, ZJ
enter_near_letter_quality, snlq, ZK
enter_normal_quality, snrmq, ZL
enter_protected_mode, prot, mp
enter_reverse_mode, rev, mr
enter_secure_mode, invis, mk
enter_shadow_mode, sshm, ZM
enter_standout_mode, smso, so
enter_subscript_mode, ssubm, ZN

enter_superscript_mode, ssupm, ZO
enter_underline_mode, smul, us
enter_upward_mode, sum, ZP
enter_xon_mode, smxon, SX
erase_chars, ech, ec
exit_alt_charset_mode, rmacs, ae
exit_am_mode, rmam, RA
exit_attribute_mode, sgr0, me
exit_ca_mode, rmcup, te
exit_delete_mode, rmdc, ed
exit_doublewide_mode, rwidm, ZQ
exit_insert_mode, rmir, ei
exit_italics_mode, ritm, ZR
exit_leftward_mode, rlm, ZS
exit_micro_mode, rmicm, ZT
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ZU
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exit_underline_mode, rmul, ue
exit_upward_mode, rum, ZX
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flash_screen, flash, vb
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from_status_line, fsl, fs
goto_window, wingo, WG
hangup, hup, HU
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init_2string, is2, is
init_3string, is3, i3
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init_prog, iprog, iP
initialize_color, initc, Ic
initialize_pair, initp, Ip
insert_character, ich1, ic
insert_line, il1, al
insert_padding, ip, ip
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key_btab, kcbt, kB
key_c1, kc1, K4
key_c3, kc3, K5

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key_catab, ktbc, ka
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key_create, kcrt, @6
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key_f25, kf25, FF
key_f26, kf26, FG
key_f27, kf27, FH
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key_f47, kf47, Fb
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key_help, khlp, %1
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key_il, kil1, kA
key_left, kcub1, kl
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key_mark, kmrk, %2
key_message, kmsg, %3
key_move, kmov, %4
key_next, knxt, %5
key_npage, knp, kN
key_open, kopn, %6

key_options, kopt, %7
key_ppage, kpp, kP
key_previous, kprv, %8
key_print, kprt, %9
key_redo, krdo, %0
key_reference, kref, &1
key_refresh, krfr, &2
key_replace, krpl, &3
key_restart, krst, &4
key_resume, kres, &5
key_right, kcuf1, kr
key_save, ksav, &6
key_sbeg, kBEG, &9
key_scancel, kCAN, &0
key_scommand, kCMD, *1
key_scopy, kCPY, *2
key_screate, kCRT, *3
key_sdc, kDC, *4
key_sdl, kDL, *5
key_select, kslt, *6
key_send, kEND, *7
key_seol, kEOL, *8
key_sexit, kEXT, *9
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key_sfind, kFND, *0
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key_sleft, kLFT, #4
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key_smove, kMOV, %b
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key_sprint, kPRT, %f
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key_sreplace, kRPL, %h
key_sright, kRIT, %i
key_srsume, kRES, %j
key_ssave, kSAV, !1
key_ssuspend, kSPD, !2
key_stab, khts, kT
key_sundo, kUND, !3
key_suspend, kspd, &7
key_undo, kund, &8
key_up, kcuu1, ku

keypad_local, rmkx, ke
keypad_xmit, smkx, ks
lab_f0, lf0, l0
lab_f1, lf1, l1
lab_f10, lf10, la
lab_f2, lf2, l2
lab_f3, lf3, l3
lab_f4, lf4, l4
lab_f5, lf5, l5
lab_f6, lf6, l6
lab_f7, lf7, l7
lab_f8, lf8, l8
lab_f9, lf9, l9
label_format, fln, Lf
label_off, rmln, LF
label_on, smln, LO
meta_off, rmm, mo
meta_on, smm, mm
micro_column_address, mhpa, ZY
micro_down, mcud1, ZZ
micro_left, mcub1, Za
micro_right, mcuf1, Zb
micro_row_address, mvpa, Zc
micro_up, mcuu1, Zd
newline, nel, nw
order_of_pins, porder, Ze
orig_colors, oc, oc
orig_pair, op, op
pad_char, pad, pc
parm_dch, dch, DC
parm_delete_line, dl, DL
parm_down_cursor, cud, DO
parm_down_micro,
mcud, Zf
parm_ich, ich, IC
parm_index, indn, SF
parm_insert_line, il, AL
parm_left_cursor, cub, LE
parm_left_micro, mcub, Zg
parm_right_cursor, cuf, RI
parm_right_micro, mcuf, Zh
parm_rindex, rin, SR
parm_up_cursor, cuu, UP
parm_up_micro, mcuu, Zi
pkey_key, pfkey, pk
pkey_local, pfloc, pl
pkey_xmit, pfx, px
plab_norm, pln, pn

print_screen, mc0, ps
prtr_non, mc5p, pO
prtr_off, mc4, pf
prtr_on, mc5, po
pulse, pulse, PU
quick_dial, qdial, QD
remove_clock, rmclk, RC
repeat_char, rep, rp
req_for_input, rfi, RF
reset_1string, rs1, r1
reset_2string, rs2, r2
reset_3string, rs3, r3
reset_file, rf, rf
restore_cursor, rc, rc
row_address, vpa, cv
save_cursor, sc, sc
scroll_forward, ind, sf
scroll_reverse, ri, sr
select_char_set, scs, Zj
set_attributes, sgr, sa
set_background, setb, Sb
set_bottom_margin, smgb, Zk
set_bottom_margin_parm, smgbp, Zl
set_clock, sclk, SC
set_color_pair, scp, sp
set_foreground, setf, Sf
set_left_margin, smgl, ML
set_left_margin_parm, smglp, Zm
set_right_margin,
smgr, MR
set_right_margin_parm, smgrp, Zn
set_tab, hts, st
set_top_margin, smgt, Zo
set_top_margin_parm, smgtp, Zp
set_window, wind, wi
start_bit_image, sbim, Zq
start_char_set_def, scsd, Zr
stop_bit_image, rbim, Zs
stop_char_set_def, rcsd, Zt
subscript_characters, subcs, Zu
superscript_characters, supcs, Zv
tab, ht, ta
these_cause_cr, docr, Zw
to_status_line, tsl, ts
tone, tone, TO
underline_char, uc, uc
up_half_line, hu, hu
user0, u0, u0

user1, u1, u1
user2, u2, u2
user3, u3, u3
user4, u4, u4
user5, u5, u5
user6, u6, u6
user7, u7, u7
user8, u8, u8
user9, u9, u9
wait_tone, wait, WA
xoff_character, xoffc, XF
xon_character, xonc, XN
zero_motion, zerom, Zx
alt_scancode_esc, scesa, S8
bit_image_carriage_return, bicr, Yv
bit_image_newline, binel, Zz
bit_image_repeat, birep, Xy
char_set_names, csnm, Zy
code_set_init, csin, ci
color_names, colornm, Yw
define_bit_image_region, defbi, Yx
device_type, devt, dv
display_pc_char, dispc, S1
end_bit_image_region, endbi, Yy
enter_pc_charset_mode,
smpch, S2
enter_scancode_mode, smsc, S4
exit_pc_charset_mode, rmpch, S3
exit_scancode_mode, rmsc, S5
get_mouse, getm, Gm
key_mouse, kmous, Km
mouse_info, minfo, Mi
pc_term_options, pctrm, S6
pkey_plab, pfxl, xl
req_mouse_pos, reqmp, RQ
scancode_escape, scesc, S7
set0_des_seq, s0ds, s0
set1_des_seq, s1ds, s1
set2_des_seq, s2ds, s2
set3_des_seq, s3ds, s3
set_a_background, setab, AB
set_a_foreground, setaf, AF
set_color_band, setcolor, Yz
set_lr_margin, smglr, ML
set_page_length, slines, YZ
set_tb_margin, smgtb, MT
enter_horizontal_hl_mode, ehhlm, Xh
enter_left_hl_mode, elhlm, Xl

enter_low_hl_mode, elohlm, Xo
enter_right_hl_mode, erhlm, Xr
enter_top_hl_mode, ethlm, Xt
enter_vertical_hl_mode, evhlm, Xv
set_a_attributes, sgr1, sA
set_pglen_inch, slength, sL

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* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/jansi/win/WindowsAnsiWriter.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/AnsiWriter.java
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* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/Diag.java
* /jline-3-22-0-sources-9-jar/org/jline/terminal/spi/TerminalProvider.java
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*
/jline-3-22-0-sources-9-jar/org/jline/builtins/telnet/TelnetIO.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/telnet/ConnectionData.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/telnet/ConnectionEvent.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/telnet/Connection.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/telnet/ConnectionManager.java

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black
maroon
green
olive
navy
purple
teal
silver
grey
red
lime
yellow
blue
fuchsia
aqua
white
grey0
navyblue
darkblue
blue3
blue3a
blue1
darkgreen
deepskyblue4
deepskyblue4a
deepskyblue4b
dodgerblue3
dodgerblue2
green4
springgreen4
turquoise4
deepskyblue3
deepskyblue3a
dodgerblue1
green3
springgreen3
darkcyan
```

lightseagreen
deepskyblue2
deepskyblue1
green3a
springgreen3a
springgreen2
cyan3
darkturquoise
turquoise2
green1
springgreen2a
springgreen1
mediumspringgreen
cyan2
cyan1
darkred
deeppink4
purple4
purple4a
purple3
blueviolet
orange4
grey37
mediumpurple4
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slateblue3a
royalblue1
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darkseagreen4
paleturquoise4
steelblue
steelblue3
cornflowerblue
chartreuse3
darkseagreen4a
cadetblue
cadetbluea
skyblue3
steelblue1
chartreuse3a
palegreen3
seagreen3
aquamarine3
mediumturquoise
steelblue1a
chartreuse2
seagreen2
seagreen1

seagreen1a
aquamarine1
darkslategray2
darkreda
deeppink4a
darkmagenta
darkmagentaa
darkviolet
purplea
orange4a
lightpink4
plum4
mediumpurple3
mediumpurple3a
slateblue1
yellow4
wheat4
grey53
lightslategrey
mediumpurple
lightslateblue
yellow4a
darkolivegreen3
darkseagreen
lightskyblue3
lightskyblue3a
skyblue2
chartreuse2a
darkolivegreen3a
palegreen3a
darkseagreen3
darkslategray3
skyblue1
chartreuse1
lightgreen
lightgreena
palegreen1
aquamarine1a
darkslategray1
red3
deeppink4b
mediumvioletred
magenta3
darkvioleta
purpleb
darkorange3
indianred
hotpink3

mediumorchid3
mediumorchid
mediumpurple2
darkgoldenrod
lightsalmon3
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mediumpurple2a
mediumpurple1
gold3
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navajowhite3
grey69
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yellow3
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darkseagreen3a
darkseagreen2
lightcyan3
lightskyblue1
greenyellow
darkolivegreen2
palegreen1a
darkseagreen2a
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paleturquoise1
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deeppink3
deeppink3a
magenta3a
magenta3b
magenta2
darkorange3a
indianreda
hotpink3a
hotpink2
orchid
mediumorchid1
orange3
lightsalmon3a
lightpink3
pink3
plum3
violet
gold3a
lightgoldenrod3
tan

mistyrose3
thistle3
plum2
yellow3a
khaki3
lightgoldenrod2
lightyellow3
grey84
lightsteelblue1
yellow2
darkolivegreen1
darkolivegreen1a
darkseagreen1a
honeydew2
lightcyan1
red1
deeppink2
deeppink1
deeppink1a
magenta2a
magenta1
orangered1
indianred1
indianred1a
hotpink
hotpinka
mediumorchid1a
darkorange
salmon1
lightcoral
palevioletred1
orchid2
orchid1
orange1
sandybrown
lightsalmon1
lightpink1
pink1
plum1
gold1
lightgoldenrod2a
lightgoldenrod2b
navajowhite1
mistyrose1
thistle1
yellow1
lightgoldenrod1
khaki1

wheat1
cornsilk1
grey100
grey3
grey7
grey11
grey15
grey19
grey23
grey27
grey30
grey35
grey39
grey42
grey46
grey50
grey54
grey58
grey62
grey66
grey70
grey74
grey78
grey82
grey85
grey89
grey93

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* /jline-3-22-0-sources-9-jar/org/jline/terminal/TerminalBuilder.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/Highlighter.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/Styles.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/Completers.java

* /jline-3-22-0-sources-9-jar/org/jline/terminal/impl/AbstractTerminal.java
* /jline-3-22-0-sources-9-jar/org/jline/console/ConsoleEngine.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/Nano.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/history/DefaultHistory.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/AttributedCharSequence.java
*
 /jline-3-22-0-sources-9-jar/org/jline/console/ArgDesc.java
* /jline-3-22-0-sources-9-jar/org/jline/utils/AttributedStyle.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/PrintAboveWriter.java
* /jline-3-22-0-sources-9-jar/org/jline/console/SystemRegistry.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/LineReader.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/Parser.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/ConsoleOptionGetter.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/DefaultHighlighter.java
* /jline-3-22-0-sources-9-jar/org/jline/console/impl/ConsoleEngineImpl.java
* /jline-3-22-0-sources-9-jar/org/jline/builtins/TTop.java
* /jline-3-22-0-sources-9-jar/org/jline/reader/impl/CompletionMatcherImpl.java
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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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a) Accompany
the work with the complete corresponding
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the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

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d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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1.268 libnpmteam 6.0.5

1.268.1 Available under license :

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1.269 dumb-init 1.2.5-2

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1.270 montanaflynn-stats 0.7.1

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1.271 regiondata 75.1

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* /region-data-tar/region-data.txt

1.272 gzip 1.10-4ubuntu4.1

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c) Convey individual copies of the object code with a copy of the

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1.273 normalize-package-data 6.0.2

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* /hikaricp-java7-2-4-13-sources-7-jar/com/zaxxer/hikari/metrics/prometheus/HikariCPCollector.java

1.275 hk2-api 2.6.1

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If distribution of object code is made by offering access to copy
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5. A program that contains no derivative of any portion of the
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However, linking a "work that uses the Library" with the Library
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Section 6 states terms for distribution of such executables.

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^L
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#+TITLE: List of code with permissive licenses as used by GnuPG.
#+STARTUP: showall

* DNS resolver (dirmngr/dns.c)

dns.c - Recursive, Reentrant DNS Resolver.

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* Regular
expression support

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Subsequently modified by:

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1987 James A. Woods ames!jaw
1993 Christopher Seiwald seiwald@vix.com
2000, 2002 Christopher Seiwald <seiwald@perforce.com>
2010 Steve Bennett <steveb@workware.net.au>
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1.287 woodstox 6.3.1

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* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api

* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

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module is selected.

* java.sun.security.ssl

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are hosted at github and both modified and original are under GPL v2 with
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http://openjdk.java.net/legal/gplv2+ce.html

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terms of http://asm.ow2.org/license.html

org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

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licensed.

org.mortbay.jasper:apache-jsp
org.apache.tomcat:tomcat-jasper
org.apache.tomcat:tomcat-juli

org.apache.tomcat:tomcat-jsp-api
org.apache.tomcat:tomcat-el-api
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-api
org.apache.tomcat:tomcat-util-scan
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-el-api

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

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builds/unix/pkg.m4
#
docs/FTL.TXT
docs/GPLv2.TXT
#
include/freetype/internal/fthash.h
#
src/base/fthash.c
src/base/md5.c
src/base/md5.h
#
src/bdf/bdf.c
src/bdf/bdf.h
src/bdf/bdfdrivr.c
src/bdf/bdfdrivr.h
src/bdf/bdferror.h
src/bdf/bdflib.c
src/bdf/module.mk
src/bdf/README
src/bdf/rules.mk
#
```

src/pcf/module.mk
src/pcf/pcf.c
src/pcf/pcf.h
src/pcf/pcfdrivr.c
src/pcf/pcfdrivr.h
src/pcf/pcferror.h
src/pcf/pcfread.c
src/pcf/pcfread.h
src/pcf/pcfutil.c
src/pcf/pcfutil.h
src/pcf/README
src/pcf/rules.mk
#
src/gzip/adler32.c
src/gzip/infblock.c
src/gzip/infblock.h
src/gzip/infcodes.c
src/gzip/infcodes.h
src/gzip/inffixed.h
src/gzip/inflate.c
src/gzip/inftrees.c
src/gzip/inftrees.h
src/gzip/infutil.c
src/gzip/infutil.h
src/gzip/zconf.h
src/gzip/zlib.h
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src/gzip/zutil.h
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src/tools/apinames.c
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* /isorelax-20090621-sources-5-jar/org/iso_relax/dispatcher/Dispatcher.java
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/*

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1.299 abbrev 2.0.0

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* /annotations-4-1-1-4-sources-jar/android/annotation/SuppressLint.java
* /annotations-4-1-1-4-sources-jar/android/annotation/TargetApi.java

1.303 cobra 1.4.0

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1.304 reflections 0.9.10

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1.305 python3.10 3.10.12-1~22.04.11

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Mathematisch Centrum (CWI, see https://www.cwi.nl) in the Netherlands
as a successor of a language called ABC. Guido remains Python's
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see https://www.cnri.reston.va.us) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see https://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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2.2 and above	2.1.1	2001-now	PSF	yes

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1.308 go-toml 1.9.5

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Changes:
* Renamed files from civil* to localtime*.
* Package changed from civil to toml.
* 'Local' prefix added to all structs.
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1.309 asm 9.2

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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/lang/NonNull.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/lang/Nullable.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/AsyncClientSession.java
*
 /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/ServerVersionHelper.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/lang/NonNullApi.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/AsyncClientSessionImpl.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ReadConcernHelper.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/lang/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/TransactionOptions.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/ReadConcernAwareNoOpSessionContext.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/WriteConcernHelper.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/annotations/Immutable.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/DnsSrvRecordMonitor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/changestream/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/vault/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/connection/netty/NettyByteBuf.java
*
 /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoInternalException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ConnectionReadyEvent.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/ExplainVerbosity.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoGridFSException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/Crypts.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/OrderBy.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/result/InsertManyResult.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/gridfs/AsyncGridFSBuckets.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ConnectionCheckedInEvent.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/session/ClientSessionContext.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/management/NullMBeanServer.java
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 /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/connection/netty/NettyStreamFactoryFactory.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/Geometry.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/InternalConnectionInitializer.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ClusterOpeningEvent.java
* /mongodb-driver-core-4-1-0-sources-1-
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ClusterClosedEvent.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/InsertOneOptions.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/gridfs/AsyncInputStream.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/CommandEvent.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoExecutionTimeoutException.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/Updates.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/AsyncMongoClientImpl.java

* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/UpdateOperation.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/DistinctOperation.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoWriteConcernException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/session/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/binding/ReadBinding.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/ReturnDocument.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/connection/ClusterConnectionMode.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/MessageSettings.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/AsyncWriteOperation.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/management/JMXMBeanServer.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/connection/netty/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/DefaultDnsSrvRecordMonitor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/BulkWriteBatch.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/CommandMarker.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/InternalConnection.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/DropIndexOptions.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/codecs/MultiPolygonCodec.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/DecimalFormatHelper.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/UpdateMessage.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/codecs/LineStringCodec.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoSocketReadTimeoutException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/WriteOperation.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/connection/netty/NettyStreamFactory.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/LegacyProtocol.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ConnectionPoolClosedEvent.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/MapReduceHelper.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoNamespace.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/UpdateManyModel.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/changestream/OperationTypeCodec.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/AsyncListCollectionsIterable.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/package-info.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/authentication/NativeAuthenticationHelper.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/CommandWriteOperation.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/LineString.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/bulk/WriteRequestWithIndex.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/ExplainHelper.java
* /mongodb-driver-core-4-1-0-sources-1-
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/ServerAddress.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/ServerCursor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/BsonField.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoSocketWriteException.java
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 /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/bulk/BulkWriteInsert.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/MapReduceAction.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/CommandProtocolImpl.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/BuildersHelper.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/management/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/AuthorizationHeader.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ServerListener.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/MultiPolygon.java
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* /mongodb-driver-core-4-1-0-sources-1-
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/CountOptions.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/MapReduceInlineResultsCursor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ProtocolExecutor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/SaslAuthenticator.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/RenameCollectionOperation.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/ReplaceOptions.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/ValidationOptions.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/Polygon.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/gridfs/helpers/package-info.java
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/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/vault/DataKeyOptions.java
* /mongodb-driver-core-4-1-0-sources-1-
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoSecurityException.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/client/model/geojson/codecs/GeometryCollectionCodec.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ServerMonitor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ServerHeartbeatStartedEvent.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/selector/CompositeServerSelector.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/DeleteManyModel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/CommandListener.java
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/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ClusterableServerFactory.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ZstdCompressor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/changestream/FullDocument.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/CreateIndexCommitQuorum.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/management/JMXConnectionPoolListener.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/codecs/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ProtocolHelper.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/Crypt.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ConnectionPoolListener.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/BsonDocumentWrapperHelper.java
*
/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/diagnostics/logging/SLF4JLogger.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/DuplicateKeyException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/AsyncChangeStreamBatchCursor.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ClusterableServer.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/AsyncSingleBatchQueryCursor.java
* /mongodb-driver-core-4-1-0-sources-1-
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/bulk/DeleteRequest.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/ReadConcernLevel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/bulk/UpdateRequest.java

* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/CommandResultArrayCodec.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/SpeculativeAuthenticator.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoClientException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/FindAndReplaceOperation.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/CommandResultCodecProvider.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/DBRefCodecProvider.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/BasicDBList.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/Position.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/gridfs/model/GridFSFile.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/geojson/GeoJsonObjectType.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/MongoConfigurationException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/session/BaseClientSessionImpl.java
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/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/model/IndexOptions.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/BsonWriterDecorator.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/bulk/BulkWriteUpsert.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/event/ConnectionRemovedEvent.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/CommandEventSender.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/client/gridfs/codecs/GridFSFileCodec.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/client/ClientSessionBinding.java
* /mongodb-driver-core-4-1-0-sources-1-
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/async/ErrorHandlingResultCallback.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/selector/ServerAddressSelector.java
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/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/connection/netty/NettyStream.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/management/ConnectionPoolStatisticsMBean.java
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* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/operation/DeleteOperation.java
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* https://github.com/marianobarrios/tls-channel
*/
```

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*/
/**
    * Returns an array containing all of the elements in this deque, in
    * proper sequence (from first to last element).

   *
    * <p>The returned array will be "safe" in that no references to it are
    * maintained by this deque.  (In other words, this method must allocate
```

```
   * a new array).  The caller is thus free to modify the returned array.
   *
   * <p>This method acts as bridge between array-based and collection-based
   * APIs.
   *
   * @return an array containing all of the elements in this deque
   */
```

Found in path(s):
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/ConcurrentLinkedDeque.java
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```

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*
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* https://github.com/marianobarrios/tls-channel
*/

Found in path(s):
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/ClientTlsChannel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/TlsChannelBuilder.java
*
/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/DirectBufferAllocator.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/async/AsynchronousTlsChannel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/util/Util.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/NeedsReadException.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/NeedsWriteException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/NeedsTaskException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/impl/BufferHolder.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/impl/TlsChannelImpl.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/async/package-info.java
*
/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/impl/ByteBufferSet.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/util/DirectBufferDeallocator.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/async/ExtendedAsynchronousByteChannel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/package-info.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/async/AsynchronousTlsChannelGroup.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/TlsChannelFlowControlException.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/TlsChannelCallbackException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/impl/ByteBufferUtil.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/SniSslContextFactory.java
*
/mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/TlsChannel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/impl/TlsExplorer.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/ServerTlsChannel.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/TrackingAllocator.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/BufferAllocator.java
* /mongodb-driver-core-4-1-0-sources-1-
jar/com/mongodb/internal/connection/tlschannel/WouldBlockException.java
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/connection/tlschannel/HeapBufferAllocator.java

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```

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```

Found in path(s):
* /mongodb-driver-core-4-1-0-sources-1-jar/com/mongodb/internal/authentication/SaslPrep.java

1.314 cache-api 1.0.0

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1.315 python 3.10.12-1~22.04.9

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==============

A. HISTORY OF THE SOFTWARE
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see http://www.cwi.nl) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see http://www.cnri.reston.va.us) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see http://www.zope.com). In 2001, the Python Software Foundation (PSF, see http://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes

2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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Mersenne Twister

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following are the verbatim comments from the original code:

A C-program for MT19937, with initialization improved 2002/1/26.
Coded by Takuji Nishimura and Makoto Matsumoto.

Before using, initialize the state by using init_genrand(seed)
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http://www.math.keio.ac.jp/matumoto/emt.html
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Sockets

The `socket' module uses the functions, `getaddrinfo', and

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- Arguments more compliant with python standard

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A. HISTORY OF THE SOFTWARE
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Python was created in the early 1990s by Guido van Rossum at Stichting
Mathematisch Centrum (CWI, see https://www.cwi.nl) in the Netherlands
as a successor of a language called ABC. Guido remains Python's
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for
National Research Initiatives (CNRI, see https://www.cnri.reston.va.us)
in Reston, Virginia where he released several versions of the
software.

In May 2000, Guido and the Python core development team moved to
BeOpen.com to form the BeOpen PythonLabs team. In October of the same
year, the PythonLabs team moved to Digital Creations, which became
Zope Corporation. In 2001, the Python Software Foundation (PSF, see
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Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes

1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
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Thanks to the many outside volunteers who have worked under Guido's
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1.319 sed 4.8-1ubuntu2

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1.332 e2fsprogs 1.46.5-2ubuntu1.2

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Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

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file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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#
This is a Makefile stub which handles the creation of BSD shared
libraries.
#
In order to use this stub, the following makefile variables must be defined.
#
BSDLIB_VERSION = 1.0
BSDLIB_IMAGE = libce
BSDLIB_MYDIR = et
BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image: $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))

install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::

```
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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This is the Debian GNU/Linux prepackaged version of the translation
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Theodore Ts'o <tytso@mit.edu> on Fri Dec 14 22:24:35 EST 2007

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Index: tdbsa/tdb.c

```
===================================================================
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371
Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
-   Unix SMB/CIFS implementation.
+   trivial database library - standalone version

-   trivial database library - private includes
-
-   Copyright (C) Andrew Tridgell              2005
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+   Copyright (C) Jeremy Allison               2000-2006
+   Copyright (C) Paul `Rusty' Russell         2000

     ** NOTE! The following LGPL license applies to the tdb
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```

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Gadi Oxman, August 1995

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`Gnomovision' (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice

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Theodore Ts'o
23-June-2007

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with the information you received as to the offer
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 The reason we have a separate public license for some libraries is that they blur the distinction we usually make between modifying or adding to a program and simply using it. Linking a program with a library, without changing the library, is
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 However, unrestricted linking of non-free programs would deprive the users of those programs of all benefit from the free status of the libraries themselves. This Library General Public License is intended to permit developers of non-free programs to use free libraries, while preserving your freedom as a user of such programs to change the free

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If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not

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5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

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If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were
written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

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Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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1.333 sqlite 3.37.2-2ubuntu0.5

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1.334 quartz 2.3.2

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1.335 rcrowley-go-metrics 0.0.0-20181016184325-3113b8401b8a

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1.336 fs-minipass 2.1.0

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1.337 asm 11.0.27-1

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jQuery UI v1.13.2

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Mesa 3-D

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1.339 python-requests 2.21.0

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1.341 jedis 4.4.0-m2

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1.342 libcap-ng 0.7.9-2.2build3

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1.345 proto-google-common-protos 2.48.0

1.345.1 Available under license :

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1.346 libx11 2:1.7.5-1ubuntu0.3

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jQuery UI v1.13.2

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Mesa 3-D Graphics Library v21.0.3

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	GL/wglext.h	Khronos
	KHR/khrplatform.h	Khronos

****

---
include/GL/gl.h :

Mesa 3-D

graphics library

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include/GL/glxext.h
include/GL/wglxext.h :

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## ASM Bytecode Manipulation Framework v6.0

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1.356 asm 6.0

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*/
/**
```

```
   * Constructs a new {@link LocalVariableAnnotationNode}. <i>Subclasses must
   * not use this constructor</i>. Instead, they must use the
   * {@link #LocalVariableAnnotationNode(int, TypePath, LabelNode[], LabelNode[], int[], String)}
   * version.
   *

   * @param typeRef
   *          a reference to the annotated type. See {@link TypeReference}.
   * @param typePath
   *          the path to the annotated type argument, wildcard bound, array
   *          element type, or static inner type within 'typeRef'. May be
   *          <tt>null</tt> if the annotation targets 'typeRef' as a whole.
   * @param start
   *          the fist instructions corresponding to the continuous ranges
   *          that make the scope of this local variable (inclusive).
   * @param end
   *          the last instructions corresponding to the continuous ranges
   *          that make the scope of this local variable (exclusive). This
   *          array must have the same size as the 'start' array.
   * @param index
   *          the local variable's index in each range. This array must have
   *          the same size as the 'start' array.
   * @param desc
   *          the class descriptor of
 the annotation class.
   */
```

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*/
/**
    * Creates a new {@link GeneratorAdapter}. Subclasses must not use this
    * constructor. Instead, they must use the
    * {@link #GeneratorAdapter(int, MethodVisitor, int, String, String)}

```
   * version.
   *
   * @param mv
   *          the
 method visitor to which this adapter delegates calls.
   * @param access
   *          the method's access flags (see {@link Opcodes}).
   * @param name
   *          the method's name.
   * @param desc
   *          the method's descriptor (see {@link Type Type}).
   * @throws IllegalStateException
   *           If a subclass calls this constructor.
   */
```

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*/
/**
   * Constructs a new {@link ClassNode}. <i>Subclasses must not use this
   * constructor</i>. Instead, they must use the {@link #ClassNode(int)}
   * version.
   *
   * @throws IllegalStateException
   *             If a subclass calls this constructor.
    */

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* /asm-6-0-sources-jar/org/objectweb/asm/tree/ClassNode.java
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*/

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* /asm-6-0-sources-jar/org/objectweb/asm/signature/SignatureVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/ModuleRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/ModuleExportNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/Value.java
*
/asm-6-0-sources-jar/org/objectweb/asm/util/TraceMethodVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/ClassRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/ByteVector.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/TraceAnnotationVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/IntInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/RemappingAnnotationAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/RemappingMethodAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/TypeInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/SimpleRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/CheckSignatureAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/TableSwitchInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/TraceSignatureVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/LabelNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/ClassVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/MethodInsnNode.java
*
/asm-6-0-sources-jar/org/objectweb/asm/ClassReader.java
* /asm-6-0-sources-jar/org/objectweb/asm/FieldVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/SourceInterpreter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tools/ModuleInfoBndPlugin.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/Subroutine.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/ModuleRequireNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/AnnotationRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/ModuleHashesAttribute.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/CheckClassAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/RemappingSignatureAdapter.java

* /asm-6-0-sources-jar/org/objectweb/asm/tree/InnerClassNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/ModuleProvideNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/CurrentFrame.java
* /asm-6-0-sources-jar/org/objectweb/asm/Label.java
*
 /asm-6-0-sources-jar/org/objectweb/asm/tree/JumpInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/Opcodes.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/MethodRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/Frame.java
* /asm-6-0-sources-jar/org/objectweb/asm/ClassWriter.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/CodeSizeEvaluator.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/Analyzer.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/CheckMethodAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/signature/SignatureReader.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/SmallSet.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/AnalyzerException.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/BasicInterpreter.java
* /asm-6-0-sources-jar/org/objectweb/asm/Attribute.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/RemappingFieldAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/LocalVariableNode.java
*
 /asm-6-0-sources-jar/org/objectweb/asm/tree/TryCatchBlockNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/CheckAnnotationAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/AnnotationNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/Context.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/SimpleVerifier.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/MethodNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/StaticInitMerger.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/LocalVariablesSorter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/AbstractInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/InsnList.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/AdviceAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/IincInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/TypeAnnotationNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/FieldNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/Handle.java
*
 /asm-6-0-sources-jar/org/objectweb/asm/tree/ModuleOpenNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/TryCatchBlockSorter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/LdcInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/Interpreter.java
* /asm-6-0-sources-jar/org/objectweb/asm/ModuleVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/TraceFieldVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/Handler.java
* /asm-6-0-sources-jar/org/objectweb/asm/AnnotationVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/ModuleWriter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/ModuleNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/TraceModuleVisitor.java

* /asm-6-0-sources-jar/org/objectweb/asm/commons/RemappingClassAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/CheckFieldAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/InstructionAdapter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/InvokeDynamicInsnNode.java
*
 /asm-6-0-sources-jar/org/objectweb/asm/tree/InsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/BasicValue.java
* /asm-6-0-sources-jar/org/objectweb/asm/MethodVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/SerialVersionUIDAdder.java
* /asm-6-0-sources-jar/org/objectweb/asm/Frame.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/TableSwitchGenerator.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/FieldInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/Method.java
* /asm-6-0-sources-jar/org/objectweb/asm/MethodWriter.java
* /asm-6-0-sources-jar/org/objectweb/asm/signature/SignatureWriter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/VarInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/LineNumberNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/SourceValue.java
* /asm-6-0-sources-jar/org/objectweb/asm/tools/Retrofitter.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/ModuleTargetAttribute.java
*
 /asm-6-0-sources-jar/org/objectweb/asm/AnnotationWriter.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/LookupSwitchInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/FieldWriter.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/SignatureRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/TraceClassVisitor.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/FieldRemapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/BasicVerifier.java
* /asm-6-0-sources-jar/org/objectweb/asm/commons/Remapper.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/Printer.java
* /asm-6-0-sources-jar/org/objectweb/asm/Item.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/ParameterNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/Edge.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/FrameNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/Type.java
* /asm-6-0-sources-jar/org/objectweb/asm/tree/MultiANewArrayInsnNode.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/ASMifier.java
*
 /asm-6-0-sources-jar/org/objectweb/asm/commons/ModuleResolutionAttribute.java
* /asm-6-0-sources-jar/org/objectweb/asm/util/CheckModuleAdapter.java
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* /asm-6-0-sources-jar/org/objectweb/asm/util/Textifiable.java
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*/
/**
   * Creates a new {@link AnalyzerAdapter}. Subclasses must not use this
   * constructor. Instead, they must use the
   * {@link #AnalyzerAdapter(int, String, int, String, String, MethodVisitor)}
   * version.
   *
   * @param owner
   *
     the owner's class name.
   * @param access
   *   the method's access flags (see {@link Opcodes}).
   * @param name
   *   the method's name.
   * @param desc
   *   the method's descriptor (see {@link Type Type}).
   * @param mv
   *   the method visitor to which this adapter delegates calls. May
   *   be <tt>null</tt>.
   * @throws IllegalStateException
   *   If a subclass calls this constructor.
   */

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* /asm-6-0-sources-jar/org/objectweb/asm/util/package.html
* /asm-6-0-sources-jar/org/objectweb/asm/commons/package.html
* /asm-6-0-sources-jar/org/objectweb/asm/tree/analysis/package.html
* /asm-6-0-sources-jar/org/objectweb/asm/signature/package.html
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/**
   * Constructs a new {@link Textifier}. <i>Subclasses must not use this
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   * version.
   *
   * @throws IllegalStateException
   *             If a subclass calls this constructor.
    */
```

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/**
   * Creates a new JSRInliner. <i>Subclasses must not use this
   * constructor</i>. Instead, they must use the
   * {@link #JSRInlinerAdapter(int, MethodVisitor, int, String, String, String, String[])}
   * version.
   *
   * @param mv
   *
  the <code>MethodVisitor</code> to send the resulting inlined
   *          method code to (use <code>null</code> for none).
   * @param access
   *          the method's access flags (see {@link Opcodes}). This
   *          parameter also indicates if the method is synthetic and/or
   *          deprecated.
   * @param name
   *          the method's name.
   * @param desc
   *          the method's descriptor (see {@link Type}).
   * @param signature
   *          the method's signature. May be <tt>null</tt>.
   * @param exceptions
   *          the internal names of the method's exception classes (see
   *          {@link Type#getInternalName() getInternalName}). May be
   *          <tt>null</tt>.
   * @throws IllegalStateException
   *           If a subclass calls this constructor.
   */
```

Found in path(s):
* /asm-6-0-sources-jar/org/objectweb/asm/commons/JSRInlinerAdapter.java

1.357 alsa 1.2.6.1-1ubuntu1

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1.360 maglev-cloud-kvstore-go-sdk-go-sdk 0.0.18

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analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java

analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

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1.364 json-path 2.4.0

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Found in path(s):

```
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/InvalidJsonException.java
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* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/JsonPathException.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/PredicateContextImpl.java
*
 /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/Utils.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/function/latebinding/PathLateBindingValue.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/ParseContext.java
```

* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/Configuration.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/EvaluationListener.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/RootPathToken.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/json/JettisonProvider.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/CompiledPath.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/WriteContext.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/Option.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/PredicatePathToken.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/InvalidPathException.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/Path.java
*
 /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/ArrayPathToken.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/json/JsonProvider.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/ValueCompareException.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/Predicate.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/mapper/JsonSmartMappingProvider.java
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* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/PathToken.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/json/AbstractJsonProvider.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/Filter.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/json/JacksonJsonProvider.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/function/latebinding/JsonLateBindingValue.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/ScanPathToken.java
*
 /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/cache/LRUCache.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/InvalidModificationException.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/mapper/MappingException.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/path/WildcardPathToken.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/mapper/TapestryMappingProvider.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/Criteria.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/TypeRef.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/JsonContext.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/internal/EvaluationContext.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/spi/mapper/JacksonMappingProvider.java
* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/DocumentContext.java
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* /json-path-2-4-0-sources-7-jar/com/jayway/jsonpath/PathNotFoundException.java
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1.365 foreground-child 3.2.1

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1.366 treeverse 3.0.0

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* ASM: a very small and fast Java bytecode manipulation framework
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For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the
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A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another
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"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

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(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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Otherwise, if the work is a derivative of the Library, you may distribute the object
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Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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1.371 make-fetch-happen 13.0.1

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1.372 iconv 2.35-0ubuntu3.10

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a purpose that is entirely well-defined independent of the
application. Therefore, Subsection 2d requires that any
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If distribution of object code is made by offering access to copy
from a designated place, then offering equivalent access to copy the
source code from the same place satisfies the requirement to
distribute the source code, even though third parties are not
compelled to copy the source along with the object code.

@item
A program that contains no derivative of any portion of the
Library, but is designed to work with the Library by being compiled or
linked with it, is called a ``work that uses the Library''. Such a
work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

However, linking a ``work that uses the Library'' with the Library

creates an executable that is a derivative of the Library (because
it
contains portions of the Library), rather than a ``work that uses the
library''. The executable is therefore covered by this License.
Section 6 states terms for distribution of such executables.

When a ``work that uses the Library'' uses material from a header file
that is part of the Library, the object code for the work may be a
derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be
linked without the Library, or if the work is itself a library. The
threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data
structure layouts and accessors, and small macros and small inline
functions (ten lines or less in length), then the use of the object
file is unrestricted, regardless of whether it is legally a derivative
work. (Executables containing this object code plus portions of the
Library will still fall under Section 6.)

Otherwise,
if the work is a derivative of the Library, you may
distribute the object code for the work under the terms of Section 6.
Any executables containing that work also fall under Section 6,
whether or not they are linked directly with the Library itself.

@item
As an exception to the Sections above, you may also combine or
link a ``work that uses the Library'' with the Library to produce a
work containing portions of the Library, and distribute that work
under terms of your choice, provided that the terms permit
modification of the work for the customer's own use and reverse
engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the
Library is used in it and that the Library and its use are covered by
this License. You must supply a copy of this License. If the work
during execution displays copyright notices, you must include the
copyright notice for the Library among them, as well as a reference
directing the user to the copy of
this License. Also, you must do one
of these things:

@enumerate a
@item
Accompany the work with the complete corresponding
machine-readable source code for the Library including whatever
changes were used in the work (which must be distributed under

Sections 1 and 2 above); and, if the work is an executable linked
with the Library, with the complete machine-readable ``work that
uses the Library'', as object code and/or source code, so that the
user can modify the Library and then relink to produce a modified
executable containing the modified Library. (It is understood
that the user who changes the contents of definitions files in the
Library will not necessarily be able to recompile the application
to use the modified definitions.)

@item
Use a suitable shared library mechanism for linking with the Library. A
suitable mechanism is one that (1) uses at run time a copy of the
library already present on the user's computer system, rather than
copying library functions into the executable,
 and (2) will operate
properly with a modified version of the library, if the user installs
one, as long as the modified version is interface-compatible with the
version that the work was made with.

@item
Accompany the work with a written offer, valid for at
least three years, to give the same user the materials
specified in Subsection 6a, above, for a charge no more
than the cost of performing this distribution.

@item
If distribution of the work is made by offering access to copy
from a designated place, offer equivalent access to copy the above
specified materials from the same place.

@item
Verify that the user has already received a copy of these
materials or that you have already sent this user a copy.
@end enumerate

 For an executable, the required form of the ``work that uses the
Library'' must include any data and utility programs needed for
reproducing the executable from it. However, as a special exception,
the materials to be distributed need not include anything that
 is
normally distributed (in either source or binary form) with the major
components (compiler, kernel, and so on) of the operating system on
which the executable runs, unless that component itself accompanies the
executable.

 It may happen that this requirement contradicts the license
restrictions of other proprietary libraries that do not normally
accompany the operating system. Such a contradiction means you cannot

use both them and the Library together in an executable that you
distribute.

@item
You may place library facilities that are a work based on the
Library side-by-side in a single library together with other library
facilities not covered by this License, and distribute such a combined
library, provided that the separate distribution of the work based on
the Library and of the other library facilities is otherwise
permitted, and provided that you do these two things:

@enumerate a
@item
Accompany the combined library with a copy of the same work
based on the Library,
 uncombined with any other library
facilities. This must be distributed under the terms of the
Sections above.

@item
Give prominent notice with the combined library of the fact
that part of it is a work based on the Library, and explaining
where to find the accompanying uncombined form of the same work.
@end enumerate

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If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

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This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

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@end enumerate

@subheading END OF TERMS AND CONDITIONS

@page
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@var{signature of Ty Coon}, 1 April 1990
Ty Coon, President of Vice
@end smallexample

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Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that

any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

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When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

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A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

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2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) The modified work must itself be a software library.

b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

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This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

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When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

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a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that

uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate
properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally
distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzwrite.c
No license file was found, but licenses were detected in source scan.

/* inffast.h -- header to use inffast.c
* Copyright (C) 1995-2003, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inffast.h
No license file was found, but licenses were detected in source scan.

Not copyrighted -- provided to the public domain

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zlib_how.html
No license file was found, but licenses were detected in source scan.

/* unzip.c -- IO for uncompress .zip files using zlib
  Version 1.1, February 14h, 2010
  part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

Modifications of Unzip for Zip64
Copyright (C) 2007-2008 Even Rouault

Modifications for Zip64 support on both zip and unzip
Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

For more info read MiniZip_info.txt

Decryption code comes from crypt.c by Info-ZIP but has been greatly reduced in terms of compatibility with older software. The following is from the original crypt.c.
Code woven in by Terry Thorsen 1/2003.

Copyright (c) 1990-2000 Info-ZIP. All rights reserved.

See the accompanying
file LICENSE, version 2000-Apr-09 or later
(the contents of which are also included in zip.h) for terms of use.
If, for some reason, all these files are missing, the Info-ZIP license
also may be found at: ftp://ftp.info-zip.org/pub/infozip/license.html

crypt.c (full version) by Info-ZIP. Last revised: [see crypt.h]

The encryption/decryption parts of this source code (as opposed to the
non-echoing password parts) were originally written in Europe. The
whole source package can be freely distributed, including from the USA.
(Prior to January 2000, re-export from the US was a violation of US law.)

This encryption code is a direct transcription of the algorithm from
Roger Schlafly, described by Phil Katz in the file appnote.txt. This
file (appnote.txt) is distributed with the PKZIP program (even in the
version without encryption capabilities).

Changes in unzip.c

2007-2008 - Even Rouault - Addition of cpl_unzGetCurrentFileZStreamPos
2007-2008 - Even Rouault - Decoration of symbol names unz* -> cpl_unz*
2007-2008 - Even Rouault - Remove old C style function prototypes
2007-2008 - Even Rouault - Add unzip support for ZIP64

Copyright (C) 2007-2008 Even Rouault

Oct-2009 - Mathias Svensson - Removed cpl_* from symbol names (Even Rouault added them but since this is now moved to a new project (minizip64) I renamed them again).

Oct-2009 - Mathias Svensson - Fixed problem if uncompressed size was > 4G and compressed size was <4G
should only read the compressed/uncompressed size from the Zip64 format if
the size from normal header was 0xFFFFFFFF
Oct-2009 - Mathias Svensson - Applied some bug fixes from paches recived from Gilles Vollant
Oct-2009 - Mathias Svensson - Applied support to unzip files with compression mathod
BZIP2 (bzip2 lib is required)
Patch created by Daniel Borca

Jan-2010 - back to unzip and minizip 1.0 name scheme, with compatibility layer

Copyright (C) 1998 - 2010 Gilles Vollant, Even Rouault, Mathias Svensson

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/unzip.c
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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zlib.3
No license file was found, but licenses were detected in source scan.

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Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/old/Makefile.emx
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/old/os2/Makefile.os2
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/msdos/Makefile.dj2
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/msdos/Makefile.emx
No license file was found, but licenses were detected in source scan.

/* inflate.c -- zlib decompression
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inflate.c
No license file was found, but licenses were detected in source scan.

/* infback.c -- inflate using a call-back interface
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/infback.c
No license file was found, but licenses were detected in source scan.

/* gzlog.h
 Copyright (C) 2004, 2008, 2012 Mark Adler, all rights reserved
 version 2.2, 14 Aug 2012

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 3. This notice may not be removed or altered from any source
 distribution.

 Mark Adler   madler@alumni.caltech.edu
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzlog.h
No license file was found, but licenses were detected in source scan.

/* uncompr.c -- decompress a memory buffer
* Copyright (C) 1995-2003, 2010, 2014, 2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/uncompr.c
No license file was found, but licenses were detected in source scan.

/* inflate.h -- internal inflate state definition
* Copyright (C) 1995-2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inflate.h
No license file was found, but licenses were detected in source scan.

/* zip.h -- IO on .zip files using zlib
Version 1.1, February 14h, 2010
part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

Modifications for Zip64 support
Copyright (C) 2009-2010 Mathias Svensson (http://result42.com)

For more info read MiniZip_info.txt

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misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Changes

See header of zip.h

*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/zip.h
No license file was found, but licenses were detected in source scan.

```
/*
* gzlog.c
* Copyright (C) 2004, 2008, 2012, 2016 Mark Adler, all rights reserved
* For conditions of distribution and use, see copyright notice in gzlog.h
* version 2.2, 14 Aug 2012
*/
```

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzlog.c
No license file was found, but licenses were detected in source scan.

```
/* gzjoin -- command to join gzip files into one gzip file

 Copyright (C) 2004, 2005, 2012 Mark Adler, all rights reserved
 version 1.2, 14 Aug 2012

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    misrepresented as being the original software.
 3. This
notice may not be removed or altered from any source distribution.

 Mark Adler    madler@alumni.caltech.edu
*/
```

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/gzjoin.c
No license file was found, but licenses were detected in source scan.

ZLIB DATA COMPRESSION LIBRARY

zlib 1.2.11 is a general purpose data compression library. All the code is
thread safe. The data format used by the zlib library is described by RFCs
(Request for Comments) 1950 to 1952 in the files
http://tools.ietf.org/html/rfc1950 (zlib format), rfc1951 (deflate format) and
rfc1952 (gzip format).

All functions of the compression library are documented in the file zlib.h
(volunteer to write man pages welcome, contact zlib@gzip.org). A usage example
of the library is given in the file test/example.c which also tests that
the library is working correctly. Another example is given in the file
test/minigzip.c. The compression library itself is composed of all source
files in the root directory.

To compile all files and run the test program, follow the instructions given at
the top of Makefile.in. In short "./configure; make test", and if that goes
well, "make install" should work
for most flavors of Unix. For Windows, use
one of the special makefiles in win32/ or contrib/vstudio/ . For VMS, use
make_vms.com.

Questions about zlib should be sent to <zlib@gzip.org>, or to Gilles Vollant
<info@winimage.com> for the Windows DLL version. The zlib home page is
http://zlib.net/ . Before reporting a problem, please check this site to
verify that you have the latest version of zlib; otherwise get the latest
version and check whether the problem still exists or not.

PLEASE read the zlib FAQ http://zlib.net/zlib_faq.html before asking for help.

Mark Nelson <markn@ieee.org> wrote an article about zlib for the Jan. 1997
issue of Dr. Dobb's Journal; a copy of the article is available at
http://marknelson.us/1997/01/01/zlib-engine/ .

The changes made in version 1.2.11 are documented in the file ChangeLog.

Unsupported third party contributions are provided in directory contrib/ .

zlib is available in Java using the java.util.zip package, documented at
http://java.sun.com/developer/technicalArticles/Programming/compression/
.

A Perl interface to zlib written by Paul Marquess <pmqs@cpan.org> is available
at CPAN (Comprehensive Perl Archive Network) sites, including
http://search.cpan.org/~pmqs/IO-Compress-Zlib/ .

A Python interface to zlib written by A.M. Kuchling <amk@amk.ca> is
available in Python 1.5 and later versions, see
http://docs.python.org/library/zlib.html .

zlib is built into tcl: http://wiki.tcl.tk/4610 .

An experimental package to read and write files in .zip format, written on top
of zlib by Gilles Vollant <info@winimage.com>, is available in the
contrib/minizip directory of zlib.

Notes for some targets:

- For Windows DLL versions, please see win32/DLL_FAQ.txt

- For 64-bit Irix, deflate.c must be compiled without any optimization. With
 -O, one libpng test fails. The test works in 32 bit mode (with the -n32
 compiler flag). The compiler bug has been reported to SGI.

- zlib doesn't work with gcc 2.6.3 on a DEC 3000/300LX under
 OSF/1 2.1 it works
 when compiled with cc.

- On Digital Unix 4.0D (formely OSF/1) on AlphaServer, the cc option -std1 is
 necessary to get gzprintf working correctly. This is done by configure.

- zlib doesn't work on HP-UX 9.05 with some versions of /bin/cc. It works with
 other compilers. Use "make test" to check your compiler.

- gzdopen is not supported on RISCOS or BEOS.

- For PalmOs, see http://palmzlib.sourceforge.net/

Acknowledgments:

The deflate format used by zlib was defined by Phil Katz. The deflate and
zlib specifications were written by L. Peter Deutsch. Thanks to all the
people who reported problems and suggested various improvements in zlib; they
are too numerous to cite here.

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Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

If you use the zlib library in a product, we would appreciate *not* receiving lengthy legal documents to sign. The sources are provided for free but without warranty of any kind. The library has been entirely written by Jean-loup Gailly and Mark Adler; it does not include
third-party code.

If you redistribute modified sources, we would appreciate that you include in the file ChangeLog history information documenting your changes. Please read the FAQ for more information on the distribution of modified source versions.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/README
No license file was found, but licenses were detected in source scan.

/* fitblk.c: example of fitting compressed output to a specified size
Not copyrighted -- provided to the public domain
Version 1.1 25 November 2004 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/fitblk.c
No license file was found, but licenses were detected in source scan.

/* gzread.c -- zlib functions for reading gzip files
* Copyright (C) 2004, 2005, 2010, 2011, 2012, 2013, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzread.c
No license file was found, but licenses were detected in source scan.

/* inftrees.h -- header to use inftrees.c
* Copyright (C) 1995-2005, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inftrees.h
No license file was found, but licenses were detected in source scan.

/* zlib.h -- interface of the 'zlib' general purpose compression library

version 1.2.11, January 15th, 2017

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Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

The data format used by the zlib library is described by RFCs (Request for
Comments) 1950 to 1952 in the files http://tools.ietf.org/html/rfc1950
(zlib format), rfc1951 (deflate format) and rfc1952 (gzip format).
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zlib.h
No license file was found, but licenses were detected in source scan.

/* deflate.c -- compress data using the deflation algorithm
* Copyright (C) 1995-2017 Jean-loup Gailly and Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/deflate.c
No license file was found, but licenses were detected in source scan.

/* zconf.h -- configuration of the zlib compression library
* Copyright (C) 1995-2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):

* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h.in
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zconf.h.cmakein
No license file was found, but licenses were detected in source scan.

/* deflate.h -- internal compression state
* Copyright (C) 1995-2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/deflate.h
No license file was found, but licenses were detected in source scan.

/* minigzip.c -- simulate gzip using the zlib compression library
* Copyright (C) 1995-2006, 2010, 2011, 2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/minigzip.c
No license file was found, but licenses were detected in source scan.

/* gzlib.c -- zlib functions common to reading and writing gzip files
* Copyright (C) 2004-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzlib.c
No license file was found, but licenses were detected in source scan.

/* infcover.c -- test zlib's inflate routines with full code coverage
* Copyright (C) 2011, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/infcover.c
No license file was found, but licenses were detected in source scan.

/* inftrees.c -- generate Huffman trees for efficient decoding
* Copyright (C) 1995-2017 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inftrees.c

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

/* zutil.c -- target dependent utility functions for the compression library
* Copyright (C) 1995-2017 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zutil.c
No license file was found, but licenses were detected in source scan.

/* example.c -- usage example of the zlib compression library
* Copyright (C) 1995-2006, 2011, 2016 Jean-loup Gailly
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/test/example.c
No license file was found, but licenses were detected in source scan.

/*
 Additional tools for Minizip
 Code: Xavier Roche '2004
 License: Same as ZLIB (www.gzip.org)
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/mztools.h
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/mztools.c
No license file was found, but licenses were detected in source scan.

/* trees.c -- output deflated data using Huffman coding
* Copyright (C) 1995-2017 Jean-loup Gailly
* detect_data_type() function provided freely by Cosmin Truta, 2006
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/trees.c
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MiniZip - Copyright (c) 1998-2010 - by Gilles Vollant - version 1.1 64 bits from Mathias Svensson

Introduction

MiniZip 1.1 is built from MiniZip 1.0 by Gilles Vollant (http://www.winimage.com/zLibDll/minizip.html)

When adding ZIP64 support into minizip it would result into risk of breaking compatibility with minizip 1.0.

All possible work was done for compatibility.

Background

When adding ZIP64 support Mathias Svensson found that Even Rouault have added ZIP64
support for unzip.c into minizip for a open source project called gdal (http://www.gdal.org/)

That was used as a starting point. And after that ZIP64 support was added to zip.c
some refactoring and code cleanup was also done.

Changed from MiniZip 1.0 to MiniZip 1.1

---

* Added ZIP64 support for unzip (by Even Rouault)
* Added ZIP64 support for zip (by Mathias Svensson
)
* Reverted some changed that Even Rouault did.
* Bunch of patches received from Gulles Vollant that he received for MiniZip from various users.
* Added unzip patch for BZIP Compression method (patch create by Daniel Borca)
* Added BZIP Compress method for zip
* Did some refactoring and code cleanup

Credits

Gilles Vollant - Original MiniZip author
Even Rouault - ZIP64 unzip Support
Daniel Borca - BZip Compression method support in unzip
Mathias Svensson - ZIP64 zip support
Mathias Svensson - BZip Compression method support in zip

Resources

ZipLayout http://result42.com/projects/ZipFileLayout
Command line tool for Windows that shows the layout and information of the headers in a zip archive.
Used when debugging and validating the creation of zip files using MiniZip64

ZIP App Note http://www.pkware.com/documents/casestudies/APPNOTE.TXT
Zip File specification

Notes.
* To be able to use BZip compression method in
zip64.c or unzip64.c the BZIP2 lib is needed and HAVE_BZIP2 need to be defined.

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3. This notice may
not be removed or altered from any source distribution.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/MiniZip64_info.txt
No license file was found, but licenses were detected in source scan.

/* compress.c -- compress a memory buffer
* Copyright (C) 1995-2005, 2014, 2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/compress.c
No license file was found, but licenses were detected in source scan.

/* gzclose.c -- zlib gzclose() function
* Copyright (C) 2004, 2010 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzclose.c
No license file was found, but licenses were detected in source scan.

/* unzip.h -- IO for uncompress .zip files using zlib
  Version 1.1, February 14h, 2010
  part of the MiniZip project - (http://www.winimage.com/zLibDll/minizip.html)

Copyright (C) 1998-2010 Gilles Vollant (minizip) (http://www.winimage.com/zLibDll/minizip.html)

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For more info read MiniZip_info.txt

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Changes

See header of unzip64.c

*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/contrib/minizip/unzip.h
No license file was found, but licenses were detected in source scan.

/* zran.c -- example of zlib/gzip stream indexing and random access
* Copyright (C) 2005, 2012 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
  Version 1.1 29 Sep 2012 Mark Adler */

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zran.c
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/* inffast.c -- fast decoding
* Copyright (C) 1995-2017 Mark Adler
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*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/inffast.c
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/* crc32.c -- compute the CRC-32 of a data stream
* Copyright (C) 1995-2006, 2010, 2011, 2012, 2016 Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*
* Thanks to Rodney Brown <rbrown64@csc.com.au> for his contribution of faster
* CRC methods: exclusive-oring 32 bits of data at a time, and pre-computing
* tables for updating the shift register in one step with three exclusive-ors
* instead of four steps with four exclusive-ors. This results in about a
* factor of two increase in speed on a Power PC G4 (PPC7455) using gcc -O3.
*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/crc32.c
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/* adler32.c -- compute the Adler-32 checksum of a data stream
* Copyright (C) 1995-2011, 2016 Mark Adler
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*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/adler32.c
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/* zutil.h -- internal interface and configuration of the compression library
* Copyright (C) 1995-2016 Jean-loup Gailly, Mark Adler
* For conditions of distribution and use, see copyright notice in zlib.h
*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/zutil.h
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/* gzguts.h -- zlib internal header definitions for gz* operations
* Copyright (C) 2004, 2005, 2010, 2011, 2012, 2013, 2016 Mark Adler

* For conditions of distribution and use, see copyright notice in zlib.h
*/

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* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/gzguts.h
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/* zpipe.c: example of proper use of zlib's inflate() and deflate()
  Not copyrighted -- provided to the public domain
  Version 1.4 11 December 2005 Mark Adler */

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/examples/zpipe.c
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/* gzappend -- command to append to a gzip file

  Copyright (C) 2003, 2012 Mark Adler, all rights reserved
  version 1.2, 11 Oct 2012

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  Mark Adler   madler@alumni.caltech.edu
*/

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Frequently Asked Questions about zlib

If your question is not there, please check the zlib home page

http://zlib.net/ which may have more recent information.
The lastest zlib FAQ is at http://zlib.net/zlib_faq.html

1. Is zlib Y2K-compliant?

Yes. zlib doesn't handle dates.

2. Where can I get a Windows DLL version?

The zlib sources can be compiled without change to produce a DLL. See the file win32/DLL_FAQ.txt in the zlib distribution. Pointers to the precompiled DLL are found in the zlib web site at http://zlib.net/ .

3. Where can I get a Visual Basic interface to zlib?

See
* http://marknelson.us/1997/01/01/zlib-engine/
* win32/DLL_FAQ.txt in the zlib distribution

4. compress() returns Z_BUF_ERROR.

Make sure that before the call of compress(), the length of the compressed buffer is equal to the available size of the compressed buffer and not zero. For Visual
Basic, check that this parameter is passed by reference ("as any"), not by value ("as long").

5. deflate() or inflate() returns Z_BUF_ERROR.

Before making the call, make sure that avail_in and avail_out are not zero. When setting the parameter flush equal to Z_FINISH, also make sure that avail_out is big enough to allow processing all pending input. Note that a Z_BUF_ERROR is not fatal--another call to deflate() or inflate() can be made with more input or output space. A Z_BUF_ERROR may in fact be unavoidable depending on how the functions are used, since it is not possible to tell whether or not there is more output pending when strm.avail_out returns with zero. See http://zlib.net/zlib_how.html for a heavily annotated example.

6. Where's the zlib documentation (man pages, etc.)?

It's in zlib.h . Examples of zlib usage are in the files test/example.c and test/minigzip.c, with more in examples/ .

7. Why don't you use GNU
autoconf or libtool or ...?

Because we would like to keep zlib as a very small and simple package.
zlib is rather portable and doesn't need much configuration.

8. I found a bug in zlib.

Most of the time, such problems are due to an incorrect usage of zlib.
Please try to reproduce the problem with a small program and send the
corresponding source to us at zlib@gzip.org . Do not send multi-megabyte
data files without prior agreement.

9. Why do I get "undefined reference to gzputc"?

If "make test" produces something like

example.o(.text+0x154): undefined reference to `gzputc'

check that you don't have old files libz.* in /usr/lib, /usr/local/lib or
/usr/X11R6/lib. Remove any old versions, then do "make install".

10. I need a Delphi interface to zlib.

See the contrib/delphi directory in the zlib distribution.

11. Can zlib handle .zip archives?

Not by itself, no. See the directory contrib/minizip in the zlib
distribution.

12.
Can zlib handle .Z files?

No, sorry. You have to spawn an uncompress or gunzip subprocess, or adapt
the code of uncompress on your own.

13. How can I make a Unix shared library?

By default a shared (and a static) library is built for Unix. So:

make distclean
./configure
make

14. How do I install a shared zlib library on Unix?

After the above, then:

make install

However, many flavors of Unix come with a shared zlib already installed. Before going to the trouble of compiling a shared version of zlib and trying to install it, you may want to check if it's already there! If you can #include <zlib.h>, it's there. The -lz option will probably link to it. You can check the version at the top of zlib.h or with the ZLIB_VERSION symbol defined in zlib.h .

15. I have a question about OttoPDF.

We are not the authors of OttoPDF. The real author is on the OttoPDF web site: Joel Hainley, jhainley@myndkryme.com.

16.
Can zlib decode Flate data in an Adobe PDF file?

Yes. See http://www.pdflib.com/ . To modify PDF forms, see http://sourceforge.net/projects/acroformtool/ .

17. Why am I getting this "register_frame_info not found" error on Solaris?

After installing zlib 1.1.4 on Solaris 2.6, running applications using zlib generates an error such as:

ld.so.1: rpm: fatal: relocation error: file /usr/local/lib/libz.so: symbol __register_frame_info: referenced symbol not found

The symbol __register_frame_info is not part of zlib, it is generated by the C compiler (cc or gcc). You must recompile applications using zlib which have this problem. This problem is specific to Solaris. See http://www.sunfreeware.com for Solaris versions of zlib and applications using zlib.

18. Why does gzip give an error on a file I make with compress/deflate?

The compress and deflate functions produce data in the zlib format, which is different and incompatible
with the gzip format. The gz* functions in
zlib on the other hand use the gzip format. Both the zlib and gzip formats use the same compressed data format internally, but have different headers and trailers around the compressed data.

19. Ok, so why are there two different formats?

The gzip format was designed to retain the directory information about a single file, such as the name and last modification date. The zlib format on the other hand was designed for in-memory and communication channel applications, and has a much more compact header and trailer and uses a faster integrity check than gzip.

20. Well that's nice, but how do I make a gzip file in memory?

You can request that deflate write the gzip format instead of the zlib format using deflateInit2(). You can also request that inflate decode the gzip format using inflateInit2(). Read zlib.h for more details.

21. Is zlib thread-safe?

Yes. However any library routines that zlib uses and any application-provided memory allocation routines must also be thread-safe. zlib's gz* functions use stdio library routines, and most of zlib's functions use the library memory allocation routines by default. zlib's *Init* functions allow for the application to provide custom memory allocation routines.

Of course, you should only operate on any given zlib or gzip stream from a single thread at a time.

22. Can I use zlib in my commercial application?

Yes. Please read the license in zlib.h.

23. Is zlib under the GNU license?

No. Please read the license in zlib.h.

24. The license says that altered source versions must be "plainly marked". So what exactly do I need to do to meet that requirement?

You need to change the ZLIB_VERSION and ZLIB_VERNUM #defines in zlib.h. In particular, the final version number needs to be changed to "f", and an identification string should be appended to ZLIB_VERSION. Version numbers x.x.x.f are reserved for modifications to zlib by others than the zlib maintainers. For example, if the version of the base zlib you are altering is "1.2.3.4", then in zlib.h you should change ZLIB_VERNUM to 0x123f, and ZLIB_VERSION to something like "1.2.3.f-zachary-mods-v3". You can also update the version strings in deflate.c and inftrees.c.

For altered source distributions, you should also note the origin and nature of the changes in zlib.h, as well as in ChangeLog and README, along with the dates of the alterations. The origin should include at least your name (or your company's name), and an email address to contact for help or issues with the library.

Note that distributing a compiled zlib library along with zlib.h and zconf.h is also a source distribution, and so you should change ZLIB_VERSION and ZLIB_VERNUM and note the origin and nature of the changes

in zlib.h as you would for a full source distribution.

25.
Will zlib work on a big-endian or little-endian architecture, and can I exchange compressed data between them?

Yes and yes.

26. Will zlib work on a 64-bit machine?

Yes. It has been tested on 64-bit machines, and has no dependence on any data types being limited to 32-bits in length. If you have any difficulties, please provide a complete problem report to zlib@gzip.org

27. Will zlib decompress data from the PKWare Data Compression Library?

No. The PKWare DCL uses a completely different compressed data format than does PKZIP and zlib. However, you can look in zlib's contrib/blast directory for a possible solution to your problem.

28. Can I access data randomly in a compressed stream?

No, not without some preparation. If when compressing you periodically use Z_FULL_FLUSH, carefully write all the pending data at those points, and keep an index of those locations, then you can start decompression at those points. You have to be
careful to not use Z_FULL_FLUSH too often, since it can significantly degrade compression. Alternatively, you can scan a deflate stream once to generate an index, and then use that index for random access. See examples/zran.c .

29. Does zlib work on MVS, OS/390, CICS, etc.?

It has in the past, but we have not heard of any recent evidence. There were working ports of zlib 1.1.4 to MVS, but those links no longer work. If you know of recent, successful applications of zlib on these operating systems, please let us know. Thanks.

30. Is there some simpler, easier to read version of inflate I can look at to understand the deflate format?

First off, you should read RFC 1951. Second, yes. Look in zlib's contrib/puff directory.

31. Does zlib infringe on any patents?

As far as we know, no. In fact, that was originally the whole point behind zlib. Look here for some more information:

http://www.gzip.org/#faq11

32. Can zlib work
with greater than 4 GB of data?

Yes. inflate() and deflate() will process any amount of data correctly.
Each call of inflate() or deflate() is limited to input and output chunks
of the maximum value that can be stored in the compiler's "unsigned int"
type, but there is no limit to the number of chunks. Note however that the
strm.total_in and strm_total_out counters may be limited to 4 GB. These
counters are provided as a convenience and are not used internally by
inflate() or deflate(). The application can easily set up its own counters
updated after each call of inflate() or deflate() to count beyond 4 GB.
compress() and uncompress() may be limited to 4 GB, since they operate in a
single call. gzseek() and gztell() may be limited to 4 GB depending on how
zlib is compiled. See the zlibCompileFlags() function in zlib.h.

The word "may" appears several times above since there is a 4 GB limit only
if the compiler's "long" type is
32 bits. If the compiler's "long" type is
64 bits, then the limit is 16 exabytes.

33. Does zlib have any security vulnerabilities?

The only one that we are aware of is potentially in gzprintf(). If zlib is
compiled to use sprintf() or vsprintf(), then there is no protection
against a buffer overflow of an 8K string space (or other value as set by
gzbuffer()), other than the caller of gzprintf() assuring that the output
will not exceed 8K. On the other hand, if zlib is compiled to use
snprintf() or vsnprintf(), which should normally be the case, then there is
no vulnerability. The ./configure script will display warnings if an
insecure variation of sprintf() will be used by gzprintf(). Also the
zlibCompileFlags() function will return information on what variant of
sprintf() is used by gzprintf().

If you don't have snprintf() or vsnprintf() and would like one, you can
find a portable implementation here:

http://www.ijs.si/software/snprintf/

Note that you should be using the most recent version of zlib. Versions
1.1.3 and before were subject to a double-free vulnerability, and versions
1.2.1 and 1.2.2 were subject to an access exception when decompressing
invalid compressed data.

34. Is there a Java version of zlib?

Probably what you want is to use zlib in Java. zlib is already included as part of the Java SDK in the java.util.zip package. If you really want a version of zlib written in the Java language, look on the zlib home page for links: http://zlib.net/ .

35. I get this or that compiler or source-code scanner warning when I crank it up to maximally-pedantic. Can't you guys write proper code?

Many years ago, we gave up attempting to avoid warnings on every compiler in the universe. It just got to be a waste of time, and some compilers were downright silly as well as contradicted each other. So now, we simply make sure that the code always
works.

36. Valgrind (or some similar memory access checker) says that deflate is performing a conditional jump that depends on an uninitialized value. Isn't that a bug?

No. That is intentional for performance reasons, and the output of deflate is not affected. This only started showing up recently since zlib 1.2.x uses malloc() by default for allocations, whereas earlier versions used calloc(), which zeros out the allocated memory. Even though the code was correct, versions 1.2.4 and later was changed to not stimulate these checkers.

37. Will zlib read the (insert any ancient or arcane format here) compressed data format?

Probably not. Look in the comp.compression FAQ for pointers to various formats and associated software.

38. How can I encrypt/decrypt zip files with zlib?

zlib doesn't support encryption. The original PKZIP encryption is very weak and can be broken with freely available programs. To get strong encryption,
use GnuPG, http://www.gnupg.org/ , which already includes zlib compression. For PKZIP compatible "encryption", look at http://www.info-zip.org/

39. What's the difference between the "gzip" and "deflate" HTTP 1.1 encodings?

"gzip" is the gzip format, and "deflate" is the zlib format. They should probably have called the second one "zlib" instead to avoid confusion with the raw deflate compressed data format. While the HTTP 1.1 RFC 2616 correctly points to the zlib specification in RFC 1950 for the "deflate" transfer encoding, there have been reports of servers and browsers that incorrectly produce or expect raw deflate data per the deflate

specification in RFC 1951, most notably Microsoft. So even though the "deflate" transfer encoding using the zlib format would be the more efficient approach (and in fact exactly what the zlib format was designed for), using the "gzip" transfer encoding is probably more reliable due to an
unfortunate choice of name on the part of the HTTP 1.1 authors.

Bottom line: use the gzip format for HTTP 1.1 encoding.

40. Does zlib support the new "Deflate64" format introduced by PKWare?

No. PKWare has apparently decided to keep that format proprietary, since they have not documented it as they have previous compression formats. In any case, the compression improvements are so modest compared to other more modern approaches, that it's not worth the effort to implement.

41. I'm having a problem with the zip functions in zlib, can you help?

There are no zip functions in zlib. You are probably using minizip by Giles Vollant, which is found in the contrib directory of zlib. It is not part of zlib. In fact none of the stuff in contrib is part of zlib. The files in there are not supported by the zlib authors. You need to contact the authors of the respective contribution for help.

42. The match.asm code in contrib is under the GNU General Public License.
Since it's part of zlib, doesn't that mean that all of zlib falls under the GNU GPL?

No. The files in contrib are not part of zlib. They were contributed by other authors and are provided as a convenience to the user within the zlib distribution. Each item in contrib has its own license.

43. Is zlib subject to export controls? What is its ECCN?

zlib is not subject to export controls, and so is classified as EAR99.

44. Can you please sign these lengthy legal documents and fax them back to us so that we can use your software in our product?

No. Go away. Shoo.

Found in path(s):
* /zlib-1-2-11-dfsg-orig-2-tar-gz/zlib-1.2.11.dfsg/FAQ

1.382 libnpmexec 8.1.3

1.382.1 Available under license :

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1.383 xorg 7.7+23ubuntu2

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Source Package: xorg
Debian/Ubuntu package authors: Branden Robinson, Fabio M. Di Nitto, Daniel
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1.384 debconf 1.5.79ubuntu1

1.384.1 Available under license :

Format: https://www.debian.org/doc/packaging-manuals/copyright-format/1.0/

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1.385 mawk 1.3.4.20200120-3

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1.386 swagger-annotations 1.5.3

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import java.lang.annotation.ElementType;
import java.lang.annotation.Retention;
import java.lang.annotation.RetentionPolicy;
import java.lang.annotation.Target;

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* License metadata available within the info section of a Swagger definition, see
* https://github.com/swagger-api/swagger-spec/blob/master/versions/2.0.md#licenseObject
*
* @since 1.5.0
```

```
 */

@Target(ElementType.ANNOTATION_TYPE)
@Retention(RetentionPolicy.RUNTIME)
public @interface License {

  /**
   * The name of the license.
   *
   * @return the name of the license
   */
  String name();

  /**
   * An optional URL for the license.
   *
   * @return an optional URL for the license.
   */
  String url() default "";
}
```

1.387 annotations 16.0.3

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1.389 libxcrypt 1:4.4.27-1

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File: aclocal.m4 (only for ICU4C)
Section: pkg.m4 - Macros to locate and utilise pkg-config.

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* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/analysis/Frame.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/ConstantAttribute.java

* /javassist-3-30-2-ga-sources-jar/javassist/compiler/ast/MethodDecl.java
* /javassist-3-30-2-ga-sources-jar/javassist/tools/web/BadHttpRequest.java
* /javassist-3-30-2-ga-sources-jar/javassist/tools/rmi/ObjectImporter.java
*
 /javassist-3-30-2-ga-sources-jar/javassist/bytecode/analysis/MultiArrayType.java
* /javassist-3-30-2-ga-sources-jar/javassist/runtime/Desc.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/BadBytecode.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/analysis/Subroutine.java
* /javassist-3-30-2-ga-sources-jar/javassist/runtime/Cflow.java
* /javassist-3-30-2-ga-sources-jar/javassist/tools/rmi/StubGenerator.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/MemberResolver.java
* /javassist-3-30-2-ga-sources-jar/javassist/ByteArrayClassPath.java
* /javassist-3-30-2-ga-sources-jar/javassist/convert/TransformBefore.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/NoSuchClassError.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/ExceptionsAttribute.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/ClassFilePrinter.java
* /javassist-3-30-2-ga-sources-jar/javassist/tools/web/Webserver.java
*
 /javassist-3-30-2-ga-sources-jar/javassist/CodeConverter.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/LocalVariableTypeAttribute.java
* /javassist-3-30-2-ga-sources-jar/javassist/expr/ExprEditor.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/ClassFile.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/ast/DoubleConst.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/ast/Stmnt.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtField.java
* /javassist-3-30-2-ga-sources-jar/javassist/util/proxy/FactoryHelper.java
* /javassist-3-30-2-ga-sources-jar/javassist/tools/rmi/ObjectNotFoundException.java
* /javassist-3-30-2-ga-sources-jar/javassist/ClassPool.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtBehavior.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtConstructor.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtClass.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/ast/ASTList.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtMethod.java
*
 /javassist-3-30-2-ga-sources-jar/javassist/bytecode/analysis/IntQueue.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/JvstCodeGen.java
* /javassist-3-30-2-ga-sources-jar/javassist/util/HotSwapAgent.java
* /javassist-3-30-2-ga-sources-jar/javassist/util/proxy/MethodHandler.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/AnnotationsAttribute.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtMember.java
* /javassist-3-30-2-ga-sources-jar/javassist/ClassMap.java
* /javassist-3-30-2-ga-sources-jar/javassist/convert/Transformer.java
* /javassist-3-30-2-ga-sources-jar/javassist/util/proxy/ProxyObjectInputStream.java
* /javassist-3-30-2-ga-sources-jar/javassist/CtNewConstructor.java
* /javassist-3-30-2-ga-sources-jar/javassist/tools/reflect/Metalevel.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/ast/CastExpr.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/analysis/Type.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/AnnotationImpl.java

*
 /javassist-3-30-2-ga-sources-jar/javassist/bytecode/CodeAnalyzer.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/KeywordTable.java
* /javassist-3-30-2-ga-sources-jar/javassist/compiler/ast/CallExpr.java
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Found in path(s):
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/ArrayMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/IntegerMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/CharMemberValue.java
*
 /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/FloatMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/MemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/MemberValueVisitor.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/StringMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/ShortMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/AnnotationMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/ByteMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/LongMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/EnumMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/ClassMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/Annotation.java
*
 /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/BooleanMemberValue.java
* /javassist-3-30-2-ga-sources-jar/javassist/bytecode/annotation/DoubleMemberValue.java

1.392 packaging 23.3.dev0

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1.393 ci-info 4.0.0

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1.394 diffutils 1:3.8-0ubuntu2

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1.395 usrmerge 25ubuntu2

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1.399 streadway-amqp 0.0.0-20190404075320-75d898a42a94

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1.403 commons-compress 1.28.0

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1.404 mute-stream 1.0.0

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Python was created in the early 1990s by Guido van Rossum at Stichting
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as a successor of a language called ABC. Guido remains Python's
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for
National Research Initiatives (CNRI, see http://www.cnri.reston.va.us)
in Reston, Virginia where he released several versions of the
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In May 2000, Guido and the Python core development team moved to
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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no

2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
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Julian Seward, jseward@bzip.org
bzip2/libbzip2 version 1.0.6 of 6 September 2010

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1.407 debug 4.3.5

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1.411 ncurses 6.3-2ubuntu0.1

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* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/NumberType.java
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/DateType.java
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/DoubleType.java
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/LanguageType.java
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/MaxInclusiveFacet.java
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/ByteType.java
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/xsd/EntityType.java
No license file was found, but licenses were detected in source scan.

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Found in path(s):
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/regexp/message_fr.properties
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/regexp/message_ja.properties
* /xsdlib-2013-6-1-sources-2-jar/com/sun/msv/datatype/regexp/message.properties

1.418 distlib 0.2.8

1.418.1 Available under license :

A. HISTORY OF THE SOFTWARE
==========

Python was created in the early 1990s by Guido van Rossum at Stichting
Mathematisch Centrum (CWI, see http://www.cwi.nl) in the Netherlands
as a successor of a language called ABC. Guido remains Python's
principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for
National Research Initiatives (CNRI, see http://www.cnri.reston.va.us)

in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see http://www.zope.com). In 2001, the Python Software Foundation (PSF, see http://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see http://www.opensource.org for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
2.3.1	2.3	2002-2003	PSF	yes
2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes
2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
2.5	2.4	2006	PSF	yes

2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
2.6	2.5	2008	PSF	yes
2.6.1	2.6	2008	PSF	yes
2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
2.6.4	2.6.3	2009	PSF	yes
2.6.5	2.6.4	2010	PSF	yes
3.0	2.6	2008	PSF	yes
3.0.1	3.0	2009	PSF	yes
3.1	3.0.1	2009	PSF	yes
3.1.1	3.1	2009	PSF	yes
3.1.2	3.1	2010	PSF	yes
3.2	3.1	2010	PSF	yes

Footnotes:

(1) GPL-compatible doesn't mean that we're distributing Python under the GPL. All Python licenses, unlike the GPL, let you distribute a modified version without making your changes open source. The GPL-compatible licenses make it possible to combine Python with other software that is released under the GPL; the others don't.

(2) According to Richard Stallman, 1.6.1 is not GPL-compatible, because its license has a choice of law clause. According to CNRI, however, Stallman's lawyer has told CNRI's lawyer that 1.6.1 is "not incompatible" with the GPL.

Thanks to the many outside volunteers who have worked under Guido's direction to make these releases possible.

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======================
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======================

The Distutils2 project was started by Tarek Ziad and is currently
maintained by ric Araujo. Many people have contributed to the project.

distlib has started off using some of the code from distutil2.

If you're making a patch, please add your name below in alphabetical order,
and welcome into the Fellowship of the Packaging!

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1.435 libpkit 0.24.0-6build1

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This gmp package was built for Debian by

 Steve M. Robbins <smr@debian.org>
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That's all there is to it!

1.440 cobra v1.4.0

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1.441 jetty-security 9.4.18.v20190429

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org.mortbay.jasper:apache-jsp

org.apache.tomcat:tomcat-jasper
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org.apache.tomcat:tomcat-jsp-api
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org.eclipse.jetty.toolchain:jetty-schemas

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uses the
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Otherwise, if the work is a derivative of the Library, you may distribute the
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Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

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the work with the complete corresponding
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The "source code" for a work means the preferred form of the work for making modifications to it. "Object code" means any non-source form of a work.

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1.446 perl 5.34.0-3ubuntu1.5

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[input]
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Julian Seward, jseward@acm.org
bzip2/libbzip2 version 1.0.8 of 13 July 2019

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<one line to give the program's name and a brief idea of what it does.>
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  Gnomovision version 69, Copyright (C) 19xx name of author
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commands you use may be called something other than `show w' and `show
c'; they could even be mouse-clicks or menu items--whatever suits your
program.

You should also get your employer (if you work as a programmer) or your
school, if any, to sign a "copyright disclaimer" for the program, if
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 program `Gnomovision' (a program to direct compilers to make passes
 at assemblers) written by James Hacker.

 <signature of Ty Coon>, 1 April 1989
 Ty Coon, President of Vice

That's all there is to it!
#!perl

=head1 NAME

copyright.t

=head1 DESCRIPTION

Tests that the latest copyright years in the top-level README file and the

```
C<perl -v> output match each other.

If the test fails, update at least one of README and perl.c so that they match
reality.

Optionally you can pass the C<--now> option to check they are at the current
year. This isn't checked by default, so that it doesn't fail for people
working on older releases. It should be run before making a new release.

=cut

use strict;
use Config;
BEGIN { require './test.pl' }

if ( $Config{usecrosscompile} ) {
 skip_all( "Not all files are available during cross-compilation" );
}

my ($opt) = @ARGV;

my $readme_year = readme_year();
my $v_year = v_year();

# Check that both copyright dates are up-to-date, but only if requested, so
# that tests still pass for people intentionally working on older versions:
if ($opt eq '--now')
{
 my $current_year = (gmtime)[5] + 1900;
 is $v_year, $current_year, 'perl -v copyright includes current
 year';
 is $readme_year, $current_year, 'README copyright includes current year';
}

# Otherwise simply check that the two copyright dates match each other:
else
{
 is $readme_year, $v_year, 'README and perl -v copyright dates match';
}

done_testing;


sub readme_year
# returns the latest copyright year from the top-level README file
{

 open my $readme, '<', '../README' or die "Opening README failed: $!";
```

```
 # The copyright message is the first paragraph:
 local $/ = '';
 my $copyright_msg = <$readme>;

 my ($year) = $copyright_msg =~ /.*\b(\d{4,})/s
    or die "Year not found in README copyright message '$copyright_msg'";

 $year;
}


sub v_year
# returns the latest copyright year shown in perl -v
{

 my $output = runperl switches => ['-v'];
 my ($year) = $output =~ /copyright 1987.*\b(\d{4,})/i
    or die "Copyright statement not found in perl -v output '$output'";

 $year;
}
```

1.447 java-common 0.72build2

1.447.1 Available under license :

```
Format: https://www.debian.org/doc/packaging-manuals/copyright-format/1.0/
Upstream-Name: Java Common
Upstream-Contact: Debian Java Team <debian-java@lists.debian.org>

Files: *
Copyright: 2000, Stephane Bortzmeyer <bortzmeyer@debian.org>
        2001-2003, Ola Lundqvist <opal@debian.org>
        2003, Stefan Gybas <sgybas@debian.org>
        2005, Arnaud Vandyck <avdyk@debian.org>
        2006-2008, Michael Koch <konqueror@gmx.de>
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1.448 packaging 19.0

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1.449 init-package-json 6.0.3

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1.450 node-gyp 10.1.0

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elements; automatically closes elements with optional end tags; and can
handle mismatched inline element tags.

NekoHTML is written using the Xerces Native Interface (XNI) that is the
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---
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Mesa 3-D
graphics library

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== Authors ==

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There have been many other contributors; see the attributions in the
version-control history to learn more.

tree/openbsd-reallocarray.c

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```
## ASM Bytecode Manipulation Framework v6.0

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</pre>

1.457 go-toml 1.9.4

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localtime.go, localtime_test.go:

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* Renamed files from civil* to localtime*.
* Package changed from civil to toml.
* 'Local' prefix added to all structs.
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1.458 free-type 2.13.2

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# Files that don't get a copyright, or which are taken from elsewhere.
#
# All lines in this file are patterns (relative to the top-level directory),
# including the comment lines; this means that e.g. `FTL.TXT' matches all
# files that have this string in the file name (including the path relative
# to the current directory, always starting with `./').
#
# Don't put empty lines into this file!
#
```

builds/unix/pkg.m4
#
docs/FTL.TXT
docs/GPLv2.TXT
#
include/freetype/internal/fthash.h
#
src/base/fthash.c
src/base/md5.c
src/base/md5.h
#
src/bdf/bdf.c
src/bdf/bdf.h
src/bdf/bdfdrivr.c
src/bdf/bdfdrivr.h
src/bdf/bdferror.h
src/bdf/bdflib.c
src/bdf/module.mk
src/bdf/README
src/bdf/rules.mk
#
src/pcf/module.mk
src/pcf/pcf.c
src/pcf/pcf.h
src/pcf/pcfdrivr.c
src/pcf/pcfdrivr.h
src/pcf/pcferror.h
src/pcf/pcfread.c
src/pcf/pcfread.h
src/pcf/pcfutil.c
src/pcf/pcfutil.h
src/pcf/README
src/pcf/rules.mk
#
src/gzip/adler32.c
src/gzip/ftzconf.c
src/gzip/infblock.c
src/gzip/infblock.h
src/gzip/infcodes.c
src/gzip/infcodes.h
src/gzip/inffixed.h
src/gzip/inflate.c
src/gzip/inftrees.c
src/gzip/inftrees.h
src/gzip/infutil.c
src/gzip/infutil.h
src/gzip/zconf.h
src/gzip/zlib.h

src/gzip/zutil.c
src/gzip/zutil.h
#
src/tools/apinames.c
src/tools/ftrandom/ftrandom.c
#
subprojects/dlg
#
#
EOF

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1.462 golang-jwt 4.4.2

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1.463 minipass 5.0.0

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1.464 perl 5.34.0-3ubuntu1.5

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Julian Seward, jseward@acm.org
bzip2/libbzip2 version 1.0.8 of 13 July 2019

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This is free software, and you are welcome to redistribute it
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program `Gnomovision' (a program to direct compilers to make passes
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<signature of Ty Coon>, 1 April 1989
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 at assemblers) written by James Hacker.

 <signature of Ty Coon>, 1 April 1989
 Ty Coon, President of Vice

That's all there is to it!
#!perl

=head1 NAME

copyright.t

=head1 DESCRIPTION

Tests that the latest copyright years in the top-level README file and the
C<perl -v> output match each other.

If the test fails, update at least one of README and perl.c so that they match
reality.

Optionally you can pass the C<--now> option to check they are at the current
year. This isn't checked by default, so that it doesn't fail for people
working on older releases. It should be run before making a new release.

=cut

use strict;
use Config;
BEGIN { require './test.pl' }

if ($Config{usecrosscompile}) {
 skip_all("Not all files are available during cross-compilation");
}

my ($opt) = @ARGV;

my $readme_year = readme_year();
my $v_year = v_year();

Check that both copyright dates are up-to-date, but only if requested, so

```
# that tests still pass for people intentionally working on older versions:
if ($opt eq '--now')
{
 my $current_year = (gmtime)[5] + 1900;
 is $v_year, $current_year, 'perl -v copyright includes current
 year';
 is $readme_year, $current_year, 'README copyright includes current year';
}

# Otherwise simply check that the two copyright dates match each other:
else
{
 is $readme_year, $v_year, 'README and perl -v copyright dates match';
}

done_testing;


sub readme_year
# returns the latest copyright year from the top-level README file
{

 open my $readme, '<', '../README' or die "Opening README failed: $!";

 # The copyright message is the first paragraph:
 local $/ = '';
 my $copyright_msg = <$readme>;

 my ($year) = $copyright_msg =~ /.*\b(\d{4,})/s
    or die "Year not found in README copyright message '$copyright_msg'";

 $year;
}


sub v_year
# returns the latest copyright year shown in perl -v
{

 my $output = runperl switches => ['-v'];
 my ($year) = $output =~ /copyright 1987.*\b(\d{4,})/i
    or die "Copyright statement not found in perl -v output '$output'";

 $year;
}
```

1.465 aspectj-tools 1.8.13

1.465.1 Available under license :

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1.467 koanf 2.0.1

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1.470 ratelimitj-inmemory 0.4.0

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1.471 equinox 1.8.13

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1.473 ignore-walk 6.0.5

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1.474 log4j-slf4j2-impl 2.22.1

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1.476 @tufjs/canonical-json 2.0.0

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1.477 x-net 0.25.0

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1.478 json-parse-even-better-errors 3.0.2

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1.479 sigstore 2.3.1

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1.480 x-sync 0.8.0

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1.481 stax 4.2.1

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1.482 json-stringify-nice 1.1.4

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1.483 @npmcli/query 3.1.0

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1.484 apache-log4j 2.22.1

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1.486 scala 2.13.10

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SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.
not-a-legal-formal-parameter-tuple.scala:2: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple2,
    or consider a pattern matching anonymous function: `{ case (a, b) => ... }
 val x: ((Int, Int) => Int) = (((a, b)) => a)

```
                        ^
not-a-legal-formal-parameter-tuple.scala:3: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple2,
    or consider a pattern matching anonymous function: `{ case (param1, param2) => ... }
 val y: ((Int, Int, Int) => Int) = (((a, !!)) => a)
                          ^
not-a-legal-formal-parameter-tuple.scala:4: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the
 Tuple3,
    or consider a pattern matching anonymous function: `{ case (param1, ..., param3) => ... }
 val z: ((Int, Int, Int) => Int) = (((a, NotAPatternVariableName, c)) => a)
                          ^
3 errors
```

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1.488 ms 2.1.3

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Files:
man/mdX.3
src/helper.c

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Files:
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src/md4.c
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Todd C. Miller
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This code implements the MD4 message-digest algorithm.
The algorithm is due to Ron Rivest. This code was
written by Colin Plumb in 1993, no copyright is claimed.
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Todd C. Miller modified the MD5 code to do MD4 based on RFC 1186.

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src/md5.c
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1.497 tiny-relative-date 1.3.0

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1.498 antlr 3.5.3

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*/

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/
parserMembers() ::= <<
protected DebugTreeAdaptor adaptor =
  new DebugTreeAdaptor(null,new CommonTreeAdaptor());
public void setTreeAdaptor(TreeAdaptor adaptor) {
  this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
}
public TreeAdaptor getTreeAdaptor()
 {
  return adaptor;
}<\n>
>>

parserCtorBody() ::= <<
>>

createListenerAndHandshake() ::= <<
<super.createListenerAndHandshake()>
>>

ctorForPredefinedListener() ::= <<
>>

@rewriteElement.pregen() ::= ""
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/C/ASTDbg.stg
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```
/*
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```

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*/
/** Add an adaptor property that knows how to build trees */
@headerFile.members() ::= <<
/* @headerFile.members() */
pANTLR3_BASE_TREE_ADAPTOR adaptor;
pANTLR3_VECTOR_FACTORY vectors;
/* End @headerFile.members() */
>>

/** Install the tree adaptor interface pointer and anything else that
* tree parsers and producers require.
*/
@genericParser.apifuncs() ::= <<
<if(PARSER)>
ADAPTOR = ANTLR3_TREE_ADAPTORNew(instream->tstream->tokenSource->strFactory);<\n>
<endif>
ctx->vectors =
 antlr3VectorFactoryNew(0);
>>

```
@genericParser.cleanup() ::= <<
ctx->vectors->close(ctx->vectors);
<if(PARSER)>
/* We created the adaptor so we must free it
*/
ADAPTOR->free(ADAPTOR);
<endif>
>>

@returnScope.ruleReturnMembers() ::= <<

<super.ASTLabelType()> tree;

>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0;<\n>
>>

ruleInitializations() ::= <<
<super.ruleInitializations()>
root_0 = NULL;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{it | <ASTLabelType> <it.label.text>_tree;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> <it.label.text>_tree;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM
 stream_<it>;}; separator="\n">
>>

/* Note that we defer the actual creation of any rewrite streams we need here and just initialize
* them to NULL. This saves creating huge numbers of rewrite streams that cannot be used as only
* one alt will be taken in a rule, but we are declaring all the streams here. So we define
* a macro that conatins the create code, then use this macro later to check if the stream
* has been created yet. Checking for NULL is almost free in C.
*/
ruleLabelInitializations() ::= <<
<super.ruleLabelInitializations()>
<ruleDescriptor.tokenLabels:{it | <it.label.text>_tree   = NULL;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <it.label.text>_tree   = NULL;}; separator="\n">
```

```
<ruleDescriptor.allTokenRefsInAltsWithRewrites
:{it | stream_<it>   = NULL;
#define CREATE_stream_<it>  if (stream_<it> == NULL) {stream_<it> =
antlr3RewriteRule<rewriteElementType>StreamNewAE(ADAPTOR, RECOGNIZER, (pANTLR3_UINT8)"token
<it>"); \} };
 separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
:{it | stream_<it>   = NULL;
#define CREATE_stream_<it>  if (stream_<it> == NULL) {stream_<it> =
antlr3RewriteRuleSubtreeStreamNewAE(ADAPTOR, RECOGNIZER, (pANTLR3_UINT8)"rule <it>"); \}};
separator="\n">

<if(ruleDescriptor.hasMultipleReturnValues)>
retval.tree  = NULL;
<endif>
>>


/**  a rule label including default value */
ruleLabelInitVal(label) ::= <<
<super.ruleLabelInitVal(...)>
<label.label.text>.tree = NULL;
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<endif>
<endif>
>>

@alt.initializations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));<\n>
<endif>
<endif>
<endif>
>>


// T r a c k i n g  R u l e  E l e m e
```

```
 n t s
//
/** ID but track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<token>;
stream_<token>->add(stream_<token>, <label>, NULL);<if(backtracking)> }<endif><\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>CREATE_stream_<token>; stream_<token>-
>add(stream_<token>, <label>, NULL);<if(backtracking)> }<endif><\n>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>

/**
 rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<rule.name>;
stream_<rule.name>->add(stream_<rule.name>, <label>.tree, NULL);<if(backtracking)> }<endif>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelTrack(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<rule.name>;
stream_<rule.name>->add(stream_<rule.name>, <label>.tree, NULL);<if(backtracking)> }<endif>
>>
```

```
/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelAST(...)>
>>


// RULE REF AST



/** Match ^(label+=TOKEN
 ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>


/* How to accumulate lists when we are doing rewrite tracking...
*/
listLabelTrack(label) ::= <<
/* listLabelTrack(label)
*/
if (list_<label> == NULL)
{
  list_<label>=ctx->vectors->newVector(ctx->vectors);
}
list_<label>->add(list_<label>, <label>.tree, NULL);
>>

/* How to accumulate lists of rule outputs (only allowed with AST
* option but if the user is going to walk the tree, they will want
* all their custom elements from rule returns.
*
* Normally, we use inline structures (which the compiler lays down
* code to copy from heap allocations. However, here we want to accumulate copies
* of the returned structures because we are adding them to a list. This only makes sense if the
* grammar is not rewriting the tree as a tree rewrite only preserves the tree, not the object/structure
* returned from the
 rule. The rewrite will extract the tree pointer. However, if we are not going to
* do a tree re-write, then the user may wish to iterate the structures returned by the rule in
* action code and will expect the user defined returns[] elements to be available when they do this.
* Hence we cannot just preserve the tree that was returned. So, we must copy the local structure and provide
* a function that can free the allocated space. We cannot know how to free user allocated elements and
* presume that the user will know to do this using their own factories for the structures they allocate.
*/
```

```
listLabelAST(label) ::= <<
if (list_<label> == NULL)
{
  list_<label>=ctx->vectors->newVector(ctx->vectors);
}
{
  RETURN_TYPE_<label> * tcopy;

  tcopy = (RETURN_TYPE_<label> *)ANTLR3_MALLOC(sizeof(RETURN_TYPE_<label>)); /* Note no
memory allocation checks! */
  ANTLR3_MEMCPY((void *)(tcopy), (const void *)&<label>, sizeof(RETURN_TYPE_<label>));
  list_<label>->add(list_<label>, (void
 *)tcopy, freeScope);  /* Add whatever the return type is */<\n>
}
>>

// R e w r i t e

rewriteCode(
 alts,
 description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
  referencedWildcardLabels,
  referencedWildcardListLabels,
 rewriteBlockLevel,
 enclosingTreeLevel,
 treeLevel) ::=
<<

/* AST REWRITE
* elements          : <referencedElementsDeep; separator=", ">
* token labels      : <referencedTokenLabels; separator=", ">
* rule labels       : <referencedRuleLabels; separator=", ">
* token list labels : <referencedTokenListLabels; separator=", ">
* rule list labels  : <referencedRuleListLabels; separator=", ">
*/
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) <\n>
<endif>
{
 <rewriteCodeLabelsDecl()>
 <rewriteCodeLabelsInit()>
 root_0       = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
 <prevRuleRootRef()>.tree    = root_0;
```

```
 <alts:rewriteAlt();
 separator="else ">
 <if(TREE_PARSER)>
 <if(rewriteMode)>
 <prevRuleRootRef()>.tree = (<ASTLabelType>)(ADAPTOR->rulePostProcessing(ADAPTOR, root_0));
 INPUT->replaceChildren(INPUT, ADAPTOR->getParent(ADAPTOR, retval.start),
                ADAPTOR->getChildIndex(ADAPTOR, retval.start),
                ADAPTOR->getChildIndex(ADAPTOR, _last),
                retval.tree);
 <endif>
 <endif>
 <prevRuleRootRef()>.tree = root_0; // set result root
 <rewriteCodeLabelsFree()>

}
>>

rewriteCodeLabelsDecl() ::= <<
<referencedTokenLabels
  :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;};
  separator="\n"
>
<referencedTokenListLabels
  :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;};
  separator="\n"
>
<referencedRuleLabels
  :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;};
  separator="\n"
>
<referencedRuleListLabels
  :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;};
  separator="\n"
>
>>

rewriteCodeLabelsInit()
 ::= <<
<referencedTokenLabels
:{it | stream_<it>=antlr3RewriteRule<rewriteElementType>StreamNewAEE(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", <it>);};
separator="\n"
>
<referencedTokenListLabels
:{it | stream_<it>=antlr3RewriteRule<rewriteElementType>StreamNewAEV(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", list_<it>); };
separator="\n"
>
```

```
<referencedRuleLabels
:{it | stream_<it>=antlr3RewriteRuleSubtreeStreamNewAEE(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", <it>.tree != NULL ? <it>.tree : NULL);};
separator="\n"
>
<referencedRuleListLabels
:{it | stream_<it>=antlr3RewriteRuleSubtreeStreamNewAEV(ADAPTOR,  RECOGNIZER,
(pANTLR3_UINT8)"token <it>", list_<it>);};
separator="\n"
>
>>
rewriteCodeLabelsFree() ::= <<
<referencedTokenLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>); };
separator="\n"
>
<referencedTokenListLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
<referencedRuleLabels
:{it
 | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
<referencedRuleListLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
 if ( <referencedElementsDeep:{el | (stream_<el> != NULL && stream_<el>->hasNext(stream_<el>)) };
separator="|| "> )
 {
  <alt>
 }
```

```
 <referencedElementsDeep:{el | if ( stream_<el> != NULL) stream_<el>->reset(stream_<el>);<\n>}>
}<\n>
>>

rewriteClosureBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
 while
 ( <referencedElements:{el | (stream_<el> != NULL && stream_<el>->hasNext(stream_<el>)) }; separator="|| "> )
 {
  <alt>
 }
 <referencedElements:{el | if (stream_<el> != NULL) stream_<el>->reset(stream_<el>);<\n>}>
}<\n>
>>
RewriteEarlyExitException() ::=
<<
CONSTRUCTEX();
EXCEPTION->type         = ANTLR3_REWRITE_EARLY_EXCEPTION;
EXCEPTION->name         = (void *)ANTLR3_REWRITE_EARLY_EXCEPTION_NAME;
>>
rewritePositiveClosureBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
if (<referencedElements:{el | (stream_<el> == NULL || !stream_<el>->hasNext(stream_<el>)) }; separator="|| "> )
{
   <RewriteEarlyExitException()>
}
else
{
 while ( <referencedElements:{el | (stream_<el>->hasNext(stream_<el>)) }; separator="|| "> ) {
  <alt>
 }
 <referencedElements:{el | stream_<el>->reset(stream_<el>);<\n>}>
}
>>

rewriteAlt(a) ::= <<
```

```
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
   <a.alt>
}<\n>
<else>
{
  <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = NULL; /* \<-- rewriteEmptyAlt()) */"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
  <ASTLabelType> root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
  <root:rewriteElement()>
  <children:rewriteElement()>
  ADAPTOR->addChild(ADAPTOR, root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextNode(stream_<label>));<\n>
>>

/**
 Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
```

```
>nextNode(stream_<label>));<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRootToken(ADAPTOR, stream_<label> == NULL ?
NULL : stream_<label>->nextToken(stream_<label>), root_<treeLevel>));<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR,
<createRewriteNodeFromElement(...)>, root_<treeLevel>));<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <createImaginaryNode(tokenType=token,
 ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR,
<createImaginaryNode(tokenType=token, ...)>, root_<treeLevel>));<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule,dup) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<rule> == NULL ? NULL : stream_<rule>-
>nextTree(stream_<rule>));<\n>
>>

rewriteRuleRefRoot(rule,dup) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, stream_<rule> == NULL ? NULL
: stream_<rule>->nextNode(stream_<rule>), root_<treeLevel>));<\n>
```

```
>>

rewriteNodeAction(action)
 ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <action>, root_<treeLevel>));<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, stream_<label> == NULL ? NULL
: stream_<label>->nextNode(stream_<label>), root_<treeLevel>));<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label)
 ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot((<ASTLabelType>)(stream_<label> == NULL
? NULL : stream_<label>->nextNode(stream_<label>), root_<treeLevel>));<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
<terminalOptions.node>New(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
<if(args)>
```

```
#if <length(args)> == 2
 (<ASTLabelType>)ADAPTOR->createTypeTokenText(ADAPTOR, <tokenType>, TOKTEXT(<args; separator=",
">))
#else
 (<ASTLabelType>)ADAPTOR->createTypeText(ADAPTOR, <tokenType>, (pANTLR3_UINT8)<args;
separator=", ">)
#endif

<else>
(<ASTLabelType>)ADAPTOR->createTypeText(ADAPTOR, <tokenType>, (pANTLR3_UINT8)"<tokenType>")
<endif>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args)
 ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(stream_<token>->nextToken(stream_<token>)<if(args)>, <args; separator=",
"><endif>)
<else>
<if(args)> <! must create new node from old !>

#if <length(args)> == 2
ADAPTOR->createTypeTokenText(ADAPTOR, <token>->getType(<token>, TOKTEXT(<token>, <args;
separator=", ">)) /* JIMI */
#else
ADAPTOR->createTypeToken(ADAPTOR, <token>->getType(<token>, <token>, <args; separator=", ">)
#endif

<else>
stream_<token> == NULL ? NULL : stream_<token>->nextNode(stream_<token>)
<endif>
<endif>
>>

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/C/AST.stg
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*/

/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label
* is combined into tokenRef, ruleRef, ...
*/
/** Add a variable to track last
 element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> _last;<\n>
<ASTLabelType> _first_0;<\n>
>>

/** Add a variable to track last element matched */
ruleInitializations() ::= <<
<super.ruleInitializations()>
_last = NULL;<\n>
_first_0 = NULL;<\n>
>>

```
/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType>)_first_0;
if ( ADAPTOR->getParent(ADAPTOR, retval.tree) != NULL && ADAPTOR->isNilNode(ADAPTOR,
ADAPTOR->getParent(ADAPTOR, retval.tree) ) )
{
  retval.tree = (<ASTLabelType>)ADAPTOR->getParent(ADAPTOR, retval.tree);
}
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
_last = (<ASTLabelType>)LT(1);
{
<ASTLabelType>
 _save_last_<treeLevel>;
<ASTLabelType> _first_<treeLevel>;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel>;
<endif>
_save_last_<treeLevel> = _last;
_first_<treeLevel>     = NULL;
<if(!rewriteMode)>
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel> == NULL ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel> == NULL ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<if(backtracking)>}<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( LA(1)==ANTLR3_TOKEN_DOWN ) {
```

```
  MATCHT(ANTLR3_TOKEN_DOWN, NULL);
  <children:element()>
  MATCHT(ANTLR3_TOKEN_UP, NULL);
}
<else>
MATCHT(ANTLR3_TOKEN_DOWN, NULL);
<children:element()>
MATCHT(ANTLR3_TOKEN_UP, NULL);
<endif>
<if(!rewriteMode)>
ADAPTOR->addChild(ADAPTOR, root_<enclosingTreeLevel>,
 root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif>
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
if ( _first_<treeLevel> == NULL ) _first_<treeLevel> = <label>;
<if(backtracking)>}<endif>
<endif>
>>

/** label+=TOKEN auto construct */
```

```
tokenRefAndListLabel(token,label,elementIndex,terminalOptions)
 ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING == 0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate>
 ) {<endif>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupTree(ADAPTOR, <label>);
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)LT(1);
```

```
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING == 0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif><\n>
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}
,...)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode)
 ::= <<
_last = (<ASTLabelType>)LT(1);
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ){<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif>
root_<treeLevel> = (<ASTLabelType>)ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRef(...)>
```

```
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )
{
<endif>
<if(!rewriteMode)>
 ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>.tree);
<else>
 if ( _first_<treeLevel> == NULL ) _first_<treeLevel> = <label>.tree;
<endif>
<if(backtracking)>}<endif>
>>

/**
 x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<super.listLabelAST(elem=label,...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( ( <actions.(actionScope).synpredgate> ) ) <endif>root_<treeLevel> =
(<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>.tree, root_<treeLevel>));
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<super.listLabelAST(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefTrackAndListLabel(...)>
>>
/**
 ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
```

```
_last = (<ASTLabelType>)LT(1);
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>


/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(stream_<token>->nextNode(stream_<token>))
<else>
stream_<token>->nextNode(stream_<token>)
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp(...)>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<if(!ruleDescriptor.isSynPred)>
 retval.stop = LT(-1);<\n>
<endif>
 retval.tree = (<ASTLabelType>)ADAPTOR->rulePostProcessing(ADAPTOR, root_0);
<if(backtracking)>
}
<endif>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
    :{if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
>>
```

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/C/ASTTreeParser.stg
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*/

/** Templates for building ASTs during normal parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* The situation is not too bad as rewrite (->) usage makes ^ and !
* invalid. There is no huge explosion of combinations.
*/

finishedBacktracking(block) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
<endif>
>>

```
@ruleBody.setErrorReturnValue() ::= <<
retval.tree = self._adaptor.errorNode(self.input, retval.start, self.input.LT(-1), re)
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/**
 label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST
```

```
// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate
 that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <%
<super.matchSet(postmatchCode={<finishedBacktracking({self._adaptor.addChild(root_0,
<createNodeFromToken(...)>)})>}, ...)>
%>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
<super.matchSet(postmatchCode={<finishedBacktracking({root_0 =
self._adaptor.becomeRoot(<createNodeFromToken(...)>, root_0)})>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({self._adaptor.addChild(root_0,
 <label>.tree)})>
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
```

```
<super.ruleRef(...)>
<finishedBacktracking({root_0 = self._adaptor.becomeRoot(<label>.tree, root_0)})>
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
self._adaptor.addChild(root_0,
 <label>_tree)
})>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<terminalOptions.node>(<label>) <! new MethodNode(IDLabel) !>
<else>
self._adaptor.createWithPayload(<label>)
```

```
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
self._adaptor.setTokenBoundaries(retval.tree, retval.start, retval.stop)
})>
>>
```

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*/
group AST;

@outputFile.imports() ::= <<
<@super.imports()><if(!TREE_PARSER)><! tree parser would already have imported !>
Antlr.Runtime.Tree,<\n><endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

@genericParser.membersConstructor() ::= <<
<@super.membersConstructor()>
<parserMembersConstructor()>
>>
```

```
@genericParser.membersImplementation()
 ::= <<
<@super.membersImplementation()>
<parserMembersImplementation()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
 strict protected
   FAdaptor: ITreeAdaptor;
   procedure SetAdaptor(const Value: ITreeAdaptor);
   property Adaptor: ITreeAdaptor read FAdaptor;
 public
   property TreeAdaptor: ITreeAdaptor read FAdaptor write SetAdaptor;

>>

parserMembersConstructor() ::= <<
FAdaptor := TCommonTreeAdaptor.Create;
>>

parserMembersImplementation() ::= <<
procedure T<grammar.recognizerName>.SetAdaptor(const Value: ITreeAdaptor);
begin
 FAdaptor := Value;
 <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor := FAdaptor;}>
end;
>>

@returnScope.ruleReturnMembers() ::= <<
function T<grammar.recognizerName>.T<ruleDescriptor:returnStructName()>.GetTree: IANTLRInterface;
begin
 Result := FTree;
end;

procedure T<grammar.recognizerName>.T<ruleDescriptor:returnStructName()>.SetTree(const Value:
IANTLRInterface);
begin
 FTree := Value
 as I<ASTLabelType>;
end;
>>

@returnScopeDeclaration.ruleReturnMembers() ::= <<
strict private
 FTree: I<ASTLabelType>;
protected
 { IRuleReturnScope }
```

```
 function GetTree: IANTLRInterface; override;
 procedure SetTree(const Value: IANTLRInterface); override;
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
Root[0] := nil;<\n>
>>

ruleDeclarationVars() ::= <<
<super.ruleDeclarationVars()>
Root: array [0..63] of I<ASTLabelType>;
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{<it.label.text>_tree := nil;}; separator="\n">
<ruleDescriptor.tokenListLabels:{<it.label.text>_tree := nil;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites:{Locals['Stream_<it>'] :=
TRewriteRule<rewriteElementType>Stream.Create(Adaptor,'token <it>');}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites:{Locals['Stream_<it>'] :=
TRewriteRuleSubtreeStream.Create(Adaptor,'rule <it>');}; separator="\n">
>>

ruleLabelDefVars()
 ::= <<
<super.ruleLabelDefVars()>
<ruleDescriptor.tokenLabels:{<it.label.text>_tree: I<ASTLabelType>;}; separator="\n">
<ruleDescriptor.tokenListLabels:{<it.label.text>_tree: I<ASTLabelType>;}; separator="\n">
>>
/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
Root[0] := Adaptor.GetNilNode as I<ASTLabelType>;
<endif>
<endif>
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s
```

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<token>'] as
IRewriteRuleElementStream).Add(<label>);<\n>
>>

/** ids+=ID and track
 it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<token>'] as
IRewriteRuleElementStream).Add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<rule.name>'] as
IRewriteRuleElementStream).Add(<label>.Tree);<\n>
>>

/**
 x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** ^(rule ...) rewrite */
```

```
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<rule>'] as
IRewriteRuleElementStream).Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem=label+".Tree",...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST
 REWRITE
// elements:          <referencedElementsDeep; separator=", ">
// token labels:      <referencedTokenLabels; separator=", ">
// rule labels:       <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels:  <referencedRuleListLabels; separator=", ">
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<prevRuleRootRef()>.Tree := Root[0];
<rewriteCodeLabels()>
Root[0] := Adaptor.GetNilNode as I<ASTLabelType>;
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.rulePostProcessing(root[0]);
input.ReplaceChildren(adaptor.GetParent(retval.Start),
                      adaptor.GetChildIndex(retval.Start),
                      adaptor.GetChildIndex(_last),
```

```
                retval.Tree);
<endif>
<endif>
<! if parser or rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.Tree
 := Root[0];<\n>
<endif>
<if(!rewriteMode)>
<prevRuleRootRef()>.Tree := Root[0];<\n>
<endif>
<if(backtracking)>
end;
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{Locals['Stream_<it>'] := TRewriteRule<rewriteElementType>Stream.Create(Adaptor, 'token <it>', <it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{Locals['Stream_<it>'] := TRewriteRule<rewriteElementType>Stream.Create(Adaptor,'token <it>', list_<it>);};
  separator="\n"
>
<referencedRuleLabels:{
if Assigned(<it>) then
 Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', <it>.Tree)
else
 Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', nil);}; separator="\n">
<referencedRuleListLabels
  :{Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', list_<it>);};
  separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow
 like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
(* <fileName>:<description> *)
if (<referencedElementsDeep:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator="
```

```
or '>) then
begin
 <alt>
end;
<referencedElementsDeep:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset;<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
(* <fileName>:<description> *)
while (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">) do
begin
 <alt>
end;
<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep,
 // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
if (not (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">)) then
 raise ERewriteEarlyExitException.Create('');

while (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">) do
begin
 <alt>
end;
<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
(* <a.description> *)
<if(a.pred)>
if (<a.pred>) then
begin
 <a.alt>
end<\n>
```

```
<else>
begin
 <a.alt>
end;<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "Root[0] = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
(* <fileName>:<description> *)
begin
 Root[<treeLevel>] := Adaptor.GetNilNode as I<ASTLabelType>;
 <root:rewriteElement()>
 <children:rewriteElement()>
 Adaptor.AddChild(Root[<enclosingTreeLevel>],
 Root[<treeLevel>]);
end;<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as
IRewriteRuleElementStream).NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode);<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as
IRewriteRuleElementStream).NextNode(), Root[<treeLevel>]) as I<ASTLabelType>;<\n>
```

```
>>

/**
 Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>, Root[<treeLevel>]) as
I<ASTLabelType>;<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>, Root[<treeLevel>]) as
I<ASTLabelType>;<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
Root[0] = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the
 value of Root[0] right
*  before I set it during rewrites.  The assign will be to retval.Tree.
*/
prevRuleRootRef() ::= "RetVal"

rewriteRuleRef(rule) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<rule>'] as IRewriteRuleElementStream).NextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<rule>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

rewriteNodeAction(action) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
```

```
Root[<treeLevel>] := Adaptor.BecomeRoot(<action>, Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
Adaptor.AddChild(Root[<treeLevel>],
 (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
T<terminalOptions.node>.Create(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
Adaptor.CreateNode(<tokenType>, <args; separator=", "><if(!args)>'<tokenType>'<endif>) as I<ASTLabelType>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create((Locals['Stream_<token>']
 as IRewriteRuleElementStream).NextToken<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
Adaptor.Create(<token>, <args; separator=", ">)
<else>
(Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode
<endif>
<endif>
>>
```

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/Delphi/AST.stg
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*/

csharpVisibilityMap ::= [
 "private":"private",
 "protected":"protected",
 "public":"public",
 "fragment":"private",
 default:"private"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,PARSER,TREE_PARSER, actionScope, actions,
   docComment,
 recognizer,
   name, tokens, tokenNames, rules, cyclicDFAs,
   bitsets, buildTemplate, buildAST, rewriteMode, profile,
   backtracking, synpreds, memoize, numRules,
   fileName, ANTLRVersion, generatedTimestamp, trace,
   scopes, superClass, literals) ::=
<<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------
```

```
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<if(trace)>
#define ANTLR_TRACE
<endif>
<@debugPreprocessor()>
// The variable 'variable' is assigned but its value is never used.
#pragma warning disable 168, 219
// Unreachable code detected.
#pragma warning disable 162
// Missing XML comment for publicly visible type or member
 'Type_or_Member'
#pragma warning disable 1591

<actions.(actionScope).header>

<@imports>
using System.Collections.Generic;
using Antlr.Runtime;
using Antlr.Runtime.Misc;
<if(TREE_PARSER)>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
using ConditionalAttribute = System.Diagnostics.ConditionalAttribute;
<@end>
<if(actions.(actionScope).namespace)>
namespace <actions.(actionScope).namespace>
{
<endif>
<docComment>
<recognizer>
<if(actions.(actionScope).namespace)>

} // namespace <actions.(actionScope).namespace>
<endif>
>>

lexerInputStreamType() ::= <<
<actions.(actionScope).inputStreamType; null="ICharStream">
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Lexer
<endif>}) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
```

```
<parserModifier(grammar=grammar,
 actions=actions)> partial class <grammar.recognizerName> : <@superClassName><superClass><@end>
{
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">
 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.lexer.members>

  // delegates
  <grammar.delegates:
      {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>()<! needed by subclasses !>
 {
  OnCreated();
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
  : this(input, new RecognizerSharedState()<grammar.delegators:{g|,
 <g:delegateName()>}>)
 {
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
  : base(input, state)
 {
<if(memoize)>
<if(grammar.grammarIsRoot)>
  state.ruleMemo = new System.Collections.Generic.Dictionary\<int, int>[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, this.state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this);}; separator="\n">
  <grammar.delegators:
   {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>

  OnCreated();
 }
 public override string GrammarFileName { get { return "<fileName>"; } }

 private static readonly bool[] decisionCanBacktrack = new bool[0];
```

```
<if(grammar.hasDelegates)>
 public override <lexerInputStreamType()> CharStream
 {
  get
  {
   return
 base.CharStream;
  }
  set
  {
   base.CharStream = value;
   <grammar.directDelegates:
    {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
   <grammar.delegators:
    {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
   <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
 }

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
<endif>

<endif>
<if(filterMode)>
 <filteringNextToken()>
<endif>

 [Conditional("ANTLR_TRACE")]
 protected virtual void OnCreated() {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void EnterRule(string ruleName, int ruleIndex) {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void LeaveRule(string ruleName, int ruleIndex) {}

   <rules; separator="\n">

 <insertLexerSynpreds(synpreds)>

 #region
 DFA
 <cyclicDFAs:{dfa | DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">
```

```
 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>(this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif>);}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
 #endregion

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override IToken NextToken()
{
 while (true)
 {
  if (input.LA(1) == CharStreamConstants.EndOfFile)
  {
   IToken eof = new CommonToken((ICharStream)input, CharStreamConstants.EndOfFile, TokenChannels.Default,
input.Index,
 input.Index);
   eof.Line = Line;
   eof.CharPositionInLine = CharPositionInLine;
   return eof;
  }
  state.token = null;
  state.channel = TokenChannels.Default;
  state.tokenStartCharIndex = input.Index;
  state.tokenStartCharPositionInLine = input.CharPositionInLine;
  state.tokenStartLine = input.Line;
  state.text = null;
  try
  {
   int m = input.Mark();
   state.backtracking=1;<! means we won't throw slow exception !>
   state.failed=false;
   mTokens();
   state.backtracking=0;
   <! mTokens backtracks with synpred at backtracking==2
```

```
     and we set the synpredgate to allow actions at level 1. !>
   if (state.failed)
   {
    input.Rewind(m);
    input.Consume();<! advance one char and try again !>
   }
   else
   {
    Emit();
    return state.token;
   }
  }
  catch (RecognitionException re)
  {
   // shouldn't happen in backtracking mode, but...
   ReportError(re);
   Recover(re);
  }
 }
}

public override void Memoize(IIntStream input, int ruleIndex, int ruleStartIndex)
{
 if
 (state.backtracking > 1)
  base.Memoize(input, ruleIndex, ruleStartIndex);
}

public override bool AlreadyParsedRule(IIntStream input, int ruleIndex)
{
 if (state.backtracking > 1)
  return base.AlreadyParsedRule(input, ruleIndex);

 return false;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, inputStreamType, superClass,
            labelType, members, rewriteElementType,
            filterMode, ASTLabelType="object") ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
```

```
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
<if(grammar.grammarIsRoot)>
 internal static readonly string[] tokenNames = new string[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames;
 separator=", ">
 };
<endif>
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">

<if(grammar.delegates)>
 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
<endif>

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }

<if(TREE_PARSER)>
 public override void SetTreeNodeStream(ITreeNodeStream input)
 {
  base.SetTreeNodeStream(input);
  <grammar.delegates:{g|<g:delegateName()>.SetTreeNodeStream(input);}; separator="\n">
 }
<endif>
<endif>

 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <@members()>

 public override
 string[] TokenNames { get { return <grammar.composite.rootGrammar.recognizerName>.tokenNames; } }
 public override string GrammarFileName { get { return "<fileName>"; } }

 <members>
```

```
 [Conditional("ANTLR_TRACE")]
 protected virtual void OnCreated() {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void EnterRule(string ruleName, int ruleIndex) {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void LeaveRule(string ruleName, int ruleIndex) {}

 #region Rules
 <rules; separator="\n">
 #endregion Rules

<if(grammar.delegatedRules)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 #region Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 <ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)>
<ruleDescriptor.name; format="id">(<ruleDescriptor.parameterScope:parameterScope()>) <!throws
RecognitionException !>{ <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name;
 format="id">(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.name;
format="id">}; separator=", "><endif>); \}}; separator="\n">
 #endregion Delegated rules
<endif>

 <insertSynpreds(synpreds)>

<if(cyclicDFAs)>
 #region DFA
 <cyclicDFAs:{dfa | private DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>( this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif> );}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion DFA
<endif>

<if(bitsets)>
 #region Follow sets
 private static class Follow
 {
  <bitsets:{it|<bitset(name={_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}; separator="\n">
 }
```

```
 #endregion Follow sets
<endif>
}
>>

@genericParser.members() ::= <<
#if ANTLR_DEBUG
private static readonly
 bool[] decisionCanBacktrack =
 new bool[]
 {
  false, // invalid decision
  <grammar.decisions:{d | <d.dfa.hasSynPred>}; wrap="\n", separator=", ">
 };
#else
private static readonly bool[] decisionCanBacktrack = new bool[0];
#endif
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
{
}
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : base(input, state)
{
<if(grammar.directDelegates)>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
<endif>
<if(grammar.indirectDelegates)>
 <grammar.indirectDelegates:{g
 | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
<endif>
 <parserCtorBody()>
 OnCreated();
}
>>

// imported grammars are 'public' (can't be internal because their return scope classes must be accessible)
parserModifier(grammar, actions) ::= <<
<if(grammar.grammarIsRoot)><actions.(actionScope).modifier; null="public"><else>public<endif>
>>
```

```
parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new System.Collections.Generic.Dictionary\<int,
int>[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Parser
<endif>},
 labelType="IToken",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="IToken", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Tree.<
if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif><endif>},
        members={<actions.treeparser.members>}) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*
 nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>_fragment() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>_fragment() {}

// $ANTLR start <ruleName>
```

```
<ruleModifier(grammar,ruleDescriptor)> void
<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs()>
 EnterRule_<ruleName>_fragment();
 EnterRule("<ruleName>_fragment", <ruleDescriptor.index>);
 TraceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try
 {
  <block>
 }
 finally
 {
  TraceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule_<ruleName>_fragment();
 }
}
//
 $ANTLR end <ruleName>
>>

insertLexerSynpreds(synpreds) ::= <<
<insertSynpreds(synpreds)>
>>

insertSynpreds(synpreds) ::= <<
<if(synpreds)>
#region Synpreds
private bool EvaluatePredicate(System.Action fragment)
{
 bool success = false;
 state.backtracking++;
 <@start()>
 try { DebugBeginBacktrack(state.backtracking);
 int start = input.Mark();
 try
 {
  fragment();
 }
 catch ( RecognitionException re )
 {
  System.Console.Error.WriteLine("impossible: "+re);
 }
 success = !state.failed;
 input.Rewind(start);
 } finally { DebugEndBacktrack(state.backtracking, success); }
 <@stop()>
```

```
 state.backtracking--;
 state.failed=false;
 return success;
}
#endregion Synpreds
<endif>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if (state.backtracking > 0 && AlreadyParsedRule(input, <ruleDescriptor.index>)) { <returnFromRule()> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnFromRule()><endif>
>>

/**
 This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; <returnFromRule()>}<endif>
>>

ruleWrapperMap ::= [
 "bottomup":{<ruleWrapperBottomup()>},
 "topdown":{<ruleWrapperTopdown()>},
 default:""
]

ruleWrapperBottomup() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Bottomup() { return bottomup(); }
<endif>
>>

ruleWrapperTopdown() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Topdown() { return topdown(); }
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
```

```
<returnScope(ruleDescriptor.returnScope)>

[Conditional("ANTLR_TRACE")]
protected
 virtual void EnterRule_<ruleName>() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>() {}
<ruleWrapperMap.(ruleName)>
// $ANTLR start "<ruleName>"
// <fileName>:<description>
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)> <ruleName;
format="id">(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
 try { DebugEnterRule(GrammarFileName, "<ruleName>");
 DebugLocation(<ruleDescriptor.tree.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 <@preamble()>
 try
 {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch
 (RecognitionException re)
 {
  ReportError(re);
  Recover(input,re);
 <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
```

```
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
      <memoize()>
      <ruleScopeCleanUp()>
      <finally>
   }
 DebugLocation(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 } finally { DebugExitRule(GrammarFileName, "<ruleName>"); }
 <@postamble()>
 <returnFromRule()><\n>
}
// $ANTLR end "<ruleName>"
>>

// imported grammars need to have internal rules
ruleModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>internal<endif>
>>

// imported grammars need to have public return scopes
returnScopeModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
 null="private"><else>public<endif>
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
 <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new <returnType(ruleDescriptor)>();
retval.Start = (<labelType>)input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name; format="id"> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.Index;
<endif>
```

```
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_stack.Push(new <it>_scope());<it>_scopeInit(<it>_stack.Peek());};
separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_stack.Push(new
<it.name>_scope());<it.name>_scopeInit(<it.name>_stack.Peek());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_scopeAfter(<it>_stack.Peek());<it>_stack.Pop();};
 separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_scopeAfter(<it.name>_stack.Peek());<it.name>_stack.Pop();};
separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wil
dcardTreeListLabels]
   :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<ruleDescriptor.tokenListLabels
   :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<[ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it|List\<<ASTLabelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:ruleLabelDef(); separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<[ruleDescriptor.charListLabels,
  ruleDescriptor.charLabels]
 :{it|int <it.label.text> = 0;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.charListLabels:{it|List\<int> list_<it.label.text> = null;}; separator="\n"
>
>>
```

```
returnFromRule() ::= <%
return
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<! This comment is a hack to make sure the following
  single space appears in the output. !> <ruleDescriptor.singleValueReturnName>
<else>
<!!> retval
<endif>
<endif>
<endif>
;
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.Stop = (<labelType>)input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) { Memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the
 lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<

[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>() {}

// $ANTLR start "<ruleName>"
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
```

```
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
  <ruleScopeSetUp()>
  <ruleDeclarations()>
 try
 {
<if(nakedBlock)>
 <ruleMemoization(name=ruleName)>
 <lexerRuleLabelDefs()>
 <ruleDescriptor.actions.init>
 <block>
<else>
 int _type = <ruleName>;
 int _channel = DefaultTokenChannel;
 <ruleMemoization(name=ruleName)>
 <lexerRuleLabelDefs()>
 <ruleDescriptor.actions.init>
 <block>
 <ruleCleanUp()>
 state.type = _type;
 state.channel =
_channel;
 <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
      <ruleScopeCleanUp()>
      <memoize()>
   }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<

public override void mTokens()
{
 <block><\n>
}
>>
```

```
// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterSubRule(<decisionNumber>);
try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
<@prebranch()>
switch
 (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
} finally { DebugExitSubRule(<decisionNumber>); }
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>
```

```
/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/**
 A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  if (cnt<decisionNumber> >= 1)
   goto loop<decisionNumber>;

  <ruleBacktrackFailure()>
  EarlyExitException eee<decisionNumber> = new EarlyExitException( <decisionNumber>, input );
  DebugRecognitionException(eee<decisionNumber>);
  <@earlyExitException()>
  throw eee<decisionNumber>;
 }
 cnt<decisionNumber>++;
}
loop<decisionNumber>:
 ;

}
```

```
 finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch ( alt<decisionNumber> )
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  goto loop<decisionNumber>;
 }
}

loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
 */
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
```

```
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
 <@prealt()>
 DebugEnterAlt(<altNum>);
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(it) ::= <%
<@prematch()>
DebugLocation(<it.line>, <it.pos>);<\n>
<it.el><\n>
%>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={})
 ::= <<
<if(label)><label>=(<labelType>)<endif>Match(input,<token>,Follow._<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

listLabelElem(label,elem,elemType) ::= <<
```

```
if (list_<label>==null) list_<label>=new List\<<elemType; null={<labelType>}>\>();
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<matchSetLabel()>
<endif>
if (<s>)
{
 input.Consume();
 <postmatchCode>
 <if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
}
else
{
 <ruleBacktrackFailure()>
 MismatchedSetException
 mse = new MismatchedSetException(null,input);
 DebugRecognitionException(mse);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,Follow._set_in_<ruleName><elementIndex>);
 !>
<endif>
}<\n>
```

```
>>

matchSetUnchecked(s,label,elementIndex,postmatchCode=false) ::= <%
<if(label)>
<matchSetLabel()><\n>
<endif>
input.Consume();<\n>
<if(postmatchCode)>
<postmatchCode><\n>
<endif>
<if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
%>

matchSetLabel() ::= <%
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=(<labelType>)input.LT(1);
<endif>
%>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/**
 Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <%
<if(label)>
int <label>Start = CharIndex;<\n>
Match(<string>); <checkRuleBacktrackFailure()><\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
%>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
```

```
MatchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex)
 ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(Follow._<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name; format="id">(<args;
separator=", ">);
PopFollow();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem=label,elemType={<ASTLabelType>},...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was
 the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
```

```
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()><\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
%>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/**
 EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
Match(EOF); <checkRuleBacktrackFailure()><\n>
<labelType> <label> = new <labelType>(input, EOF, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
%>

// used for left-recursive rules
recRuleDefArg()                   ::= "int <recRuleArg()>"
recRuleArg()                      ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()          ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"
```

```
/** match ^(root children) in tree parser */
tree(root,
 actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down)
{
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if (!(<evalPredicate(...)>))
{
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges;
 separator="\nelse ">
<if((!isTrue.(last(edges).labelExpr)) && (!last(edges).predicates))>
else
{
<if(eotPredictsAlt)>
 alt<decisionNumber> = <eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
 DebugRecognitionException(nvae);
 <@noViableAltException()>
```

```
 throw nvae;
<endif>
}
<endif>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
 *  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt>;<! if no edges, don't gen ELSE !>
<else>
else
{
 alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
 <targetState>
```

```
}
>>

//
 F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<else>
 {
  <ruleBacktrackFailure()>
  NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
  DebugRecognitionException(nvae);
  <@noViableAltException()>
  throw nvae;
 }
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<endif>
}<\n>
>>
```

```
dfaEdgeSwitch(labels,
 targetState) ::= <<
<labels:{it|case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
try
{
 alt<decisionNumber> = dfa<decisionNumber>.Predict(input);
}
catch (NoViableAltException nvae)
{
 DebugRecognitionException(nvae);
 throw;
}
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa)
 ::= <<
private class DFA<dfa.decisionNumber> : DFA
{
 private const string DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n\t\t\"">";
```

```
 private const string DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n\t\t\"">}>";
 private static readonly string[] DFA<dfa.decisionNumber>_transitionS =
  {
   <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
  };

 private static readonly short[] DFA<dfa.decisionNumber>_eot =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eotS);
 private static readonly short[]
 DFA<dfa.decisionNumber>_eof = DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eofS);
 private static readonly char[] DFA<dfa.decisionNumber>_min =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
 private static readonly char[] DFA<dfa.decisionNumber>_max =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
 private static readonly short[] DFA<dfa.decisionNumber>_accept =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
 private static readonly short[] DFA<dfa.decisionNumber>_special =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_specialS);
 private static readonly short[][] DFA<dfa.decisionNumber>_transition;

 static DFA<dfa.decisionNumber>()
 {
  int numStates = DFA<dfa.decisionNumber>_transitionS.Length;
  DFA<dfa.decisionNumber>_transition = new short[numStates][];
  for ( int i=0; i \< numStates; i++ )
  {
   DFA<dfa.decisionNumber>_transition[i] =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
  }
 }

 public
 DFA<dfa.decisionNumber>( BaseRecognizer recognizer<if(dfa.specialStateSTs)>, SpecialStateTransitionHandler
specialStateTransition<endif> )
<if(dfa.specialStateSTs)>
  : base(specialStateTransition)
<endif>
 {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
  this.accept = DFA<dfa.decisionNumber>_accept;
```

```
 this.special = DFA<dfa.decisionNumber>_special;
 this.transition = DFA<dfa.decisionNumber>_transition;
 }

 public override string Description { get { return "<dfa.description>"; } }

 public override void Error(NoViableAltException nvae)
 {
  DebugRecognitionException(nvae);
 }
}<\n>
<if(dfa.specialStateSTs)>
private int SpecialStateTransition<dfa.decisionNumber>(DFA dfa, int s, IIntStream _input)<! throws
NoViableAltException!>
{
 <if(LEXER)>
 IIntStream input = _input;
 <endif>
 <if(PARSER)>
 ITokenStream
 input = (ITokenStream)_input;
 <endif>
 <if(TREE_PARSER)>
 ITreeNodeStream input = (ITreeNodeStream)_input;
 <endif>
 int _s = s;
 s = -1;
 <! pull these outside the switch cases to save space on locals !>
 int LA<dfa.decisionNumber>_1 = input.LA(1);
 int index<dfa.decisionNumber>_1 = input.Index;
 switch (_s)
 {
 <dfa.specialStateSTs:{state |case <i0>:<! compressed special state numbers 0..n-1 !>
 <state>}; separator="\n">

 default:
  break;
 }

 if (s >= 0)
  return s;

<if(backtracking)>
 if (state.backtracking > 0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae = new NoViableAltException(dfa.Description, <dfa.decisionNumber>, _s, input);
 dfa.Error(nvae);
 throw nvae;
```

```
}
<endif>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
<if(semPredState)>
 <! get next lookahead symbol to test edges, then rewind !>
 input.Rewind();
<endif>
 <edges;
 separator="\nelse ">
<if(semPredState)>
 <! return input cursor to state before we rewound !>
 input.Seek(index<decisionNumber>_1);
<endif>
 break;
}
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"
```

```
evalSynPredicate(pred,description) ::= "EvaluatePredicate(<pred>_fragment)"

lookaheadTest(atom,k,atomAsInt)
 ::= "LA<decisionNumber>_<k>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<k><ge()><lower> && LA<decisionNumber>_<k><le()><upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::=
"(input.LA(<k>)<ge()><lower> && input.LA(<k>)<le()><upper>)"

le() ::= "\<="
ge() ::= ">="

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

attributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected sealed partial class <scope.name>_scope
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
}
<if(scope.actions.scopeinit)>
protected void <scope.name>_scopeInit( <scope.name>_scope scope )
{
 <scope.actions.scopeinit>
}
<else>
protected virtual void <scope.name>_scopeInit(
 <scope.name>_scope scope ) {}
<endif>
<if(scope.actions.scopeafter)>
protected void <scope.name>_scopeAfter( <scope.name>_scope scope )
{
 <scope.actions.scopeafter>
}
<else>
```

```
protected virtual void <scope.name>_scopeAfter( <scope.name>_scope scope ) {}
<endif>
protected readonly ListStack\<<scope.name>_scope> <scope.name>_stack = new
ListStack\<<scope.name>_scope>();
<endif>
<endif>
>>

globalAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

ruleAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

returnStructName(it) ::= "<it.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.returnScope.attributes && ruleDescriptor.hasMultipleReturnValues)>
 <ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
 <ruleDescriptor.singleValueReturnType>
<else>
 void
<endif>
%>

/** Generate the C# type associated with
 a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
 <referencedRule.singleValueReturnType>
<else>
 void
<endif>
%>

delegateName(it) ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>
```

```
/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
default(<typeName>)
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(scope.attributes && ruleDescriptor.hasMultipleReturnValues)>
<returnScopeModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)>
 sealed partial class <ruleDescriptor:returnStructName()> : <ruleReturnBaseType()><@ruleReturnInterfaces()>
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
 <@ruleReturnMembers()>
}
<endif>
>>

ruleReturnBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<labelType>>
%>

@returnScope.ruleReturnMembers() ::= <<
>>

parameterScope(scope) ::= <<
<scope.attributes:{it|<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= <<
<attr.name; format="id">
>>

parameterSetAttributeRef(attr,expr) ::= <<
<attr.name; format="id"> =<expr>;
>>

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
```

```
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id">
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id">
<else>
<scope>_stack.Peek().<attr.name; format="id">
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::=
 <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id"> = <expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id"> = <expr>;
<else>
<scope>_stack.Peek().<attr.name; format="id"> = <expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.Count>0 && $function::name.Equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name; format="id">:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id">
<else>
<attr.name; format="id">
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr)
```

```
 ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id"> =<expr>;
<else>
<attr.name; format="id"> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.Text:default(string))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.Type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.Line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.CharPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.Channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.TokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int.Parse(<scope>.Text):0)"

ruleLabelPropertyRef_start(scope,attr)
 ::= "(<scope>!=null?((<labelType>)<scope>.Start):default(<labelType>))"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Stop):default(<labelType>))"
ruleLabelPropertyRef_tree(scope,attr) ::=
"(<scope>!=null?((<ASTLabelType>)<scope>.Tree):default(<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(<scope>.Start),
 input.TreeAdaptor.GetTokenStopIndex(<scope>.Start))):default(string))
<else>
(<scope>!=null?input.ToString(<scope>.Start,<scope>.Stop):default(string))
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.Template:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(<scope>!=null?<scope>.Type:0)"
```

```
lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(<scope>!=null?<scope>.Line:0)"

lexerRuleLabelPropertyRef_pos(scope,attr)
 ::=
   "(<scope>!=null?<scope>.CharPositionInLine:-1)"

lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(<scope>!=null?<scope>.Channel:0)"

lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(<scope>!=null?<scope>.TokenIndex:0)"

lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(<scope>!=null?<scope>.Text:default(string))"

lexerRuleLabelPropertyRef_int(scope,attr) ::=
   "(<scope>!=null?int.Parse(<scope>.Text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.Start"
rulePropertyRef_stop(scope,attr) ::= "retval.Stop"
rulePropertyRef_tree(scope,attr) ::= "retval.Tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start))
<else>
input.ToString(retval.Start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr)
 ::= "retval.Template"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int.Parse(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
```

```
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.Tree = <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.Template =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)<\n>
{<\n>
<@indentedAction()><\n>
}
<else>
<action>
<endif>
%>

@execAction.indentedAction()
 ::= <<
 <action>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static readonly BitSet <name> = new BitSet(new ulong[]{<words64:{it|<it>UL};separator=",">});
>>

codeFileExtension() ::= ".cs"

true_value() ::= "true"
false_value() ::= "false"

isTrue ::= [
 "true" : true,
 default : false
]
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp2/CSharp2.stg
No license file was found, but licenses were detected in source scan.

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*/
group Delphi;

csharpTypeInitMap ::= [
 "int":"0",
 "uint":"0",
 "long":"0",
 "ulong":"0",
 "float":"0.0",
 "double":"0.0",
 "bool":"False",
 "byte":"0",
 "sbyte":"0",
 "short":"0",
 "ushort":"0",
 "char":"#0",
 "string":"",
 "String":"",
 default:"nil" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods
 for rules
* and cyclic DFAs plus support code.

```
*  LEXER (Boolean): should we generate lexer code?
*  PARSER (Boolean): should we generate parser code?
*  TREE_PARSER (Boolean): should we generate tree parser code?
*  actionScope (String): 'lexer', 'parser', 'tree_parser' or custom scope
*  actions (HashMap):
*  docComment (String): document comment
*  recognizer (Object): recognizer class generator
*  name (String): name of grammar
*  tokens (HashMap<name: String, type: Integer>):
*  tokenNames:
*  rules:
*  cyclicDFAs:
*  bitsets:
*  buildTemplate (Boolean): should we generate a string template?
*  buildAST (Boolean): should we generate an AST?
*  rewriteMode (Boolean): are we rewriteing nodes?
*  profile (Boolean):
*  backtracking (Boolean): backtracking mode?
*  synpreds (): syntactic predicates
*  memoize (Boolean): should we memoize?
*  numRules (Integer): number of rules
*  fileName (String): fully qualified name of original .g file
*  ANTLRVersion
 (String): ANTLR version in Major.Minor.Build format
*  generatedTimestamp (String): date/time when the file is generated
*  trace (Boolean): should we trace input/output?
*  scopes:
*  superClass (String): name of base class, or empty string
*  literals:
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
unit <name>;

{$HINTS OFF}

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<actions.(actionScope).header>

interface
```

```
<@imports>
uses<\n>
<@end>
 <actions.(actionScope).usesInterface>
<if(TREE_PARSER)>
 Antlr.Runtime.Tree,<\n>
<endif>
 Antlr.Runtime,
 Antlr.Runtime.Collections,
 Antlr.Runtime.Tools;

<docComment>
<recognizer>
>>

/** Generates source code for the
 lexer class
* grammar (Grammar object)
*/
lexer(grammar, name, tokens, scopes, rules, numRules, labelType="Token",
    filterMode, superClass="Lexer") ::= <<
type
 I<grammar.recognizerName> = interface(I<@superClassName><superClass><@end>)
 end;

 T<grammar.recognizerName> = class(T<@superClassName><superClass><@end>,
I<grammar.recognizerName>)
 strict private
  FCnt: array [0..<grammar.numberOfDecisions>] of Byte;
  FLA: array [0..<grammar.numberOfDecisions>, 0..255] of Integer;
  FException: ERecognitionException;
  procedure InitializeCyclicDFAs;
 <cyclicDFAs:cyclicDFADeclaration()>
 public
  const
    <tokens:{<it.name> = <it.type>;}; separator="\n">
  <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 strict private
  <actions.(actionScope).memberDeclarations>
 public
  // delegates
  <grammar.delegates: {g|<g:delegateName()>: I<superClass>; {<g.recognizerName>}}; separator="\n">
 public
  // delegators
  <grammar.delegators:
 {g|<g:delegateName()>: Pointer; {<g.recognizerName>}}; separator="\n">
  <last(grammar.delegators):{g|gParent: Pointer; {<g.recognizerName>}}>
 protected
```

```
  { IBaseRecognizer }
  function GetGrammarFileName: String; override;
<if(filterMode)>
  function AlreadyParsedRule(const Input: IIntStream;
    const RuleIndex: Integer): Boolean; override;
  procedure Memoize(const Input: IIntStream; const RuleIndex,
    RuleStartIndex: Integer); override;
 protected
  { ILexer }
  function NextToken: IToken; override;<\n>
<endif>
 protected
  { ILexer }
  procedure DoTokens; override;
 public
  constructor Create; overload;
  constructor Create(const AInput: ICharStream<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
  constructor Create(const AInput: ICharStream; const AState: IRecognizerSharedState<grammar.delegators:{g|;
const A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>); overload;

   <rules: {r | <if(!r.ruleDescriptor.isSynPred)><lexerRuleDeclaration(r)><endif>}>
  <synpreds:{p | <lexerSynpredDeclaration(p)>}; separator="\n">
 end;

implementation

uses
 <grammar.delegates: {g|<g.recognizerName>,}; separator="\n">
 <grammar.delegators: {g|<g.recognizerName>,}; separator="\n">
 <actions.(actionScope).usesImplementation>
 SysUtils,
 StrUtils,
 Math;

{ T<grammar.recognizerName> }

constructor T<grammar.recognizerName>.Create;
begin
 InitializeCyclicDFAs;
end;

constructor T<grammar.recognizerName>.Create(const AInput: ICharStream<grammar.delegators:{g|; const
A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>);
begin
 Create(AInput, nil<grammar.delegators:{g|, A<g:delegateName()>}>);
end;
```

```
constructor T<grammar.recognizerName>.Create(const AInput: ICharStream; const AState:
IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>);
begin
 inherited Create(AInput, AState);
 InitializeCyclicDFAs;
 { TODO: Necessary in Delphi??? Not removed yet. }
 <if(memoize)>
 <if(grammar.grammarIsRoot)>
 State.RuleMemoCount := <numRules>+1;<\n> <! index from 1..n !>
 <endif>
 <endif>
 <grammar.directDelegates:
  {g|<g:delegateName()> := T<g.recognizerName>.Create(AInput, State<trunc(g.delegators):{p|,
<p:delegateName()>}>, Self);}; separator="\n">
 <grammar.delegators:
  {g|<g:delegateName()> := Pointer(A<g:delegateName()>);}; separator="\n">
 <last(grammar.delegators):{g|gParent := Pointer(A<g:delegateName()>);}>
 <actions.(actionScope).memberInitializations>
end;
<actions.(actionScope).memberImplementations>
function T<grammar.recognizerName>.GetGrammarFileName: String;
begin
 Result := '<fileName>';
end;

<if(filterMode)>
<filteringNextToken()>
<endif>

<rules; separator="\n\n">
<synpreds:{p | <lexerSynpred(p)>}>

procedure T<grammar.recognizerName>.InitializeCyclicDFAs;
begin
 <cyclicDFAs:{dfa | FDFA<dfa.decisionNumber> :=
TDFA<dfa.decisionNumber>.Create(Self<@debugAddition()>);};
 separator="\n">
 <cyclicDFAs:{dfa | <if(dfa.specialStateSTs)>FDFA<dfa.decisionNumber>.SpecialStateTransitionHandler :=
DFA<dfa.decisionNumber>_SpecialStateTransition;<endif>}; separator="\n">
end;

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
end.>>

lexerRuleDeclaration(rule) ::= <<
procedure m<rule.ruleName>(<rule.ruleDescriptor.parameterScope:parameterScope(scope=rule)>);<\n>
>>
```

```
/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
function T<grammar.recognizerName>.NextToken: IToken;
var
 M: Integer;
begin
 while (True) do
 begin
   if (Input.LA(1) = Integer(cscEOF)) then
     Exit(TToken.EOF_TOKEN);

   State.Token := nil;
   State.Channel := TToken.DEFAULT_CHANNEL;
    State.TokenStartCharIndex := Input.Index;
   State.TokenStartCharPositionInLine := Input.CharPositionInLine;
   State.TokenStartLine := Input.Line;
   State.Text := '';
   try
     M := Input.Mark();
     State.Backtracking := 1; <! means we won't throw slow exception !>
     State.Failed := False;
     mTokens();
     State.Backtracking := 0;
<!
     mTokens backtracks with synpred at backtracking==2
          and we set the synpredgate to allow actions at level 1.
!>
     if (State.Failed) then
     begin
       Input.Rewind(M);
       Input.Consume; <! // advance one char and try again !>
     end
     else
     begin
       Emit;
       Exit(State.Token);
     end;
   except
     on RE: ERecognitionException do
     begin
       // shouldn't happen in backtracking mode, but...
```

```
      ReportError(RE);
      Recover(RE);
    end;
  end;
 end;
end;

function T<grammar.recognizerName>.AlreadyParsedRule(const Input: IIntStream;
 const
 RuleIndex: Integer): Boolean;
begin
 if (State.Backtracking > 1) then
  Result := inherited AlreadyParsedRule(Input, RuleIndex)
 else
  Result := False;
end;

procedure T<grammar.recognizerName>.Memoize(const Input: IIntStream; const RuleIndex,
 RuleStartIndex: Integer);
begin
 if (State.Backtracking > 1) then
  inherited Memoize(Input, RuleIndex, RuleStartIndex);
end;

>>

filteringActionGate() ::= "(State.Backtracking = 1)"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, inputStreamType, superClass, filterMode,
          ASTLabelType="ANTLRInterface", labelType, members, rewriteElementType) ::= <<
type
 <rules: {r | <genericParserRuleReturnType(rule=r, ruleDescriptor=r.ruleDescriptor)>}>
 I<grammar.recognizerName> = interface(I<@superClassName><superClass><@end>)
  <rules: {r | <genericParserRuleInterface(rule=r, ruleDescriptor=r.ruleDescriptor)>}>
 end;

 T<grammar.recognizerName>
 = class(T<@superClassName><superClass><@end>, I<grammar.recognizerName>)
<if(grammar.grammarIsRoot)>
 public
  const
   TOKEN_NAMES: array [0..<length(tokenNames)>+3] of String = (
    '\<invalid>',
    '\<EOR>',
    '\<DOWN>',
    '\<UP>',
```

```
      <tokenNames; separator=",\n">);<\n>
<endif>
 public
  const
    <tokens:{<it.name> = <it.type>;}; separator="\n">
 public
  // delegates
  <grammar.delegates: {g|<g:delegateName()>: I<superClass>; {<g.recognizerName>}}; separator="\n">
 public
  // delegators
  <grammar.delegators: {g|<g:delegateName()>: Pointer; {<g.recognizerName>}}; separator="\n">
  <last(grammar.delegators):{g|gParent: Pointer; {<g.recognizerName>}}>

  <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScopeDeclaration(scope=it)><endif>}>
<@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
 public
  constructor Create(const AInput: <inputStreamType><grammar.delegators:{g|; const A<g:delegateName()>:
 IBaseRecognizer{<g.recognizerName>}}>); overload;
  constructor Create(const AInput: <inputStreamType>; const AState:
IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
<@end>
 protected
  { IBaseRecognizer }
  function GetTokenNames: TStringArray; override;
  function GetGrammarFileName: String; override;
 strict private
  <actions.(actionScope).memberDeclarations>
 <rules: {r | <genericParserRuleDeclaration(rule=r, ruleDescriptor=r.ruleDescriptor)>}>

<! generate rule/method definitions for imported rules so they
 appear to be defined in this recognizer. !>
  // Delegated rules
  <grammar.delegatedRules:{ruleDescriptor| <delegatedRuleDeclaration(ruleDescriptor)>}>

  <synpreds:{p | <synpredDeclaration(p)>}; separator="\n">
 <cyclicDFAs:cyclicDFADeclaration()>
 strict private
  FException: ERecognitionException;
  FLA: array [0..<grammar.numberOfDecisions>, 0..255] of Integer;
  FCnt:
 array [0..<grammar.numberOfDecisions>] of Byte;
  procedure InitializeCyclicDFAs;
<if(bitsets)>
 public
  class var
    <bitsets:bitsetDecl(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>})>
```

```
 public
   class procedure InitializeBitsets; static;<\n>
<endif>
 end;

implementation

uses
 <grammar.delegates: {g|<g.recognizerName>,}; separator="\n">
 <grammar.delegators: {g|<g.recognizerName>,}; separator="\n">
 <actions.(actionScope).usesImplementation>
 SysUtils,
 StrUtils,
 Math;

{ T<grammar.recognizerName> }

constructor T<grammar.recognizerName>.Create(const AInput: <inputStreamType><grammar.delegators:{g|; const
A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>);
begin
 Create(AInput, TRecognizerSharedState.Create<grammar.delegators:{g|, A<g:delegateName()>}>);
end;

constructor T<grammar.recognizerName>.Create(const AInput: <inputStreamType>;
 const AState: IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>);
begin
  inherited Create(AInput, AState);
 <@membersConstructor>
 <@end>
 <parserCtorBody()>
 <grammar.directDelegates:{g|<g:delegateName()> := T<g.recognizerName>.Create(Input,
State<trunc(g.delegators):{p|, <p:delegateName()>}>, Self);}; separator="\n">
 <grammar.indirectDelegates:{g | <g:delegateName()> := <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
 <last(grammar.delegators):{g|gParent := Pointer(A<g:delegateName()>);}>
 <rules: {r | <ruleAttributeScopeInit(scope=r.ruleDescriptor.ruleScope)>}>
 <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.(actionScope).memberInitializations>
end;
<actions.(actionScope).memberImplementations>

<grammar.delegatedRules:{ruleDescriptor| <delegatedRuleImplementation(ruleDescriptor)>}; separator="\n">
procedure T<grammar.recognizerName>.InitializeCyclicDFAs;
begin
 <cyclicDFAs:{dfa | FDFA<dfa.decisionNumber> := TDFA<dfa.decisionNumber>.Create(Self);}; separator="\n">
  <cyclicDFAs:{dfa | <if(dfa.specialStateSTs)>FDFA<dfa.decisionNumber>.SpecialStateTransitionHandler :=
DFA<dfa.decisionNumber>_SpecialStateTransition;<endif>}; separator="\n">
```

```
end;

<if(bitsets)>
class procedure T<grammar.recognizerName>.InitializeBitsets;
begin
 <bitsets:bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>
end;
<endif>

<@membersImplementation>
<@end>

function T<grammar.recognizerName>.GetTokenNames: TStringArray;
var
 I: Integer;
begin
 SetLength(Result,Length(T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES));
 for I := 0 to Length(T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES) - 1 do
   Result[I] := T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES[I];
end;

function T<grammar.recognizerName>.GetGrammarFileName: String;
begin
 Result := '<fileName>';
end;

<rules; separator="\n\n">
<synpreds:{p | <synpred(p)>}>

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
<if(bitsets)>
initialization
  T<grammar.recognizerName>.InitializeBitsets;<\n>
<endif>
end.>>

delegatedRuleDeclaration(ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
<returnType()>;<\n>
<else>
procedure <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);<\n>
<endif>
<endif>
```

```
>>

delegatedRuleImplementation(ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
function
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
): I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
): <returnType()>;<\n>
<else>
procedure
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
);<\n>
<endif>
<endif>
begin
 <if(ruleDescriptor.hasReturnValue)>Result :=<endif>
T<ruleDescriptor.grammar.recognizerName>(<ruleDescriptor.grammar:delegateName()>.Implementor).<ruleDescri
ptor.name>(<ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", ">);
end;

>>

parserCtorBody() ::= <<
InitializeCyclicDFAs;
<if(memoize)>
<if(grammar.grammarIsRoot)>
State.RuleMemoCount := <length(grammar.allImportedRules)>+1;<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators: {g|<g:delegateName()> := Pointer(A<g:delegateName()>);}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType, superClass="Parser",
labelType="Token", members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules, numRules, bitsets,
labelType={<ASTLabelType>}, ASTLabelType="object", superClass="TreeParser",
members={<actions.treeparser.members>}, filterMode) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
```

```
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start "<ruleName>"
procedure
T<grammar.recognizerName>.<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope(scope=it)>)
;
var
 Alt: array [0..<grammar.numberOfDecisions>]
 of Integer;
 <ruleLabelDefVars()>
begin
 <ruleLabelDefs()>
<if(trace)>
 TraceIn('<ruleName>_fragment', <ruleDescriptor.index>);
 try
   <block>
 finally
   TraceOut('<ruleName>_fragment', <ruleDescriptor.index>);
 end;
<else>
 <block>
<endif>
end;
// $ANTLR end "<ruleName>"
>>

synpredDecls(name) ::= <<
SynPredPointer <name>;<\n>
>>

synpred(name) ::= <<

function T<grammar.recognizerName>.<name>: Boolean;
var
 Start: Integer;
 Success: Boolean;
begin
 State.Backtracking := State.Backtracking + 1;
 <@start()>
```

```
 Start := Input.Mark;
 try
   <name>_fragment(); // can never throw exception
 except
   on RE: ERecognitionException do
     WriteLn('Impossible: ' + RE.ToString);
 end;
 Success := not State.Failed;
 Input.Rewind(Start);
 <@stop()>
 State.Backtracking := State.Backtracking - 1;
 State.Failed := False;
 Result := Success;
end;<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

lexerSynpredDeclaration(name) ::= <<
function
 <name>: Boolean;
procedure <name>_fragment;
>>

synpredDeclaration(name) ::= <<
function <name>: Boolean;
procedure <name>_fragment;
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ((State.Backtracking > 0) and AlreadyParsedRule(Input, <ruleDescriptor.index>)) then
 Exit(<ruleReturnValue()>);
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)><\n>if (State.Failed) then Exit(<ruleReturnValue()>);<\n><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (State.Backtracking > 0) then
begin
 State.Failed := True;
```

```
 Exit(<ruleReturnValue()>);
end;<endif>
>>

genericParserRuleDeclaration(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.isSynPred)>
<else>
<ruleAttributeScopeDeclaration(scope=ruleDescriptor.ruleScope)>
<returnScopeDeclaration(scope=ruleDescriptor.returnScope)>
public
<if(ruleDescriptor.hasMultipleReturnValues)>
 function <rule.ruleName>:
 I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
 function <rule.ruleName>: <returnType()>;<\n>
<else>
 procedure <rule.ruleName>;<\n>
<endif>
<endif>
<endif>
>>

genericParserRuleInterface(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.isSynPred)>
<else>
<if(ruleDescriptor.hasMultipleReturnValues)>
function <rule.ruleName>: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function <rule.ruleName>: <returnType()>;<\n>
<else>
procedure <rule.ruleName>;<\n>
<endif>
<endif>
<endif>
>>

genericParserRuleReturnType(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(ruleDescriptor.isSynPred)>
<else>
I<returnType()> = interface(I<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope)
end;<\n>
<endif>
<endif>
>>
```

```
/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize)
 ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
(* <fileName>:<description> *)
<if(ruleDescriptor.hasMultipleReturnValues)>
function T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
I<returnType()>;
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
<returnType()>;
<else>
procedure
T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);
<endif>
<endif>

var
<ruleDescriptor.actions.vars>
 Locals: TLocalStorage;
<if(ruleDescriptor.hasMultipleReturnValues)>
 RetVal: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
 RetVal: <returnType()>;<\n>
<else>
<endif>
<endif>
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <ruleDeclarationVars()>
 <ruleLabelDefVars()>
begin
 Locals.Initialize;
  try
   <if(trace)>TraceIn('<ruleName>', <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   try
     try
```

```
      <ruleMemoization(name=ruleName)>
      <block>
      <ruleCleanUp()>
      <(ruleDescriptor.actions.after):execAction()>
<if(exceptions)>
      <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
      <actions.(actionScope).rulecatch>
<else>
    except
      on RE: ERecognitionException do
      begin
        ReportError(RE);
        Recover(Input,RE);
        <@setErrorReturnValue()>
      end;<\n>
<endif>
<endif>
<endif>
    end;
  finally
    <if(trace)>TraceOut("<ruleName>", <ruleDescriptor.index>);<endif>
    <memoize()>
    <ruleScopeCleanUp()>
    <finally>
  end;
  <@postamble()>
 finally
  Locals.Finalize;
 end;
 Exit(<ruleReturnValue()>);
end;
//
 $ANTLR end "<ruleName>"
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal := T<returnType()>.Create;
```

```
RetVal.Start := Input.LT(1);<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> := <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex := Input.Index();
<endif>
>>

ruleDeclarationVars() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name>: <a.type>;
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex: Integer;
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{<it>Stack.Push(T<it>Scope.Create);}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>Stack.Push(T<it.name>Scope.Create);}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{<it>Stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>Stack.Pop;};
 separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]:{<it.label.text> := nil;}; separator="\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{list_<it.label.text> := nil;}; separator="\n">
<ruleDescriptor.ruleLabels:ruleLabelDef(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|<ll.label.text> := nil;}; separator="\n">
>>

ruleLabelDefVars() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]:{<it.label.text>: I<labelType>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{list_<it.label.text>: IList\<IANTLRInterface\>;};
separator="\n">
<ruleDescriptor.ruleLabels:ruleLabelDefVar(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|<ll.label.text>: <ruleLabelType(referencedRule=ll.referencedRule)>;};
separator="\n">
```

```
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
    :{<it.label.text> := nil;}; separator="\n"
>
<ruleDescriptor.charLabels:{int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{List_<it.label.text> := nil;}; separator="\n"
>
>>

lexerRuleLabelDefDeclarations() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{<it.label.text>: I<labelType>;}; separator="\n"
>
<ruleDescriptor.charLabels:{int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{List_<it.label.text>: IList;}; separator="\n"
>
>>

ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
RetVal
<endif>
<else>
<! nil !>
<endif>
<endif>
>>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
RetVal.Stop
```

```
 := Input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (State.Backtracking > 0) then
 Memoize(Input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex);
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
<ruleDescriptor.parameterScope>
procedure
T<grammar.recognizerName>.m<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);
var
 <ruleDescriptor.actions.vars>
 Locals: TLocalStorage;
 TokenType, Channel: Integer;
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <lexerRuleLabelDefDeclarations()>
begin
 Locals.Initialize;
 try
   <ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
   <if(trace)>TraceIn("<ruleName>", <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   try
<if(nakedBlock)>

   <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
     <block><\n>
<else>
     TokenType := <ruleName>;
     Channel := DEFAULT_TOKEN_CHANNEL;
     <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
```

```
    <block>
    <ruleCleanUp()>
    State.TokenType := TokenType;
    State.Channel := Channel;
    <(ruleDescriptor.actions.after):execAction()>
<endif>
  finally
    <if(trace)>TraceOut("<ruleName>", <ruleDescriptor.index>);<endif>
    <ruleScopeCleanUp()>
    <memoize()>
  end;
 finally
  Locals.Finalize;
 end;
end;
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
procedure T<grammar.recognizerName>.mTokens;
var
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
begin
 <block>
end;

procedure T<grammar.recognizerName>.DoTokens;
begin
  mTokens;
end;
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
(* <fileName>:<description> *)
Alt[<decisionNumber>] := <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
case Alt[<decisionNumber>] of
 <alts:altSwitchCase()>
```

```
end;
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
(* <fileName>:<description> *)
Alt[<decisionNumber>] := <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
case Alt[<decisionNumber>] of
 <alts:altSwitchCase()>
end;
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
(* <fileName>:<description> *)
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule
 with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
(* <fileName>:<description> *)
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
(* <fileName>:<description> *)
FCnt[<decisionNumber>] := 0;
<decls>
<@preloop()>
while (True) do
begin
 Alt[<decisionNumber>] := <maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
```

```
 case Alt[<decisionNumber>] of
   <alts:altSwitchCase()>
 else
   begin
     if (FCnt[<decisionNumber>] >= 1) then
       Break;
     <ruleBacktrackFailure()>
     raise EEarlyExitException.Create(<decisionNumber>, Input);
     <@earlyExitException()>
   end;
 end;
 Inc(FCnt[<decisionNumber>]);
end;
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description)
 ::= <<
(* <fileName>:<description> *)
<decls>
<@preloop()>
while (True) do
begin
 Alt[<decisionNumber>] := <maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 case Alt[<decisionNumber>] of
   <alts:altSwitchCase()>
 else
   Break;
 end;
end;
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block
```

```
/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase() ::= <<
<i>:
 <@prealt()>
 <it><\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew)
 ::= <<
(* <fileName>:<description> *)
begin
 <@declarations()>
 <elements:element()>
 <rew>
 <@cleanup()>
end;
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element() ::= <<
<@prematch()>
<it.el>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> := <endif>Match(Input, <token>,
FOLLOW_<token>_in_<ruleName><elementIndex>)<if(label)> as
I<labelType><endif>;<\n><checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>
```

```
listLabel(label,elem) ::= <<
if (list_<label> = nil) then list_<label> := TList\<IANTLRInterface\>.Create;
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
Match(<char>);
 <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
MatchRange(<a>, <b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label> := Input.LA(1);<\n>
<else>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
<endif>
if (<s>) then
begin
 Input.Consume;
 <postmatchCode>
 <if(!LEXER)>
 State.ErrorRecovery := False;<endif>
 <if(backtracking)>State.Failed := False;<endif>
end
else
begin
 <ruleBacktrackFailure()>
 FException := EMismatchedSetException.Create(nil, Input);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(FException);
 raise FException;<\n>
<else>
```

```
 raise FException;
 <! use following code to make it recover inline; remove throw mse;
 RecoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
  !>
<endif>
end;<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
Locals.AsInteger['<label>Start'] := CharIndex;
Match(<string>); <checkRuleBacktrackFailure()>
<label> := TCommonToken.Create(Input, TToken.INVALID_TOKEN_TYPE, TToken.DEFAULT_CHANNEL,
Locals.AsInteger['<label>Start'], CharIndex-1);
<else>
Match(<string>); <checkRuleBacktrackFailure()>
<endif>
>>

wildcard(label,elementIndex) ::= <<
<if(label)>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(label,elementIndex) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label,
```

```
 elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)>
<label> := <if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);<\n>
<else>
<if(scope)>T<scope.recognizerName>(IANTLRObject(<scope:delegateName()>).Implementor).<endif><rule.name
>(<args; separator=", ">);<\n>
<endif>
State.FollowingStackPointer := State.FollowingStackPointer - 1;
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was
 the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
Locals.AsInteger['<label>Start<elementIndex>'] := CharIndex;
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> := TCommonToken.Create(Input, TToken.INVALID_TOKEN_TYPE, TToken.DEFAULT_CHANNEL,
 Locals.AsInteger['<label>Start<elementIndex>'], CharIndex - 1);
<else>
<if(scope)>(<scope:delegateName()>.Implementor as T<scope.recognizerName>).<endif>m<rule.name>(<args;
separator=", ">); <checkRuleBacktrackFailure()>
<endif>
>>
```

```
/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
Locals.AsInteger['<label>Start<elementIndex>'] := CharIndex;
Match(EOF);
 <checkRuleBacktrackFailure()>
Locals['<label>'] := TCommonToken.Create(Input, EOF, TToken.DEFAULT_CHANNEL,
Locals.AsInteger['<label>Start<elementIndex>'], CharIndex-1);
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (Input.LA(1) = TToken.DOWN) then
begin
 Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
end;
<else>
Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
<children:element()>
Match(Input, TToken.UP, nil);<\n><checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if (not (<evalPredicate(...)>))
 then
begin
 <ruleBacktrackFailure()>
 raise EFailedPredicateException.Create(Input, '<ruleName>', '<description>');
```

```
end;<\n>
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);<\n>
<edges; separator="\nelse ">
else
begin
<if(eotPredictsAlt)>
 Alt[<decisionNumber>] := <eotPredictsAlt>;<\n>
<else>
 <ruleBacktrackFailure()>
 raise ENoViableAltException.Create('<description>', <decisionNumber>, <stateNumber>, Input);<\n>
<endif>
end;
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);<\n>
<edges;
 separator="\nelse ">;
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);
<edges; separator="\nelse ">;<\n>
<if(eotPredictsAlt)>
<if(!edges)>
Alt[<decisionNumber>] := <eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else
begin
 Alt[<decisionNumber>] := <eotPredictsAlt>;
end;<\n>
<endif>
```

```
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "Alt[<decisionNumber>] := <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions,
 we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> and (<predicates>)<endif>) then
begin
 <targetState>
end <! no ; here !>
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n">
else
 begin
<if(eotPredictsAlt)>
   Alt[<decisionNumber>] := <eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   <@noViableAltException()>
   raise ENoViableAltException.Create('<description>', <decisionNumber>, <stateNumber>, Input);<\n>
<endif>
 end;
end;<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n">
end;<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState)
 ::= <<
case Input.LA(<k>) of
```

```
 <edges; separator="\n"><\n>
<if(eotPredictsAlt)>
else
 Alt[<decisionNumber>] := <eotPredictsAlt>;<\n>
<endif>
end;<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{<it>}; separator=",\n">:
 begin
   <targetState>
 end;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
Alt[<decisionNumber>] := FDFA<decisionNumber>.Predict(Input);
>>

/* Dump DFA tables.
*/
cyclicDFADeclaration(dfa) ::= <<
strict protected
 type
   TDFA<dfa.decisionNumber> = class(TDFA)
   protected
     { IDFA }
     function Description: String; override;
   public
     constructor Create(const ARecognizer: IBaseRecognizer);
   end;
 var
   FDFA<dfa.decisionNumber>: IDFA;
<if(dfa.specialStateSTs)>
strict
 protected
 function DFA<dfa.decisionNumber>_SpecialStateTransition(const DFA: IDFA; S: Integer;
   const AInput: IIntStream): Integer;<endif>
>>

cyclicDFA(dfa) ::= <<
{ T<grammar.recognizerName>.TDFA<dfa.decisionNumber> }
```

```
constructor T<grammar.recognizerName>.TDFA<dfa.decisionNumber>.Create(const ARecognizer:
IBaseRecognizer);
const
 DFA<dfa.decisionNumber>_EOT = '<dfa.javaCompressedEOT; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_EOF = '<dfa.javaCompressedEOF; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_MIN = '<dfa.javaCompressedMin; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_MAX = '<dfa.javaCompressedMax; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_ACCEPT = '<dfa.javaCompressedAccept; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_SPECIAL = '<dfa.javaCompressedSpecial; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_TRANSITION: array [0..<length(dfa.javaCompressedTransition)>-1] of String = (
   <dfa.javaCompressedTransition:{s|'<s; wrap="'+\n"'>'}; separator=",\n">);
begin
  inherited Create;
 Recognizer := ARecognizer;
 DecisionNumber := <dfa.decisionNumber>;
 EOT := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_EOT);
 EOF := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_EOF);
 Min := TDFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_MIN);
 Max := TDFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_MAX);
 Accept := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_ACCEPT);
 Special := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_SPECIAL);
 Transition := TDFA.UnpackEncodedStringArray(DFA<dfa.decisionNumber>_TRANSITION);
end;

function T<grammar.recognizerName>.TDFA<dfa.decisionNumber>.Description: String;
begin
 Result := '<dfa.description>';
end;<\n>
<if(dfa.specialStateSTs)>
function T<grammar.recognizerName>.DFA<dfa.decisionNumber>_SpecialStateTransition(const DFA: IDFA; S:
Integer;
 const AInput: IIntStream): Integer;
var
 Locals: TLocalStorage;
 <if(LEXER)>
 Input: IIntStream;
 <endif>
  <if(PARSER)>
 Input: ITokenStream;
 <endif>
 <if(TREE_PARSER)>
 Input: ITreeNodeStream;
 <endif>
 _S: Integer;
 NVAE: ENoViableAltException;
begin
 Result := -1;
```

```
 Locals.Initialize;
 try
  <if(LEXER)>
  Input := AInput;
  <endif>
  <if(PARSER)>
  Input := AInput as ITokenStream;
  <endif>
  <if(TREE_PARSER)>
  Input := AInput as ITreeNodeStream;
  <endif>
  _S := S;
  case S of
    <dfa.specialStateSTs:{state | <i0>: begin<! compressed special state numbers 0..n-1 !>
   <state> <\n>   end;}; separator="\n">
  end;
<if(backtracking)>
  if (State.Backtracking > 0) then
  begin
    State.Failed := True;
    Exit(-1);
  end;<\n>
<endif>
  NVAE := ENoViableAltException.Create(DFA.Description, <dfa.decisionNumber>, _S, Input);
  DFA.Error(NVAE);
  raise NVAE;
 finally
  Locals.Finalize;
 end;
end;<\n>
<endif>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState)
 ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
Locals.AsInteger['index<decisionNumber>_<stateNumber>'] := Input.Index;
Input.Rewind;<\n>
<endif>
S := -1;
<edges; separator="\nelse ">;
<if(semPredState)> <! return input cursor to state before we rewound !>
Input.Seek(Locals.AsInteger['index<decisionNumber>_<stateNumber>']);<\n>
<endif>
```

```
if (S >= 0) then
 Exit(S);
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> and (<predicates>)<endif>) then
 S := <targetStateNumber>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
S := <targetStateNumber>;<\n>
>>


//
 D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\" or \">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "FLA[<decisionNumber>,<stateNumber>] = <atomAsInt>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "Input.LA(<k>) = <atomAsInt>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
((FLA[<decisionNumber>,<stateNumber>] \>= <lowerAsInt>) and (FLA[<decisionNumber>,<stateNumber>] \<=
<upperAsInt>))
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(Input.LA(<k>) \>=
<lowerAsInt>) and (Input.LA(<k>) \<= <upperAsInt>)"
```

```
setTest(ranges) ::= "<ranges; separator=\")
 or (\">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<scope.name>Stack := TStackList\<I<scope.name>Scope\>.Create;<\n>
<endif>
>>

globalAttributeScopeDeclaration(scope) ::= <<
<if(scope.attributes)>
strict protected
 type
   I<scope.name>Scope = interface(IANTLRObject)
   end;
   T<scope.name>Scope = class(TANTLRObject, I<scope.name>Scope)
   protected
     <scope.attributes:{<it.name>: <it.type>;}; separator="\n">
   end;
strict protected
 <scope.name>Stack: IStackList\<I<scope.name>Scope\>;
<endif>
>>

ruleAttributeScopeDeclaration(scope) ::= <<
<if(scope.attributes)>
strict protected
 type
   I<scope.name>Scope = interface(IANTLRObject)
   end;
   T<scope.name>Scope = class(TANTLRObject, I<scope.name>Scope)
   protected
     <scope.attributes:{<it.name>: <it.type>;}; separator="\n">
   end;
strict protected
 <scope.name>Stack: IStackList\<I<scope.name>Scope\>;
<endif>
>>

ruleAttributeScope(scope) ::= <<
<! protected Stack <scope.name>Stack = new
 Stack();<\n> !>
>>

ruleAttributeScopeInit(scope) ::= <<
<if(scope)>
<scope.name>Stack := TStackList\<I<scope.name>Scope\>.Create;<\n>
```

```
<endif>
>>

returnStructName() ::= "<it.name>_return"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()>
<! I<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope !>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
<! Pointer/void !>
<endif>
<endif>
>>

/** Generate the C# type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
I<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

delegateName() ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<csharpTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> := <initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>
```

```
ruleLabelDefVar(label) ::= <<
<label.label.text>: <ruleLabelType(referencedRule=label.referencedRule)>;
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
{ T<ruleDescriptor:returnStructName()> }

<scope.attributes:{public <it.decl>;}; separator="\n">
<@ruleReturnMembers()>
<endif>
>>

returnScopeDeclaration(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public
 type
   T<ruleDescriptor:returnStructName()> =
class(T<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope, I<ruleDescriptor:returnStructName()>)
   <scope.attributes:{public
 <it.decl>;}; separator="\n">
   <@ruleReturnMembers()>
   end;
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> := <expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
(<scope>Stack[<scope>Stack.Count-<negIndex>-1] as T<scope>Scope).<attr.name>
<else>
<if(index)>
(<scope>Stack[<index>] as T<scope>Scope).<attr.name>
((<scope>_scope)<scope>_stack[<index>]).<attr.name>
<else>
(<scope>Stack.Peek.Implementor as T<scope>Scope).<attr.name>
<endif>
```

```
<endif>
>>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
(<scope>Stack[<scope>Stack.Count-<negIndex>-1] as T<scope>Scope).<attr.name> := <expr>;<\n>
<else>
<if(index)>
(<scope>Stack[<index>] as T<scope>Scope).<attr.name> := <expr>;<\n>
<else>
(<scope>Stack.Peek.Implementor as T<scope>Scope).<attr.name> := <expr>;<\n>
<endif>
<endif>
>>

/** $x is
 either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>Stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(IfThen(Assigned(<scope>),Def(<scope>).<attr.name>,<initValue(attr.type)>))
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal.<attr.name> := <expr>;
<else>
<attr.name> := <expr>;
<endif>
>>

/** How to translate $tokenLabel */
```

```
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next
 are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(Def(<scope>).Text)"
tokenLabelPropertyRef_type(scope,attr) ::= "(Def(<scope>).TokenType)"
tokenLabelPropertyRef_line(scope,attr) ::= "(Def(<scope>).Line)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(Def(<scope>).CharPositionInLine)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(Def(<scope>).Channel)"
tokenLabelPropertyRef_index(scope,attr) ::= "(Def(<scope>).TokenIndex)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(StrToIntDef(Def(<scope>).Text,0))"

ruleLabelPropertyRef_start(scope,attr) ::= "(IfThen(Assigned(<scope>), Def(<scope>).Start, nil) as I<labelType>)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(Def(<scope>).Stop as I<labelType>)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(Def(Def(<scope>).Tree as I<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
IfThen(Assigned(<scope>), Input.TokenStream.ToString(
 Input.TreeAdaptor.GetTokenStartIndex(Def(<scope>).Start),
  Input.TreeAdaptor.GetTokenStopIndex(Def(<scope>).Start)), '')
<else>
IfThen(Assigned(<scope>), Input.ToString(
 (Def(<scope>).Start) as IToken,(Def(<scope>).Stop) as IToken), '')
<endif>
>>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> != null) ? <scope>.ST : null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(Def(<scope>).TokenType)"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(Def(<scope>).Line)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(IfThen(Assigned(<scope>),Def(<scope>).CharPositionInLine,-1))"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(Def(<scope>).Channel)"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(Def(<scope>).TokenIndex)"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(Def(<scope>).Text)"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "(StrToIntDef(Def(<scope>).Text,0))"

// Somebody may ref $template
 or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(RetVal.Start as I<labelType>)"
rulePropertyRef_stop(scope,attr) ::= "(RetVal.Stop as I<labelType>)"
```

```
rulePropertyRef_tree(scope,attr) ::= "(RetVal.Tree as I<ASTLabelType>)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
Input.TokenStream.ToString(
 Input.TreeAdaptor.GetTokenStartIndex(RetVal.Start),
 Input.TreeAdaptor.GetTokenStopIndex(RetVal.Start))
<else>
Input.ToString(RetVal.Start as IToken,Input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "RetVal.ST"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "TokenType"
lexerRulePropertyRef_line(scope,attr) ::= "State.TokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "State.TokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "Channel"
lexerRulePropertyRef_start(scope,attr) ::= "State.TokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr)
 ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "StrToInt(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "RetVal.Tree := <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "RetVal.ST := <expr>;"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if (<actions.(actionScope).synpredgate>) then
begin
 <action>
end;
<else>
if (State.Backtracking = 0) then
begin
 <action>
end;<\n>
<endif>
<else>
<action>
<endif>
>>
```

```
/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
<name> := TBitSet.Create([<words64:{<it>};separator=",">]);<\n>
>>

bitsetDecl(name) ::= <<
<name>: IBitSet;<\n>
>>

codeFileExtension() ::= ".pas"

true()
 ::= "True"
false() ::= "False"

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Delphi/Delphi.stg
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*/

/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and
 !
*  invalid. There is no huge explosion of combinations.
*/

@rule.setErrorReturnValue() ::= <<
retval.Tree = (<ASTLabelType>)adaptor.ErrorNode(input, retval.Start, input.LT(-1), re);
<! System.out.WriteLine("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (state.backtracking == 0) {<endif>
<label>_tree = <createNodeFromToken(...)>;
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
>>
```

```
/**
 ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
//
 large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={<if(backtracking)>if (<actions.(actionScope).synpredgate>)
<endif>adaptor.AddChild(root_0, <createNodeFromToken(...)>);}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)
```

```
matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if
 (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<createNodeFromToken(...)>, root_0);}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <label>.Tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_0);
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope)
 ::= <<
<ruleRefBang(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// WILDCARD AST
```

```
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(token=[],...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions={})
 ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalO
ptions.text)>,<terminalOptions.text; format="string"><endif>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
adaptor.SetTokenBoundaries(retval.Tree, retval.Start, retval.Stop);
<if(backtracking)>}<endif>
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp2/ASTParser.stg
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```
/*
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*
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```

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* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr3.ST;
using Antlr3.ST.Language;
>>

@genericParser.members() ::= <<
<@super.members()>
private StringTemplateGroup _templateGroup = new StringTemplateGroup("<name>Templates",
 typeof(AngleBracketTemplateLexer) );

public StringTemplateGroup TemplateGroup
{
 get { return _templateGroup; }
 set { _templateGroup = value; }
}
>>
```

```
ruleReturnBaseType() ::= <%
Template<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<StringTemplate, <labelType>>
%>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Template},elemType="StringTemplate",...)>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)
{
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.TokenStream).Replace(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start),
 retval.Template);
<else>
((TokenRewriteStream)input).Replace(
 retval.Start.TokenIndex,
 input.LT(-1).TokenIndex,
 retval.Template);
<endif>
>>

rewriteTemplateAlt(it)
 ::= <<
// <it.description>
<if(it.pred)>
if (<it.pred>)
{
 retval.Template = <it.alt>;
}<\n>
<else>
```

```
{
 retval.Template = <it.alt>;
}<\n>
<endif>
>>

rewriteEmptyTemplate(alts) ::= <<
null;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <%
TemplateGroup.GetInstanceOf("<name>"<optionalArguments(args)>)
%>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
TemplateGroup.GetInstanceOf(<expr><optionalArguments(args)>)
%>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args,
 template) ::= <%
new StringTemplate(TemplateGroup, "<template>"<optionalArguments(args)>)
%>

optionalArguments(args) ::= <<
<if(args)>,
 new Dictionary\<string, object>() { <args:optionalArgument(); separator=", "> }
<endif>
>>

optionalArgument(it) ::= <<
{"<it.name>", <it.value>}
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
```

(<st>).SetAttribute("<attrName>",<expr>);
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(TemplateGroup,<stringExpr>)
>>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/ST.stg
No license file was found, but licenses were detected in source scan.

/*
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*/

/** Template overrides to add debugging to AST stuff. Dynamic inheritance
* hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/
parserMembers() ::= <<
DebugTreeAdaptor *adaptor = [DebugTreeAdaptor newTreeAdaptor:(id)dbg Adaptor:[CommonTreeAdaptor
newTreeAdaptor]];

```
// fix this
- (void) setTreeAdaptor:(id<TreeAdaptor>)anAdaptor
{
  adaptor = [DebugTreeAdaptor newTreeAdaptor:dbg Adaptor:anAdaptor];
<if(grammar.grammarIsRoot)>
  adaptor = [DebugTreeAdaptor
 newTreeAdaptor:adaptor withDBG:dbg];
<else>
  adaptor = (DebugTreeAdaptor *)adaptor; // delegator sends dbg adaptor
<endif><\n>
  <grammar.directDelegates:{g|[<g:delegateName()> setTreeAdaptor:adaptor];}>
}

- (id<TreeAdaptor>)getTreeAdaptor
{
  return adaptor;
}<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy =
  [DebugEventSocketProxy newDebugEventSocketProxy:self, port, <if(TREE_PARSER)>[input
getTreeAdaptor]<else>adaptor<endif>];
[self setDebugListener:proxy];
[self set<inputStreamType>:[Debug<inputStreamType> newDebug<inputStreamType>:input with:proxy]];
try {
  [proxy handshake];
}
@catch (IOException *ioe) {
  [self reportError:ioe];
}
>>

@ctorForRootGrammar.finally() ::= <<
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];
[proxy setTreeAdaptor:adap];
>>

@ctorForProfilingRootGrammar.finally() ::=<<
CommonTreeAdaptor *adap = [CommonTreeAdaptor
 newTreeAdaptor];
[self setTreeAdaptor:adap];
[proxy setTreeAdaptor:adap];
```

>>

@ctorForPredefinedListener.superClassRef() ::= @"super(input, dbg);"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)> <! don't create new adaptor for delegates !>
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];<\n>
<endif>
>>

@treeParserHeaderFile.superClassName ::= "DebugTreeParser"

@rewriteElement.pregen() ::= "[debugListener locationLine:<e.line> column:<e.pos>];"

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/ObjC/ASTDbg.stg
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

```
group Perl5;

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,

   scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
<if(TREE_PARSER)>
<endif>
<if(backtracking)>
<endif>
<@end>

<docComment>
<recognizer>
>>

lexer(grammar, name, tokens, scopes, rules, numRules, labelType="Token",
    filterMode, superClass="ANTLR::Runtime::Lexer")  ::= <<
package <name>;

use Carp;
use English qw( -no_match_vars ) ;
use Readonly;
use Switch;

use ANTLR::Runtime::BaseRecognizer;
use ANTLR::Runtime::DFA;
use ANTLR::Runtime::NoViableAltException;

use Moose;

extends 'ANTLR::Runtime::Lexer';

Readonly my $HIDDEN => ANTLR::Runtime::BaseRecognizer->HIDDEN;
sub HIDDEN { $HIDDEN }
```

```
use constant {
  <tokens:{ <it.name> => <it.type>, }; separator="\n">
};
<scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
<actions.lexer.members>

sub BUILD {
  my ($self, $arg_ref) = @_;

  $self->init_dfas();
}

sub get_grammar_file_name {
  return "<fileName>";
}

<if(filterMode)>
<filteringNextToken()>
<endif>
<rules;
 separator="\n\n">

<synpreds:{p | <lexerSynpred(p)>}>

<cyclicDFAs:{dfa | has 'dfa<dfa.decisionNumber>';}; separator="\n">

sub init_dfas {
  my ($self) = @_;

  <cyclicDFAs:{dfa |
  $self->dfa<dfa.decisionNumber>(<name>::DFA<dfa.decisionNumber>->new({ recognizer => $self }));
  }; separator="\n">

  return;
}

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

no Moose;
__PACKAGE__->meta->make_immutable();
1;

>>

perlTypeInitMap ::= [
 "$":"undef",
 "@":"()",
```

```
 "%":"()",
 default:"undef"
]

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public Token nextToken() {
  while (true) {
    if ( input.LA(1)==CharStream.EOF
 ) {
      return Token.EOF_TOKEN;
    }
    token = null;
 channel = Token.DEFAULT_CHANNEL;
    tokenStartCharIndex = input.index();
    tokenStartCharPositionInLine = input.getCharPositionInLine();
    tokenStartLine = input.getLine();
 text = null;
    try {
      int m = input.mark();
      backtracking=1; <! means we won't throw slow exception !>
      failed=false;
      mTokens();
      backtracking=0;
      <! mTokens backtracks with synpred at backtracking==2
        and we set the synpredgate to allow actions at level 1. !>
      if ( failed ) {
        input.rewind(m);
        input.consume(); <! advance one char and try again !>
      }
      else {
        emit();
        return token;
      }
    }
    catch (RecognitionException re) {
      // shouldn't happen in backtracking mode, but...
      reportError(re);

    recover(re);
    }
  }
}
```

```
public void memoize(IntStream input,
 int ruleIndex,
 int ruleStartIndex)
{
if ( backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
if ( backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "$self->state->backtracking==0"

filteringActionGate() ::= "backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, inputStreamType, superClass, filterMode,
          ASTLabelType="Object", labelType, members) ::= <<
package <name>;

use English qw( -no_match_vars ) ;
use Readonly;
use Switch;
use Carp;
use ANTLR::Runtime::BitSet;

use Moose;

extends '<@superClassName><superClass><@end>';

Readonly my $token_names => [
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
];

use constant {
<tokens:{ <it.name>
 => <it.type>, }; separator="\n">
};

<bitsets:bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
            words64=it.bits)>

<scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
<@members>
```

```
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>

sub BUILD {
  my ($self, $arg_ref) = @_;

<if(backtracking)>
  $self->state->rule_memo({});<\n>
<endif>
}
<@end>

sub get_token_names {
  return $token_names;
}

sub get_grammar_file_name {
  return "<fileName>";
}

<members>

<rules; separator="\n\n">

<synpreds:{p | <synpred(p)>}>

<cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = __PACKAGE__::DFA<dfa.decisionNumber>->new($self);};
separator="\n">
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

no Moose;
__PACKAGE__->meta->make_immutable();
1;
__END__
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType,
superClass="ANTLR::Runtime::Parser", labelType="ANTLR::Runtime::Token",
members={<actions.parser.members>})
 ::= <<
<genericParser(inputStreamType="ANTLR::Runtime::TokenStream", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules, numRules, bitsets,
labelType={<ASTLabelType>}, ASTLabelType="Object", superClass="ANTLR::Runtime::TreeParser",
members={<actions.treeparser.members>}, filterMode) ::= <<
```

```
<genericParser(inputStreamType="TreeNodeStream", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start
 <ruleName>
sub <ruleName>_fragment {
# <ruleDescriptor.parameterScope:parameterScope(scope=it)>

<if(trace)>
  $self->traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
  eval {
     <block>
  };
  $self->traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  if ($EVAL_ERROR) {
     croak $EVAL_ERROR;
  }
<else>
  <block>
<endif>
}
# $ANTLR end <ruleName>
>>

synpred(name) ::= <<
public final boolean <name>() {
  backtracking++;
  <@start()>
  int start = input.mark();
  try {
     <name>_fragment(); // can never throw exception
  } catch (RecognitionException re) {
     System.err.println("impossible: "+re);
  }
  boolean success = !failed;
  input.rewind(start);
  <@stop()>
  backtracking--;
  failed=false;
```

```
  return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()>;
 }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>
if ($self->state->failed) {
  return <ruleReturnValue()>;
}
<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (backtracking>0) {failed=true; return <ruleReturnValue()>;}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start <ruleName>
# <fileName>:<description>
sub <ruleName>() {
  my ($self, <ruleDescriptor.parameterScope:parameterScope(scope=it)>) = @_;
  <if(trace)>$self->traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
  <@preamble()>
  eval {
     <ruleMemoization(name=ruleName)>
```

```
      <block>
      <ruleCleanUp()>
      <(ruleDescriptor.actions.after):execAction()>
  };
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  my $exception = $EVAL_ERROR;
  if (ref $exception && $exception->isa('ANTLR::Runtime::RecognitionException')) {
     $self->report_error($exception);
     $self->recover($self->input, $exception);
     $exception = undef;
  }<\n>
<endif>
<endif>
<endif>
  <if(trace)>$self->traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  if ($exception) {
     croak $exception;
     #$exception->rethrow();
  }
  <@postamble()>
  return <ruleReturnValue()>;
}
# $ANTLR end <ruleName>
>>

catch(decl,action) ::= <<
catch
 (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
my $retval = <returnType()>->new();
$retval->set_start($self->input->LT(1));<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
my $<a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
```

```
}>
<endif>
<if(memoize)>
my $<ruleDescriptor.name>_start_index = $self->input->index();
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{<it>_stack.push(new <it>_scope());}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>_stack.push(new <it.name>_scope());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>_stack.pop();}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
  :{my $<it.label.text> = undef;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{List list_<it.label.text>=null;};
 separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|RuleReturnScope <ll.label.text> = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{<labelType> <it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{my $<it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{List list_<it.label.text>=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
$<ruleDescriptor.singleValueReturnName>
```

```
<else>
$retval
<endif>
<endif>
<endif>
>>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
$retval->set_stop($self->input->LT(-1));<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if
 ( backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start <ruleName>
sub m_<ruleName> {
# <ruleDescriptor.parameterScope:parameterScope(scope=it)>
   my ($self) = @_;
   <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
   <ruleDeclarations()>
   eval {
<if(nakedBlock)>
       <ruleMemoization(name=ruleName)>
       <lexerRuleLabelDefs()>
       <ruleDescriptor.actions.init>
       <block><\n>
<else>
       my $_type = <ruleName>;
       my $_channel = $self->DEFAULT_TOKEN_CHANNEL;
       <ruleMemoization(name=ruleName)>
       <lexerRuleLabelDefs()>
       <ruleDescriptor.actions.init>
       <block>
       <ruleCleanUp()>
```

```
      $self->state->type($_type);
      $self->state->channel($_channel);
       <(ruleDescriptor.actions.after):execAction()>
<endif>
  };
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>

  if ($EVAL_ERROR) {
     croak $EVAL_ERROR;
  }
}
# $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
sub m_tokens {
  my ($self) = @_;
  <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
my $alt<decisionNumber> = <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch ($alt<decisionNumber>) {
  <alts:altSwitchCase()>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description)
 ::= <<
# <fileName>:<description>
my $alt<decisionNumber> = <maxAlt>;
<decls>
```

```
<@predecision()>
<decision>
<@postdecision()>
switch ($alt<decisionNumber>) {
  <alts:altSwitchCase()>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
my $cnt<decisionNumber> = 0;
<decls>
<@preloop()>
LOOP<decisionNumber>:
while (1) {
  my $alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>

 switch ($alt<decisionNumber>) {
    <alts:altSwitchCase()>
    else {
       if ( $cnt<decisionNumber> >= 1 ) { last LOOP<decisionNumber> }
       <ruleBacktrackFailure()>
         my $eee =
            ANTLR::Runtime::EarlyExitException->new(<decisionNumber>, $self->input);
         <@earlyExitException()>
         croak $eee;
```

```
      }
  }
  ++$cnt<decisionNumber>;
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
LOOP<decisionNumber>:
while (1) {
  my $alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch ($alt<decisionNumber>) {
    <alts:altSwitchCase()>
    else { last LOOP<decisionNumber> }
  }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)?
 are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase() ::= <<
case <i> {
  <@prealt()>
  <it>
}<\n>
```

```
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
# <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element() ::= <<
<@prematch()>
<it.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions)
 ::= <<
<if(label)>$<label> =<endif>$self->match($self->input, <token>,
$FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new ArrayList();
list_<label>.add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
```

```
<label> = $self->input->LA(1);<\n>
<endif>
$self->match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
$self->match_range(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= $self->input->LA(1);<\n>
<else>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
<endif>
if
 ( <s> ) {
   $self->input->consume();
   <postmatchCode>
<if(!LEXER)>
   $self->state->error_recovery(0);
<endif>
   <if(backtracking)>failed=false;<endif>
}
else {
   <ruleBacktrackFailure()>
   my $mse =
       ANTLR::Runtime::MismatchedSetException->new(undef, $self->input);
   <@mismatchedSetException()>
<if(LEXER)>
   $self->recover($mse);
   $mse->throw();
<else>
   $mse->throw();
   <! use following code to make it recover inline; remove throw mse;
   $self->recoverFromMismatchedSet($self->input, $mse, $FOLLOW_set_in_<ruleName><elementIndex>);
   !>
<endif>
}<\n>
>>
```

```
matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
int <label>Start = getCharIndex();
$self->match(<string>); <checkRuleBacktrackFailure()>
<labelType> <label> = new CommonToken(input, Token.INVALID_TOKEN_TYPE,
 Token.DEFAULT_CHANNEL, <label>Start, getCharIndex()-1);
<else>
$self->match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(label,elementIndex) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(label,elementIndex) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
```

```
$self->push_follow($FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)>
$<label> = $self-><rule.name>(<args; separator=", ">);<\n>
<else>
$self-><rule.name>(<args; separator=", ">);<\n>
<endif>
$self->state->_fsp($self->state->_fsp
 - 1);
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
$self->m_<rule>(<args; separator=", ">); <checkRuleBacktrackFailure()>
<label> = new CommonToken(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<else>
$self->m_<rule.name>(<args; separator=", ">); <checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer
 */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
match(EOF); <checkRuleBacktrackFailure()>
<labelType> <label> = new CommonToken(input, EOF, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
```

```
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
  match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction
 expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels">
else {
<if(eotPredictsAlt)>
  $alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  my $nvae =
     ANTLR::Runtime::NoViableAltException->new({
        grammar_decision_description => "<description>",
        decision_number => <decisionNumber>,
```

```
        state_number => <stateNumber>,
        input => $self->input,
      });<\n>
  <@noViableAltException()>
  croak $nvae;<\n>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but
 this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
$alt<decisionNumber> = <eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  $alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/**
 An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "$alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
```

```
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
  <edges; separator="\n">
  else {
  <if(eotPredictsAlt)>
     $alt<decisionNumber> = <eotPredictsAlt>;
  <else>
     <ruleBacktrackFailure()>
     my $nvae =
        ANTLR::Runtime::NoViableAltException->new({
            grammar_decision_description => "<description>",
           decision_number => <decisionNumber>,
           state_number => <stateNumber>,
           input => $self->input,
        });<\n>
     <@noViableAltException()>
     croak $nvae;<\n>
  <endif>
  }
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
  <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
else { $alt<decisionNumber> = <eotPredictsAlt> }<\n>
<endif>
}<\n>
>>
```

```
dfaEdgeSwitch(labels, targetState) ::= <<
case [<labels:{ <it> }; separator=", ">] { <targetState> }
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA
 case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
$alt<decisionNumber> = $self->dfa<decisionNumber>->predict($self->input);
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
Readonly my $DFA<dfa.decisionNumber>_eot => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedEOT; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_eof => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedEOF; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_min => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedMin; separator=", "> ]);
Readonly
 my $DFA<dfa.decisionNumber>_max => ANTLR::Runtime::DFA->unpack_rle([ <dfa.javaCompressedMax;
separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_accept => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedAccept; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_special => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedSpecial; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_transition => [
<dfa.javaCompressedTransition:{s|ANTLR::Runtime::DFA->unpack_rle([ <s; separator=", "> ])}; separator=", "> ];

{
package <name>::DFA<dfa.decisionNumber>;
use ANTLR::Runtime::Class;

use strict;
use warnings;

extends 'ANTLR::Runtime::DFA';
```

```
sub BUILD {
  my $self = shift;
  my $param_ref = __PACKAGE__->unpack_params(@_, {
     spec => [
        {
           name => 'recognizer',
           isa  => 'ANTLR::Runtime::BaseRecognizer'
        },
     ]
  });

  $self->recognizer($param_ref->{recognizer});
  $self->decision_number(<dfa.decisionNumber>);
   $self->eot($DFA<dfa.decisionNumber>_eot);
  $self->eof($DFA<dfa.decisionNumber>_eof);
  $self->min($DFA<dfa.decisionNumber>_min);
  $self->max($DFA<dfa.decisionNumber>_max);
  $self->accept($DFA<dfa.decisionNumber>_accept);
  $self->special($DFA<dfa.decisionNumber>_special);
  $self->transition($DFA<dfa.decisionNumber>_transition);
}

sub get_description {
  return "<dfa.description>";
}

<@errorMethod()>

<if(dfa.specialStateSTs)>
sub special_state_transition {
  my ($self, $param_ref) = unpack_params(@_, {
     spec => [
        {
           name => 's',
           type => SCALAR,
        },
        {
           name => 'input',
           isa  => 'ANTLR::Runtime::IntStream',
        }
     ]
  });
  my $s = $param_ref->{s};
  my $input = $param_ref->{input};

  switch ($s) {
     <dfa.specialStateSTs:{state |
```

```
      case <i0> \{ <! compressed special state numbers 0..n-1 !>
         <state>};
 separator="\n">
      }
   }

<if(backtracking)>
   if ($self->state->backtracking > 0) {
      $self->state->failed = 1;
      return -1;
   }<\n>
<endif>

   my $nvae =
      ANTLR::Runtime::NoViableAltException->new({
         grammar_decision_description => $self->get_description(),
         decision_number => <dfa.decisionNumber>,
         state_number => $s,
         input => $input,
      });<\n>
   $self->error($nvae);
   $nvae->throw();
   }<\n>
<endif>
}<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
my $input = $self->input;
my $LA<decisionNumber>_<stateNumber> = $input->LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
my $index<decisionNumber>_<stateNumber> = $input->index();
$input->rewind();<\n>
<endif>
s = -1;
<edges; separator="\nels">
<if(semPredState)> <!
 return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
```

```
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left> && <right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "<pred>"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "$LA<decisionNumber>_<stateNumber> eq <atom>"

/**
 Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "$self->input->LA(<k>) eq <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
($LA<decisionNumber>_<stateNumber> ge <lower> && $LA<decisionNumber>_<stateNumber> le <upper>)
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "($self->input->LA(<k>) ge
<lower> && $self->input->LA(<k>) le <upper>)"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
```

```
  <scope.attributes:{<it.decl>;}; separator="\n">
}
protected Stack <scope.name>_stack = new Stack();<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
  <scope.attributes:{<it.decl>;}; separator="\n">
}
protected
 Stack <scope.name>_stack = new Stack();<\n>
<endif>
>>

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.name>_return
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "undef".
*/
initValue(typeName) ::= <<
<if(typeName)>
```

```
<perlTypeInitMap.(typeName)>
<else>
undef
<endif>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
my $<label.label.text> = <initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>

/**
 Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
{
  package <returnType()>;
  use ANTLR::Runtime::Class;

  extends 'ANTLR::Runtime::<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope';

  <scope.attributes:{public <it.decl>;}; separator="\n">
  <@ruleReturnMembers()>
}
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{$<it.name>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "$<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "$<attr.name> =<expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
((<scope>_scope)<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1)).<attr.name>
<else>
<if(index)>
((<scope>_scope)<scope>_stack.elementAt(<index>)).<attr.name>
<else>
((<scope>_scope)<scope>_stack.peek()).<attr.name>
<endif>
<endif>
>>
```

```
scopeSetAttributeRef(scope,attr,expr,index,negIndex)
 ::= <<
<if(negIndex)>
((<scope>_scope)<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1)).<attr.name> =<expr>;
<else>
<if(index)>
((<scope>_scope)<scope>_stack.elementAt(<index>)).<attr.name> =<expr>;
<else>
((<scope>_scope)<scope>_stack.peek()).<attr.name> =<expr>;
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
$<scope>.<attr.name>
<else>
$<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
$<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr)
 ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>;
<else>
$<attr.name> =<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "$<label>"
```

```
/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "$<scope>->get_text()"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.getType()"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.getLine()"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.getCharPositionInLine()"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.getChannel()"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.getTokenIndex()"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "((<labelType>)<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "((<labelType>)<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "((<ASTLabelType>)<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr)
 ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))
<else>
substr($self->input, $<scope>->start, $<scope>->stop)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "$<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "<scope>.getType()"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "<scope>.getLine()"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "<scope>.getCharPositionInLine()"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "<scope>.getChannel()"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "<scope>.getTokenIndex()"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "<scope>.getText()"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "((<labelType>)retval.start)"
rulePropertyRef_stop(scope,attr)
 ::= "((<labelType>)retval.stop)"
rulePropertyRef_tree(scope,attr) ::= "((<ASTLabelType>)retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
```

```
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "$_type"
lexerRulePropertyRef_line(scope,attr) ::= "tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "$_channel"
lexerRulePropertyRef_start(scope,attr) ::= "tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_self(scope,attr)
 ::= "$self"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"


/** How to execute an action */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
if ( backtracking==0 ) {
 <action>
}
<endif>
<else>
<action>
<endif>
>>

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
Readonly my $<name> => ANTLR::Runtime::BitSet->new({ words64 => [ <words64:{'<it>'};separator=", "> ]
});<\n>
```

>>

codeFileExtension() ::= ".pm"

true() ::= "1"
false() ::= "0"

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Perl5/Perl5.stg
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/*
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*/
@genericParserHeaderFile.memVars() ::= <<
/* AST parserHeaderFile.memVars */
NSInteger ruleLevel;
NSArray *ruleNames;
<@super.memVars()> /* AST super.memVars */
<parserMemVars()>   /* AST parserMemVars */
>>

@genericParserHeaderFile.properties() ::= <<

```
/* AST parserHeaderFile.properties */
<@super.properties()>  /* AST super.properties */
<parserProperties()>   /* AST parserproperties */
>>

@genericParserHeaderFile.methodsDecl() ::= <<
/* AST parserHeaderFile.methodsDecl
 */
<@super.methodsDecl()>  /* AST super.methodsDecl */
<parserMethodsDecl()>   /* AST parsermethodsDecl */
>>

@genericParser.synthesize() ::= <<
/* AST genericParser.synthesize */
<@super.synthesize()>
<parserSynthesize()>
>>

@genericParser.methods() ::= <<
/* AST genericParser.methods */
<@super.methods()>
<parserMethods()>
>>

/* additional init code for tree support */
@genericParser.init() ::= <<
/* AST genericParser.init */
<@super.init()>
[self setTreeAdaptor:[[CommonTreeAdaptor newTreeAdaptor] retain]];
>>

@genericParser.dealloc() ::= <<
/* AST genericParser.dealloc */
[self setTreeAdaptor:nil];
<@super.dealloc()>
>>

/* Add an adaptor property that knows how to build trees */
parserMemVars() ::= <<
/* AST parserMemVars */
id\<TreeAdaptor> treeAdaptor;
>>

/* Add an adaptor property that knows how to build trees */
parserProperties() ::= <<
/* AST parserProperties */
@property (retain, getter=getTreeAdaptor, setter=setTreeAdaptor:) id\<TreeAdaptor> treeAdaptor;
>>
```

```
/**
 Declaration of additional tree support methods - go in interface of parserHeaderFile() */
parserMethodsDecl() ::= <<
/* AST parserMethodsDecl */
- (id\<TreeAdaptor>) getTreeAdaptor;
- (void) setTreeAdaptor:(id\<TreeAdaptor>)theTreeAdaptor;
>>

/* Add an adaptor property that knows how to build trees */
parserSynthesize() ::= <<
/* AST parserProperties */
@synthesize treeAdaptor;
>>

/** Definition of addition tree support methods - go in implementation of genericParser() */
parserMethods() ::= <<
/* AST parserMethods */
- (id\<TreeAdaptor>) getTreeAdaptor
{
 return treeAdaptor;
}

- (void) setTreeAdaptor:(id\<TreeAdaptor>)aTreeAdaptor
{
 if (aTreeAdaptor != treeAdaptor) {
  treeAdaptor = aTreeAdaptor;
 }
}
>>

/** addition memVars for returnscopes */
@returnScopeInterface.memVars() ::= <<
/* AST returnScopeInterface.memVars */
<recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope properties */
@returnScopeInterface.properties() ::= <<
/* AST returnScopeInterface.properties
 */
@property (retain, getter=getTree, setter=setTree:) <recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope methodsDecl */
@returnScopeInterface.methodsDecl() ::= <<
/* AST returnScopeInterface.methodsDecl */
- (<recognizer.ASTLabelType; null="CommonTree"> *)getTree;<\n>
```

```
- (void) setTree:(<recognizer.ASTLabelType; null="CommonTree"> *)aTree;<\n>
>>

/** the implementation of returnScope synthesize */
@returnScopeImplementation.synthesize() ::= <<
/* AST returnScope.synthesize */
@synthesize tree;
>>

/** the implementation of returnScope methods */
@returnScopeImplementation.methods() ::= <<
/* AST returnScope.methods */
- (<ASTLabelType> *)getTree
{
  return tree;
}

- (void) setTree:(<ASTLabelType> *)aTree
{
  if (tree != aTree) {
     if (tree != nil) [tree release];
     if (aTree != nil) [aTree retain];
     tree = aTree;
  }
}

- (void) dealloc
{
  self.tree = nil;
  [super dealloc];
}

>>

/** Add
 a variable to track rule's return AST */
ruleDeclarations() ::= <<
/* AST ruleDeclarations */
<super.ruleDeclarations()>
<ASTLabelType> *root_0 = nil;<\n>
>>

ruleLabelDefs() ::= <<
/* AST ruleLabelDefs */
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it | <ASTLabelType> *<it.label.text>_tree=nil;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> *<it.label.text>_tree = nil;}; separator="\n">
```

```
<ruleDescriptor.allTokenRefsInAltsWithRewrites:{it | RewriteRuleTokenStream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
                                        description:@"token <it>"] retain];}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites:{it | RewriteRuleSubtreeStream *stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor

            description:@"rule <it>"] retain];}; separator="\n">
>>

ruleCleanUp() ::= <<
/* AST ruleCleanUp */
<super.ruleCleanUp()>
<[ruleDescriptor.allTokenRefsInAltsWithRewrites,ruleDescriptor.allRuleRefsInAltsWithRewrites]:{it |
[stream_<it> release];}; separator="\n">
<!
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(backtracking)>if ( state.backtracking == 0 ) {<\n>
<endif>
  [<prevRuleRootRef()> setTree:(<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0]];<\n>
  [treeAdaptor setTokenBoundaries:[<prevRuleRootRef()> getTree]
                     From:[<prevRuleRootRef()> getStart]
                       To:[<prevRuleRootRef()> getStop]];<\n>
<if(backtracking)>}<\n>
<endif>
<endif>
[root_0 release];
!>
>>

rewriteCodeLabelsCleanUp() ::= <<
/* AST rewriteCodeLabelsCleanUp */
<referencedTokenLabels:{it | [stream_<it> release];}; separator="\n">
<referencedTokenListLabels:{it | [stream_<it> release];}; separator="\n">
<referencedRuleLabels:{it |
 [stream_<it> release];}; separator="\n">
<referencedRuleListLabels:{it | [stream_<it> release];}; separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];<\n>
```

```
<endif>
<endif>
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex) ::= <<
<! <super.tokenRef(...)> !>
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) <endif>
  [stream_<token> addElement:<label>];<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the
 rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex) ::= <<
<! <super.tokenRef(...)> !>
<tokenRefBang(...)>
<if(backtracking)>
if ( !<actions.(actionScope).synpredgate> ) <endif>
  [stream_<token> addElement:<label>];<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
[stream_<rule.name> addElement:[<label> getTree]];
>>

/** x+=rule when output=AST and tracking for rewrite */
```

```
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem={[<label> getTree]},...)>
>>

/**
 ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<! <super.ruleRefRuleRoot(...)> !>
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
   [stream_<rule.name> addElement:[<label> getTree]];<\n>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem={[<label> getTree]},...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list
 labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;<\n>
<rewriteCodeLabels()>
root_0 = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];<\n>
```

```
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)[treeAdaptor rulePostProcessing:root_0];
[input replaceChildren:[treeAdaptor getParent:retval.start]
            From:[treeAdaptor getChildIndex:retval.start]
              To:[treeAdaptor getChildIndex:_last]
            With:retval.tree];
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;<\n>
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree
 = root_0;<\n>
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it | RewriteRule<rewriteElementType>Stream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
description:@"token <it>" element:<it>] retain];};
  separator="\n"
>
<referencedTokenListLabels:{it | RewriteRule<rewriteElementType>Stream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
     description:@"token <it>" elements:list_<it>] retain];};
  separator="\n"
>
<referencedWildcardLabels:{it | RewriteRuleSubtreeStream stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
     description:"wildcard <it>" element:<it>] retain];};
  separator="\n"
>
<referencedWildcardListLabels:{it | RewriteRuleSubtreeStream stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
      descriptor:"wildcard <it>" elements:list_<it>] retain];};
  separator="\n"
>
<referencedRuleLabels:{it | RewriteRuleSubtreeStream *stream_<it> =
```

```
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
     description:@"token <it>" element:<it>!=nil?[<it> getTree]:nil] retain];};
  separator="\n"
>
<referencedRuleListLabels:{it | RewriteRuleSubtreeStream *stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
     description:@"token <it>" elements:list_<it>] retain];};
  separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | [stream_<el> hasNext]}; separator="||">
 ) {
 <alt>
}
<referencedElementsDeep:{el | [stream_<el> reset];<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | [stream_<el> hasNext]}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | [stream_<el> reset];<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
```

```
{
if ( !(<referencedElements:{el | [stream_<el> hasNext]}; separator=" || ">) ) {
  @throw [RewriteEarlyExitException newException];
}
while ( <referencedElements:{el | [stream_<el> hasNext]}; separator=" || "> ) {
  <alt>
}
<referencedElements:{el | [stream_<el> reset];<\n>}>
}
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
 {
  <a.alt>
}<\n>
<else>
{
  <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = nil;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
  <ASTLabelType> *root_<treeLevel> = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];
  <root:rewriteElement()>
  <children:rewriteElement()>
  [treeAdaptor addChild:root_<treeLevel> toTree:root_<enclosingTreeLevel>];
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
// TODO: args: <args; separator=", ">
```

```
[treeAdaptor addChild:<createRewriteNodeFromElement(...)> toTree:root_<treeLevel>];<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
[treeAdaptor addChild:[stream_<label> nextNode] toTree:root_<treeLevel>];<\n>
>>

/**
 Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
[treeAdaptor addChild:[stream_<label> nextNode] toTree:root_<treeLevel>];<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createRewriteNodeFromElement(...)>
old:root_<treeLevel>];<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
[treeAdaptor addChild:<createImaginaryNode(tokenType=token, ...)> toTree:root_<treeLevel>];<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>
 *)[treeAdaptor becomeRoot:<createImaginaryNode(tokenType=token, ...)> old:root_<treeLevel>];<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
```

```
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
[treeAdaptor addChild:[stream_<rule> nextTree] toTree:root_<treeLevel>];<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:(id\<Tree>)[stream_<rule> nextNode]
old:root_<treeLevel>];<\n>
>>

rewriteNodeAction(action) ::= <<
[treeAdaptor addChild:<action> toTree:root_<treeLevel>];<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<action>
 old:root_<treeLevel>];<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
```

```
   [<terminalOptions.node> new<terminalOptions.node>:<tokenType> <if(args)>, <args; separator=", "><endif>]
<else>
  <if(args)>
     [[treeAdaptor createTree:<tokenType> <if(first(args))>FromToken:<first(args)><endif>
<if(first(rest(args)))>Text:<first(rest(args))><else>Text:@"<tokenType>"<endif>] retain]
  <else>
     [[treeAdaptor createTree:<tokenType> Text:@"<tokenType>"] retain]
  <endif>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
  [<terminalOptions.node> new<terminalOptions.node>:[stream_<token> nextToken]<if(args)>, <args;
separator=", "><endif>]
<else>
  <if(args)> <! must create new node from old !>
     [[treeAdaptor createTree:<token> Text:<first(rest(args))> <args; separator=", ">] retain]
  <else>
     [stream_<token> nextNode]
  <endif>
<endif>
>>
```

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```
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var _first_0:<ASTLabelType>
 = null;
var _last:<ASTLabelType> = null;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = <ASTLabelType>(_first_0);
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
  retval.tree = <ASTLabelType>(adaptor.getParent(retval.tree));
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
```

```
_last = <ASTLabelType>(input.LT(1));
{
var _save_last_<treeLevel>:<ASTLabelType> = _last;
var _first_<treeLevel>:<ASTLabelType> = null;
<if(!rewriteMode)>
var root_<treeLevel>:<ASTLabelType> = <ASTLabelType>(adaptor.nil());
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if
 ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==TokenConstants.DOWN ) {
  matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
}
<else>
matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions)
 ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
>>

/** ID auto construct */
```

```
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions)
 ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<label>_tree, root_<treeLevel>));
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
```

```
wildcard(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.dupTree(<label>);
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else>
 <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug)
 ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
```

```
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<label>_tree, root_<treeLevel>));
<if(backtracking)>}<endif>
<endif>
}, ...
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.tree);
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>.tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) auto
 construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_<treeLevel> =
<ASTLabelType>(adaptor.becomeRoot(<label>.tree, root_<treeLevel>));
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
```

```
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefRootTrack(...)>
>>

/**
 ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = <ASTLabelType>(adaptor.rulePostProcessing(root_0));
<if(backtracking)>}<endif>
<endif>
>>

Found in path(s):
```

* /antlr-3-5-3-jar/org/antlr/codegen/templates/ActionScript/ASTTreeParser.stg
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*/

```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

finishedBacktracking(block) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
```

```
   <block>
<else>
<block>
<endif>
<endif>
>>

@ruleBody.setErrorReturnValue() ::= <<
retval.tree = self._adaptor.errorNode(self.input, retval.start, self.input.LT(-1), re)
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/**
 label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
```

```
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate
 that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <%
<super.matchSet(postmatchCode={<finishedBacktracking({self._adaptor.addChild(root_0,
<createNodeFromToken(...)>)})>}, ...)>
%>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
<super.matchSet(postmatchCode={<finishedBacktracking({root_0 =
self._adaptor.becomeRoot(<createNodeFromToken(...)>, root_0)})>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({self._adaptor.addChild(root_0,
```

```
 <label>.tree)})>
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({root_0 = self._adaptor.becomeRoot(<label>.tree, root_0)})>
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(label, {<label>.tree})>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
self._adaptor.addChild(root_0,
 <label>_tree)
})>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
```

```
})>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<terminalOptions.node>(<label>) <! new MethodNode(IDLabel) !>
<else>
self._adaptor.createWithPayload(<label>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
self._adaptor.setTokenBoundaries(retval.tree, retval.start, retval.stop)
})>
>>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python3/ASTParser.stg
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*/

dfa(decisionRanks,states,edges,rankdir,startState,useBox) ::= <<
digraph NFA {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

nfa(decisionRanks,states,edges,rankdir,startState) ::= <<
digraph NFA {
rankdir=LR;
<decisionRanks; separator="\n">
<states;
 separator="\n">
<edges; separator="\n">
}
>>

decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states; separator="; ">}
>>

edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7, label = "<label>"<if(arrowhead)>, arrowhead =
<arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7, label = "<label>"<if(arrowhead)>, arrowhead =
<arrowhead><endif>];
>>

epsilon-edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontname="Times-Italic", label = "e"];
>>

state(name,useBox) ::= <<
node [fontsize=11, shape = <if(useBox)>box<else>circle, fixedsize=true, width=.4<endif>]; <name>
>>
```

stopstate(name,useBox) ::= <<
node [fontsize=11, shape = <if(useBox)>polygon,sides=4,peripheries=2<else>doublecircle, fixedsize=true, width=.6<endif>]; <name>
>>

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* /antlr-3-5-3-jar/org/antlr/tool/templates/dot/dot.stg
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*/

/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label

```
*  is combined into tokenRef, ruleRef, ...
*/

/* addition memVars for returnscopes */
@returnScopeInterface.memVars() ::= <<
/* ASTTreeParser returnScopeInterface.memVars
 */
<recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope methodsDecl */
@returnScopeInterface.methodsDecl() ::= <<
/* ASTTreeParser returnScopeInterface.methodsDecl */
- (<recognizer.ASTLabelType; null="CommonTree"> *)getTree;
- (void) setTree:(<recognizer.ASTLabelType; null="CommonTree"> *)aTree;<\n>
>>

/** the implementation of returnScope methods */
@returnScope.methods() ::= <<
/* ASTTreeParser returnScope.methods */
- (<ASTLabelType> *)getTree
{
  return tree;
}

- (void) setTree:(<ASTLabelType> *)aTree
{
  if (tree != aTree) {
     if (tree != nil) [tree release];
     if (aTree != nil) [aTree retain];
     tree = aTree;
  }
}

- (void) dealloc
{
  [self setTree:nil];
  [super dealloc];
}

@synthesize tree;
>>

@returnScopeProperties() ::= <<
@property (retain) <recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** Add a variable to track last element matched */
```

```
ruleDeclarations() ::= <<
/* ASTTreeParser
 ruleDeclarations */
<super.ruleDeclarations()>
<ASTLabelType> *_first_0 = nil;
<ASTLabelType> *_last = nil;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
/* ASTTreeParser noRewrite */
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType> *)_first_0;
if ( [treeAdaptor getParent:retval.tree] != nil && [treeAdaptor isNil:[treeAdaptor getParent:retval.tree]] ) )
  retval.tree = (<ASTLabelType> *)[treeAdaptor getParent:retval.tree];
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
/* ASTTreeParser tree */
_last = (<ASTLabelType> *)[input LT:1];
{
<ASTLabelType> *_save_last_<treeLevel> = _last;
<ASTLabelType> *_first_<treeLevel> = nil;
<if(!rewriteMode)>
<ASTLabelType>
 *root_<treeLevel> = [[[treeAdaptor class] newEmptyTree] retain];
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==nil ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==nil ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( [input LA:1] == TokenTypeDOWN ) {
```

```
  [self match:input TokenType:TokenTypeDOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:TokenTypeUP Follow:nil]; <checkRuleBacktrackFailure()>
}
<else>
[self match:input TokenType:TokenTypeDOWN Follow:nil]; <checkRuleBacktrackFailure()>
<children:element()>
[self match:input TokenType:TokenTypeUP Follow:nil]; <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
[treeAdaptor addChild:root_<treeLevel> toTree:root_<enclosingTreeLevel>];
<endif>
_last
 = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefBang */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRef */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
  <label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
  <label>_tree = (<ASTLabelType> *)[treeAdaptor dupNode:<label>];
<endif><\n>
  [treeAdaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==nil
 ) _first_<treeLevel> = <label>;
<endif>
>>
```

```
/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefAndListLabel */
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex) ::= <<
/* ASTTreeParser tokenRefRuleRoot */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[treeAdaptor dupNode:<label>];
<endif><\n>
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_<treeLevel>];
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefRuleRootAndListLabel
 */
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser wildcard */
_last = (<ASTLabelType> *)[input LT:1];
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType> *)[adaptor dupTree:<label>];
[adaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel> == nil ) _first_<treeLevel> = <label>;
<endif>
>>
```

```
// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
/* ASTTreeParser matchSet */
_last = (<ASTLabelType> *)[input LT:1];
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node>
 new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[adaptor dupNode:<label>];
<endif><\n>
[adaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
/* ASTTreeParser matchRuleBlockSet */
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
/* ASTTreeParser matchSetBang */
_last = (<ASTLabelType> *)[input LT:1];
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
/* ASTTreeParser matchSetRuleRoot */
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[adaptor dupNode:<label>];
<endif><\n>
root_<treeLevel>
 = (<ASTLabelType> *)[adaptor becomeRoot:<label>_tree old:root_<treeLevel>];
<if(backtracking)>\}<endif>
<endif>
```

```
}, ...
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRef */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
  [treeAdaptor addChild:<label>.tree toTree:root_<treeLevel>];
<else> <! rewrite mode !>
if ( _first_<treeLevel> == nil ) _first_<treeLevel> = <label>.tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefAndListLabel */
<ruleRef(...)>
<! <listLabel(elem = "["+label+" getTree]",...)> !>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRoot */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if
 ( state.backtracking == 0 ) <endif>
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>.tree old:root_<treeLevel>];
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootAndListLabel */
<ruleRefRuleRoot(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
```

```
/* ASTTreeParser ruleRefTrack */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefTrackAndListLabel */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser
 ruleRefRuleRootTrack */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootTrackAndListLabel */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
/* ASTTreeParser createRewriteNodeFromElement */
<if(terminalOptions.node)>
<! new <terminalOptions.node>(stream_<token>.nextNode()) !>
[[[<terminalOptions.node>(stream_<token> alloc] init] nextNode];
<else>
<! stream_<token>.nextNode() !>
[stream_<token> nextNode]
<endif>
>>

ruleCleanUp() ::= <<
/* ASTTreeParser ruleCleanUp */
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = (<ASTLabelType> *)[treeAdaptor
```

rulePostProcessing:root_0];
<if(backtracking)>}<endif>
<endif>
>>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/ObjC/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

/*
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*/

asTypeInitMap ::= [
 "int":"0",
 "uint":"0",
 "Number":"0.0",
 "Boolean":"false",
 default:"null" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
* and cyclic DFAs plus support code.
*/

```
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
          docComment, recognizer,
          name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds,
 memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
package<if(actions.(actionScope).package)> <actions.(actionScope).package><endif> {
  <actions.(actionScope).header>
  <@imports>
import org.antlr.runtime.*;
<if(TREE_PARSER)>
  import org.antlr.runtime.tree.*;
<endif>
  <@end>

  <docComment>
  <recognizer>
}
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="Token",
    superClass="Lexer") ::= <<
public class <grammar.recognizerName> extends
<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else><@superClassName><superClass
><@end><endif> {
  <tokens:{it |public static const <it.name>:int=<it.type>;}; separator="\n">
  <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
  <actions.lexer.members>

  // delegates
  <grammar.delegates:
      {g|public var <g:delegateName()>:<g.recognizerName>;};
 separator="\n">
  // delegators
  <grammar.delegators:
      {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  <last(grammar.delegators):{g|public var gParent:<g.recognizerName>;}>

  public function <grammar.recognizerName>(<grammar.delegators:{g|<g:delegateName()>:<g.recognizerName>,
}>input:CharStream = null, state:RecognizerSharedState = null) {
      super(input, state);
      <cyclicDFAs:cyclicDFACtor()>
<if(memoize)>
<if(grammar.grammarIsRoot)>
```

```
      this.state.ruleMemo = new Array(<numRules>+1);<\n> <! index from 1..n !>
<endif>
<endif>
      <grammar.directDelegates:
       {g|<g:delegateName()> = new <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>this,
input, this.state);}; separator="\n">
      <grammar.delegators:
       {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
      <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
  public override
 function get grammarFileName():String { return "<fileName>"; }

<if(filterMode)>
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override function nextToken():Token {
  while (true) {
     if ( input.LA(1)==CharStreamConstants.EOF ) {
        return TokenConstants.EOF_TOKEN;
     }
     this.state.token = null;
    this.state.channel = TokenConstants.DEFAULT_CHANNEL;
     this.state.tokenStartCharIndex = input.index;
     this.state.tokenStartCharPositionInLine = input.charPositionInLine;
      this.state.tokenStartLine = input.line;
    this.state.text = null;
     try {
        var m:int = input.mark();
        this.state.backtracking=1; <! means we won't throw slow exception !>
        this.state.failed=false;
        mTokens();
```

```
        this.state.backtracking=0;
        <! mTokens backtracks with synpred at backtracking==2
           and we set the synpredgate to allow actions at level 1. !>
        if ( this.state.failed ) {
            input.rewindTo(m);
            input.consume(); <! advance one char and try again !>
        }
        else {
            emit();
            return this.state.token;
        }
      }
      catch (re:RecognitionException) {
        // shouldn't happen in backtracking mode, but...
        reportError(re);
        recover(re);
      }
  }
  // Not reached - For ActionScript compiler
  throw new Error();
}

public override function memoize(input:IntStream,
 ruleIndex:int,
 ruleStartIndex:int):void
{
if
 ( this.state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

public override function alreadyParsedRule(input:IntStream, ruleIndex:int):Boolean {
if ( this.state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "this.state.backtracking==0"

filteringActionGate() ::= "this.state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
           bitsets, inputStreamType, superClass,
           labelType, members, rewriteElementType,
           filterMode, ASTLabelType="Object") ::= <<
public class <grammar.recognizerName> extends
<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else><@superClassName><superClass
><@end><endif> {
```

```
<if(grammar.grammarIsRoot)>
  public static const tokenNames:Array = [
     "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
 <tokenNames; separator=", ">
  ];<\n>
<endif>
  <tokens:{it |public static const <it.name>:int=<it.type>;}; separator="\n">

  // delegates
  <grammar.delegates: {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  <last(grammar.delegators):{g|public var gParent:<g.recognizerName>;}>

  <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
  <@members>
 <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
  public function <grammar.recognizerName>(<grammar.delegators:{g|<g:delegateName()>:<g.recognizerName>,
}>input:<inputStreamType>, state:RecognizerSharedState = null) {
     super(input, state);
     <cyclicDFAs:cyclicDFACtor()>
     <parserCtorBody()>
     <grammar.directDelegates:
      {g|<g:delegateName()> = new <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>,
 }>this, input, this.state);}; separator="\n">
     <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
     <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
  <@end>

  public override function get tokenNames():Array { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; }
  public override function get grammarFileName():String { return "<fileName>"; }

  <members>

  <rules; separator="\n\n">

  <! generate rule/method definitions for imported rules so they
    appear to be defined in this recognizer. !>
    // Delegated rules
  <grammar.delegatedRules:{ruleDescriptor|
     public function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>):<returnType()> {
<if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope.attribut
es:{a|<a.name>}; separator=", ">);
```

```
 \}}; separator="\n">

  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                  words64=it.bits)>}>
}
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new Array(<length(grammar.allImportedRules)>+1);<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType="Object",
superClass="Parser", labelType="Token", members={<actions.parser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, "TokenStream", superClass,
          labelType, members, "Token",
          false, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different
 type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
        superClass="TreeParser", members={<actions.treeparser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, "TreeNodeStream", superClass,
          labelType, members, "Node",
          filterMode, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
```

```
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
public
 final function <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>):void {
  <ruleLabelDefs()>
<if(trace)>
  traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
  try {
     <block>
  }
  finally {
     traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  }
<else>
  <block>
<endif>
}
// $ANTLR end <ruleName>
>>

synpred(name) ::= <<
public final function <name>():Boolean {
  this.state.backtracking++;
  <@start()>
  var start:int = input.mark();
  try {
     <name>_fragment(); // can never throw exception
  } catch (re:RecognitionException) {
     trace("impossible: "+re);
  }
  var success:Boolean = !this.state.failed;
  input.rewindTo(start);
  <@stop()>
  this.state.backtracking--;
  this.state.failed=false;
  return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( this.state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) )
```

```
 { return <ruleReturnValue()>; }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (this.state.failed) return <ruleReturnValue()>;<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (this.state.backtracking>0) {this.state.failed=true; return <ruleReturnValue()>;}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
// $ANTLR start <ruleName>
// <fileName>:<description>
public final function <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>):<returnType()> {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
   <@preamble()>
  try {
     <ruleMemoization(name=ruleName)>
     <block>
     <ruleCleanUp()>
     <(ruleDescriptor.actions.after):execAction()>
  }
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  catch (re:RecognitionException) {
     reportError(re);
     recoverStream(input,re);
     <@setErrorReturnValue()>
  }<\n>
<endif>
<endif>
```

```
<endif>
  finally {
     <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
     <memoize()>
     <ruleScopeCleanUp()>
     <finally>
  }
  <@postamble()>
  return <ruleReturnValue()>;
}
// $ANTLR end <ruleName>
>>

catch(decl,action) ::= <<
catch (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
var retval:<returnType()> = new <returnType()>();
retval.start = input.LT(1);<\n>
<else>
<ruleDescriptor.returnScope.attributes:{
 a |
var <a.name>:<a.type> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
var <ruleDescriptor.name>_StartIndex:int = input.index;
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.push(new Object());}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.push(new Object());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.pop();}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |var <it.label.text>:<labelType>=null;}; separator="\n"
```

```
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |var list_<it.label.text>:Array=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef();
 separator="\n">
<ruleDescriptor.ruleListLabels:{ll|var <ll.label.text>:RuleReturnScope = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |var <it.label.text>:<labelType>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |var <it.label.text>:int;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
  :{it |var list_<it.label.text>:Array=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1);<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( this.state.backtracking>0 ) { memoize(input,
 <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
```

```
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start <ruleName>
public final function m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>):void {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  try {
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      var _type:int = <ruleName>;
      var _channel:int = DEFAULT_TOKEN_CHANNEL;
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block>
      <ruleCleanUp()>
      this.state.type = _type;
      this.state.channel = _channel;
      <(ruleDescriptor.actions.after):execAction()>
<endif>
   }
  finally {
      <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
      <ruleScopeCleanUp()>
      <memoize()>
  }
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
public override function mTokens():void {
  <block><\n>
}
>>
```

```
// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber>:int=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
  <alts:{a | <altSwitchCase(i, a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var
 alt<decisionNumber>:int=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
  <alts:{a | <altSwitchCase(i, a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>
```

```
/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
var cnt<decisionNumber>:int=0;
<decls>
<@preloop()>
loop<decisionNumber>:
do {
  var alt<decisionNumber>:int=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
 {
 <alts:{a | <altSwitchCase(i, a)>}>
 default :
    if ( cnt<decisionNumber> >= 1 ) break loop<decisionNumber>;
    <ruleBacktrackFailure()>
        throw new EarlyExitException(<decisionNumber>, input);
        <! Need to add support for earlyExitException debug hook !>
  }
  cnt<decisionNumber>++;
} while (true);
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
loop<decisionNumber>:
do {
  var alt<decisionNumber>:int=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i, a)>}>
 default :
    break loop<decisionNumber>;
  }
} while (true);
```

```
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|)
 by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> :
   <@prealt()>
   <alt>
   break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>
```

```
/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions)
 ::= <<
<if(label)><label>=<labelType>(<endif>matchStream(input,<token>,FOLLOW_<token>_in_<ruleName><element
Index>)<if(label)>)<endif>; <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new Array();
list_<label>.push(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1);<\n>
<else>
<label>=<labelType>(input.LT(1));<\n>
<endif>
<endif>
if
 ( <s> ) {
   input.consume();
   <postmatchCode>
<if(!LEXER)>
```

```
  this.state.errorRecovery=false;
<endif>
  <if(backtracking)>this.state.failed=false;<endif>
}
else {
  <ruleBacktrackFailure()>
  <@mismatchedSetException()>
<if(LEXER)>
  throw recover(new MismatchedSetException(null,input));<\n>
<else>
  throw new MismatchedSetException(null,input);
  <! use following code to make it recover inline; remove throw mse;
  recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
  !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
var <label>Start:int = charIndex;
matchString(<string>); <checkRuleBacktrackFailure()>
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int =
 charPositionInLine;
<label> = CommonToken.createFromStream(input, TokenConstants.INVALID_TOKEN_TYPE,
TokenConstants.DEFAULT_CHANNEL, <label>Start, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
matchString(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=<labelType>(input.LT(1));<\n>
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>
```

```
wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(label, label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value
 or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*
* GMS: Note:  do not use post-decrement operator!  ASC produces bad code for exceptions in this case.
*      See: https://bugs.adobe.com/jira/browse/ASC-3625
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);<\n>
state._fsp = state._fsp - 1;
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
```

```
*/
lexerRuleRef(rule,label,args,elementIndex,scope)
 ::= <<
<if(label)>
var <label>Start<elementIndex>:int = charIndex;
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> = CommonToken.createFromStream(input, TokenConstants.INVALID_TOKEN_TYPE,
TokenConstants.DEFAULT_CHANNEL, <label>Start<elementIndex>, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
var <label>Start<elementIndex>:int
 = charIndex;
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
match(EOF); <checkRuleBacktrackFailure()>
var <label>:<labelType> = CommonToken.createFromStream(input, EOF,
TokenConstants.DEFAULT_CHANNEL, <label>Start<elementIndex>, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                 ::= "var <recRuleArg()>:int"
recRuleArg()                    ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()        ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)    ::= "$<name>=$<src>.<name>;"
```

```
/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::=
 <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==TokenConstants.DOWN ) {
  matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
}
<else>
matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(pred,description)>) ) {
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges;
 separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  throw new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);<\n>
  <! Need to add hook for noViableAltException() !>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
```

```
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so
 that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  alt<decisionNumber>=<eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.
  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
```

```
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  throw new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);<\n>
  <! Need to add hook for noViableAltException !>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
  <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber>=<eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
   {
  <targetState>
  }
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input);
```

```
>>

cyclicDFACtor(dfa) ::= <<

dfa<dfa.decisionNumber> = new DFA(this, <dfa.decisionNumber>,
        "<dfa.description>",
        DFA<dfa.decisionNumber>_eot, DFA<dfa.decisionNumber>_eof, DFA<dfa.decisionNumber>_min,
        DFA<dfa.decisionNumber>_max, DFA<dfa.decisionNumber>_accept, DFA<dfa.decisionNumber>_special,
        DFA<dfa.decisionNumber>_transition<if(dfa.specialStateSTs)>,
DFA<dfa.decisionNumber>_specialStateTransition<endif>);

>>
/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple,
 concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<

private const DFA<dfa.decisionNumber>_eot:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedEOT; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_eof:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedEOF; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_min:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedMin; wrap="\"+\n    \"">", true);
private const DFA<dfa.decisionNumber>_max:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedMax; wrap="\"+\n    \"">", true);
private const DFA<dfa.decisionNumber>_accept:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedAccept; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_special:Array =
  DFA.unpackEncodedString("<dfa.javaCompressedSpecial;
 wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_transition:Array = [
      <dfa.javaCompressedTransition:{s|DFA.unpackEncodedString("<s; wrap="\"+\n\"">")}; separator=",\n">
];
<if(dfa.specialStateSTs)>
  private function DFA<dfa.decisionNumber>_specialStateTransition(dfa:DFA, s:int, _input:IntStream):int {
      <if(LEXER)>
      var input:IntStream = _input;
      <endif>
      <if(PARSER)>
      var input:TokenStream = TokenStream(_input);
      <endif>
      <if(TREE_PARSER)>
```

```
      var input:TreeNodeStream = TreeNodeStream(_input);
      <endif>
   var _s:int = s;
      switch ( s ) {
      <dfa.specialStateSTs:{state |
      case <i0> : <! compressed special state numbers 0..n-1 !>
         <state>}; separator="\n">
      }
<if(backtracking)>
      if (this.state.backtracking>0) {this.state.failed=true; return -1;}<\n>
<endif>
      throw dfa.error(new NoViableAltException(dfa.description, <dfa.decisionNumber>,
 _s, input));
   }<\n>
<endif>

protected var dfa<dfa.decisionNumber>:DFA;  // initialized in constructor

>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
var index<decisionNumber>_<stateNumber>:int = input.index;
input.rewind();<\n>
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/**
 An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
```

```
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,{})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atomAsInt>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atomAsInt>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lowerAsInt> && LA<decisionNumber>_<stateNumber> \<=
<upperAsInt>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt)
 ::= "(input.LA(<k>) >= <lowerAsInt> && input.LA(<k>) \<= <upperAsInt>)"

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected var <scope.name>_stack:Array = new Array();<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected var <scope.name>_stack:Array = new Array();<\n>
```

```
<endif>
>>

returnStructName() ::= "<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<returnStructName()>
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

delegateName(d)
 ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<asTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
var <label.label.text>:<ruleLabelType(referencedRule=label.referencedRule)> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
```

```
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public static class <returnType()> extends <if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope {
  <scope.attributes:{it |public <it.decl>;}; separator="\n">
  <@ruleReturnMembers()>
};
<endif>
>>

parameterScope(scope)
 ::= <<
<scope.attributes:{it |<it.name>:<it.type>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
<scope>_stack[<scope>_stack.length-<negIndex>-1].<attr.name>
<else>
<if(index)>
<scope>_stack[<index>].<attr.name>
<else>
<scope>_stack[<scope>_stack.length-1].<attr.name>
<endif>
<endif>
>>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
<scope>_stack[<scope>_stack.length-<negIndex>-1].<attr.name> =<expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name> =<expr>;
<else>
<scope>_stack[<scope>_stack.length-1].<attr.name> =<expr>;
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
```

```
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope)
 ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?<scope>.values.<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.values.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.values.<attr.name> =<expr>;
<else>
<attr.name> =<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.text:null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.type:0)"
tokenLabelPropertyRef_line(scope,attr)
 ::= "(<scope>!=null?<scope>.line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.charPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.tokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
```

```
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int(<scope>.text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?<labelType>(<scope>.start):null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?<labelType>(<scope>.stop):null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=null?<ASTLabelType>(<scope>.tree):null)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(<scope>!=null?(input.tokenStream.toStringWithRange(
 input.treeAdaptor.getTokenStartIndex(<scope>.start),
 input.treeAdaptor.getTokenStopIndex(<scope>.start))):null)
<else>
(<scope>!=null?input.toStringWithTokenRange(<scope>.start,<scope>.stop):null)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr)
 ::= "(<scope>!=null?<scope>.st:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(<scope>!=null?<scope>.type:0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(<scope>!=null?<scope>.lien:0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
   "(<scope>!=null?<scope>.charPositionInLine:0)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(<scope>!=null?<scope>.channel:0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(<scope>!=null?<scope>.tokenIndex:0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(<scope>!=null?<scope>.text:null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
   "(<scope>!=null?int(<scope>.text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "<labelType>(retval.start)"
rulePropertyRef_stop(scope,attr) ::= "<labelType>(retval.stop)"
rulePropertyRef_tree(scope,attr)
 ::= "<ASTLabelType>(retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.tokenStream.toStringWithRange(
 input.treeAdaptor.getTokenStartIndex(retval.start),
 input.treeAdaptor.getTokenStopIndex(retval.start))
<else>
input.toStringWithTokenRange(retval.start,input.LT(-1))
```

```
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(charIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st
 and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static const <name>:BitSet = new BitSet([<words64:{it |<it>};separator=", ">]);<\n>
>>

codeFileExtension() ::= ".as"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/ActionScript/ActionScript.stg

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```
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType>
```

```
 _first_0 = null;
<ASTLabelType> _last = null;<\n>
<endif>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = _first_0;
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
 retval.tree = (<ASTLabelType>)adaptor.getParent(retval.tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
  enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = null;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel>
 = (<ASTLabelType>)adaptor.nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> =
(<ASTLabelType>)<root.el.label>.getTree();
<elseif(root.el.label)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
 match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
```

```
 <children:element()>
 match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF

/** ID!
 and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
```

```
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>

/** label+=TOKEN auto
 construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabel(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>
```

```
/**
 Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.dupTree(<label>);
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree
 = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
```

```
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree
 = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.getTree());
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = (<ASTLabelType>)<label>.getTree();
```

```
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabel(label, {<label>.getTree()})>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>

/**
 ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.becomeRoot(<label>.getTree(), root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.getTree()})>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
```

```
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::=
 <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::=
 <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
```

<if(backtracking)>}<endif>
<endif>
<endif>
>>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Java/ASTTreeParser.stg
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*/

@outputFile.imports() ::= <<
<@super.imports()>
<if(!TREE_PARSER)><! tree parser would already have imported !>
import org.antlr.runtime.tree.*;<\n>
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
 <parserMembers()>

```
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
protected TreeAdaptor adaptor = new CommonTreeAdaptor();

public void setTreeAdaptor(TreeAdaptor adaptor) {
 this.adaptor = adaptor;
 <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
}
public
 TreeAdaptor getTreeAdaptor() {
 return adaptor;
}
>>

@returnScope.ruleReturnMembers() ::= <<
<ASTLabelType> tree;
@Override
public <ASTLabelType> getTree() { return tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = null;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<if(!ruleDescriptor.isSynPred)>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it | <ASTLabelType> <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> <it.label.text>_tree=null;}; separator="\n">
<if(ruleDescriptor.supportsLabelOptimization)>
<ruleDescriptor.allTokenRefsInRewrites
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInRewrites
 :{it | RewriteRuleSubtreeStream
 stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");}; separator="\n">
<else>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
```

```
<endif>
<endif>
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode && !ruleDescriptor.isSynPred)>
root_0 = (<ASTLabelType>)adaptor.nil();<\n>
<endif>
<endif>
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={})
 ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label, ...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label, ...)>
>>
```

```
/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope)
 ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.getTree());
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(label, {<label>.getTree()})>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.getTree());
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(label, {<label>.getTree()})>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel,
 enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
```

```
if ( <actions.(actionScope).synpredgate> ) {
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
input.replaceChildren(adaptor.getParent(retval.start),
      adaptor.getChildIndex(retval.start),
      adaptor.getChildIndex(_last),
      retval.tree);
<endif>
<endif>
<!
 if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
 separator="\n"
>
<referencedTokenListLabels
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
 separator="\n"
>
<referencedWildcardLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
```

```
>
<referencedRuleLabels
 :{it | RewriteRuleSubtreeStream
 stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>",<it>!=null?<it>.getTree():null);};
 separator="\n"
>
<referencedRuleListLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
 separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el
 | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
```

```
if ( !(<referencedElements:{el | stream_<el>.hasNext()}; separator="||">) ) {
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
 <a.alt>
}<\n>
<else>
{
 <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.addChild(root_<enclosingTreeLevel>,
 root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);
>>
```

```
/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args]
 ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.addChild(root_<treeLevel>, <createImaginaryNode(token,args,terminalOptions)>);
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<createImaginaryNode(token,args,terminalOptions)>,
root_<treeLevel>);
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule)
```

```
 ::= <<
adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>);
>>

rewriteNodeAction(action) ::= <<
adaptor.addChild(root_<treeLevel>, <action>);
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<action>, root_<treeLevel>);
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label)
 ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>


createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
```

<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
%>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Java/AST.stg
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/*
New style messages. This file only contains the messages in English, but no

```
information about which file, line, or column it occurred in.
The location and message ids are taken out of the formats directory.
        Kay Roepke
*/
group en_US;

// TOOL ERRORS
// file errors
CANNOT_WRITE_FILE(arg,exception,stackTrace) ::= <<
cannot write file <arg>: <exception>
<stackTrace; separator="\n">
>>
CANNOT_CLOSE_FILE(arg,exception,stackTrace) ::= "cannot close file <arg>: <exception>"
CANNOT_FIND_TOKENS_FILE(arg)
 ::= "cannot find tokens file <arg>"
ERROR_READING_TOKENS_FILE(arg,exception,stackTrace) ::= <<
problem reading token vocabulary file <arg>: <exception>
<stackTrace; separator="\n">
>>
DIR_NOT_FOUND(arg,exception,stackTrace) ::= "directory not found: <arg>"
OUTPUT_DIR_IS_FILE(arg,exception,stackTrace) ::= "output directory is a file: <arg>"
CANNOT_OPEN_FILE(arg,exception,stackTrace) ::= "cannot find or open file: <arg><if(exception)>; reason:
<exception><endif>"
CIRCULAR_DEPENDENCY() ::= "your grammars contain a circular dependency and cannot be sorted into a valid
build order."

INTERNAL_ERROR(arg,arg2,exception,stackTrace) ::= <<
internal error: <arg> <arg2><if(exception)>: <exception><endif>
<stackTrace; separator="\n">
>>
INTERNAL_WARNING(arg) ::= "internal warning: <arg>"
ERROR_CREATING_ARTIFICIAL_RULE(arg,exception,stackTrace) ::= <<
problems creating lexer rule listing all tokens: <exception>
<stackTrace; separator="\n">
>>
TOKENS_FILE_SYNTAX_ERROR(arg,arg2)
 ::=
 "problems parsing token vocabulary file <arg> on line <arg2>"
CANNOT_GEN_DOT_FILE(arg,exception,stackTrace) ::=
 "cannot write DFA DOT file <arg>: <exception>"
BAD_ACTION_AST_STRUCTURE(exception,stackTrace) ::=
 "bad internal tree structure for action '<arg>': <exception>"
BAD_AST_STRUCTURE(arg,exception,stackTrace) ::= <<
bad internal tree structure '<arg>': <exception>
<stackTrace; separator="\n">
>>
FILE_AND_GRAMMAR_NAME_DIFFER(arg,arg2) ::=
 "file <arg2> contains grammar <arg>; names must be identical"
```

```
FILENAME_EXTENSION_ERROR(arg) ::=
 "file <arg> must end in a file extension, normally .g"

// code gen errors
MISSING_CODE_GEN_TEMPLATES(arg) ::=
 "cannot find code generation templates <arg>.stg"
MISSING_CYCLIC_DFA_CODE_GEN_TEMPLATES() ::=
 "cannot find code generation cyclic DFA templates for language <arg>"
CODE_GEN_TEMPLATES_INCOMPLETE(arg) ::=
 "at least one code generation template missing for language <arg>"
CANNOT_CREATE_TARGET_GENERATOR(arg,exception,stackTrace)
 ::=
 "cannot create target <arg> code generator: <exception>"
STRING_TEMPLATE_ERROR(arg,exception,stackTrace) ::=
 "template error: <arg>"
CANNOT_COMPUTE_SAMPLE_INPUT_SEQ() ::=
 "cannot generate a sample input sequence from lookahead DFA"

// grammar interpretation errors
/*
NO_VIABLE_DFA_ALT(arg,arg2) ::=
 "no viable transition from state <arg> on <arg2> while interpreting DFA"
*/

// GRAMMAR ERRORS
SYNTAX_ERROR(arg) ::= "syntax error: <arg>"
RULE_REDEFINITION(arg) ::=
 "rule <arg> redefinition"
LEXER_RULES_NOT_ALLOWED(arg) ::=
 "lexer rule <arg> not allowed in parser"
PARSER_RULES_NOT_ALLOWED(arg) ::=
 "parser rule <arg> not allowed in lexer"
CANNOT_FIND_ATTRIBUTE_NAME_IN_DECL(arg) ::=
 "cannot find an attribute name in attribute declaration"
NO_TOKEN_DEFINITION(arg) ::=
 "no lexer rule corresponding to token: <arg>"
UNDEFINED_RULE_REF(arg) ::=
 "reference to undefined rule: <arg>"
LITERAL_NOT_ASSOCIATED_WITH_LEXER_RULE(arg) ::=
 "literal has no associated lexer rule: <arg>"
CANNOT_ALIAS_TOKENS_IN_LEXER(arg)
 ::=
 "literals are illegal in lexer tokens{} section: <arg>"
ATTRIBUTE_REF_NOT_IN_RULE(arg,arg2) ::=
 "reference to attribute outside of a rule: <arg><if(arg2)>.<arg2><endif>"
UNKNOWN_ATTRIBUTE_IN_SCOPE(arg,arg2) ::=
 "unknown attribute for <arg>: <arg2>"
UNKNOWN_RULE_ATTRIBUTE(arg,arg2) ::=
```

"unknown attribute for rule <arg>: <arg2>"
UNKNOWN_SIMPLE_ATTRIBUTE(arg,args2) ::=
"attribute is not a token, parameter, or return value: <arg>"
ISOLATED_RULE_SCOPE(arg) ::=
"missing attribute access on rule scope: <arg>"
INVALID_RULE_PARAMETER_REF(arg,arg2) ::=
"cannot access rule <arg>'s parameter: <arg2>"
INVALID_RULE_SCOPE_ATTRIBUTE_REF(arg,arg2) ::=
"cannot access rule <arg>'s dynamically-scoped attribute: <arg2>"
SYMBOL_CONFLICTS_WITH_GLOBAL_SCOPE(arg) ::=
"symbol <arg> conflicts with global dynamic scope with same name"
WRITE_TO_READONLY_ATTR(arg,arg2,arg3) ::=
"cannot write to read only attribute: $<arg><if(arg2)>.<arg2><endif>"
LABEL_CONFLICTS_WITH_RULE(arg)
::=
"label <arg> conflicts with rule with same name"
LABEL_CONFLICTS_WITH_TOKEN(arg) ::=
"label <arg> conflicts with token with same name"
LABEL_CONFLICTS_WITH_RULE_SCOPE_ATTRIBUTE(arg,arg2) ::=
"label <arg> conflicts with rule <arg2>'s dynamically-scoped attribute with same name"
LABEL_CONFLICTS_WITH_RULE_ARG_RETVAL(arg,arg2) ::=
"label <arg> conflicts with rule <arg2>'s return value or parameter with same name"
ATTRIBUTE_CONFLICTS_WITH_RULE(arg,arg2) ::=
"rule <arg2>'s dynamically-scoped attribute <arg> conflicts with the rule name"
ATTRIBUTE_CONFLICTS_WITH_RULE_ARG_RETVAL(arg,arg2) ::=
"rule <arg2>'s dynamically-scoped attribute <arg> conflicts with<arg2>'s return value or parameter with same name"
LABEL_TYPE_CONFLICT(arg,arg2) ::=
"label <arg> type mismatch with previous definition: <arg2>"
ARG_RETVAL_CONFLICT(arg,arg2) ::=
"rule <arg2>'s argument <arg> conflicts a return value with same name"
NONUNIQUE_REF(arg) ::=
"<arg> is a non-unique reference"
FORWARD_ELEMENT_REF(arg)
::=
"illegal forward reference: <arg>"
MISSING_RULE_ARGS(arg) ::=
"missing parameter(s) on rule reference: <arg>"
RULE_HAS_NO_ARGS(arg) ::=
"rule <arg> has no defined parameters"
ARGS_ON_TOKEN_REF(arg) ::=
"token reference <arg> may not have parameters"
ILLEGAL_OPTION(arg) ::=
"illegal option <arg>"
LIST_LABEL_INVALID_UNLESS_RETVAL_STRUCT(arg) ::=
"rule '+=' list labels are not allowed w/o output option: <arg>"
UNDEFINED_TOKEN_REF_IN_REWRITE(arg) ::=
"reference to undefined token in rewrite rule: <arg>"

```
REWRITE_ELEMENT_NOT_PRESENT_ON_LHS(arg) ::=
 "reference to rewrite element <arg> without reference on left of ->"
UNDEFINED_LABEL_REF_IN_REWRITE(arg) ::=
 "reference to undefined label in rewrite rule: $<arg>"
NO_GRAMMAR_START_RULE (arg) ::=
 "grammar <arg>: no start rule (no rule can obviously be followed by EOF)"
EMPTY_COMPLEMENT(arg) ::= <<
<if(arg)>
set complement ~<arg> is empty
<else>
set complement is empty
<endif>
>>
UNKNOWN_DYNAMIC_SCOPE(arg) ::=
 "unknown
 dynamic scope: <arg>"
UNKNOWN_DYNAMIC_SCOPE_ATTRIBUTE(arg,arg2) ::=
 "unknown dynamically-scoped attribute for scope <arg>: <arg2>"
RULE_REF_AMBIG_WITH_RULE_IN_ALT(arg) ::=
 "reference $<arg> is ambiguous; rule <arg> is enclosing rule and referenced in the production (assuming enclosing
rule)"
ISOLATED_RULE_ATTRIBUTE(arg) ::=
 "reference to locally-defined rule scope attribute without rule name: <arg>"
INVALID_ACTION_SCOPE(arg,arg2) ::=
 "unknown or invalid action scope for <arg2> grammar: <arg>"
ACTION_REDEFINITION(arg) ::=
 "redefinition of <arg> action"
DOUBLE_QUOTES_ILLEGAL(arg) ::=
 "string literals must use single quotes (such as \'begin\'): <arg>"
INVALID_TEMPLATE_ACTION(arg) ::=
 "invalid StringTemplate % shorthand syntax: '<arg>'"
MISSING_ATTRIBUTE_NAME() ::=
 "missing attribute name on $ reference"
ARG_INIT_VALUES_ILLEGAL(arg) ::=
 "rule parameters may not have init values: <arg>"
REWRITE_OR_OP_WITH_NO_OUTPUT_OPTION(arg) ::=
 "<if(arg)>rule <arg> uses <endif>rewrite
 syntax or operator with no output option; setting output=AST"
AST_OP_WITH_NON_AST_OUTPUT_OPTION(arg) ::=
 "AST operator with non-AST output option: <arg>"
NO_RULES(arg) ::= "grammar file <arg> has no rules"
MISSING_AST_TYPE_IN_TREE_GRAMMAR(arg) ::=
 "tree grammar <arg> has no ASTLabelType option"
REWRITE_FOR_MULTI_ELEMENT_ALT(arg) ::=
 "with rewrite=true, alt <arg> not simple node or obvious tree element; text attribute for rule not guaranteed to be
correct"
RULE_INVALID_SET(arg) ::=
 "Cannot complement rule <arg>; not a simple set or element"
```

```
HETERO_ILLEGAL_IN_REWRITE_ALT(arg) ::=
 "alts with rewrites can't use heterogeneous types left of ->"
NO_SUCH_GRAMMAR_SCOPE(arg,arg2) ::=
 "reference to undefined grammar in rule reference: <arg>.<arg2>"
NO_SUCH_RULE_IN_SCOPE(arg,arg2) ::=
 "rule <arg2> is not defined in grammar <arg>"
TOKEN_ALIAS_CONFLICT(arg,arg2) ::=
 "cannot alias <arg>; string already assigned to <arg2>"
TOKEN_ALIAS_REASSIGNMENT(arg,arg2) ::=
 "cannot alias <arg>;
 token name already assigned to <arg2>"
TOKEN_VOCAB_IN_DELEGATE(arg,arg2) ::=
 "tokenVocab option ignored in imported grammar <arg>"
INVALID_IMPORT(arg,arg2) ::=
 "<arg.grammarTypeString> grammar <arg.name> cannot import <arg2.grammarTypeString> grammar
<arg2.name>"
IMPORTED_TOKENS_RULE_EMPTY(arg,arg2) ::=
 "no lexer rules contributed to <arg> from imported grammar <arg2>"
IMPORT_NAME_CLASH(arg,arg2) ::=
 "combined grammar <arg.name> and imported <arg2.grammarTypeString> grammar <arg2.name> both generate
<arg2.recognizerName>; import ignored"
AST_OP_IN_ALT_WITH_REWRITE(arg,arg2) ::=
 "rule <arg> alt <arg2> uses rewrite syntax and also an AST operator"
WILDCARD_AS_ROOT(arg) ::= "Wildcard invalid as root; wildcard can itself be a tree"
CONFLICTING_OPTION_IN_TREE_FILTER(arg,arg2) ::= "option <arg>=<arg2> conflicts with tree grammar
filter mode"
ILLEGAL_OPTION_VALUE(arg, arg2) ::= "value '<arg2>' invalid for option <arg>"
ALL_OPS_NEED_SAME_ASSOC(arg) ::= "all operators of alt <alt> of
 left-recursive rule must have same associativity"
RANGE_OP_ILLEGAL(arg) ::= "the .. range operator isn't allowed in parser rules"

// GRAMMAR WARNINGS

GRAMMAR_NONDETERMINISM(input,conflictingAlts,paths,disabled,hasPredicateBlockedByAction) ::=
<<
<if(paths)>
Decision can match input such as "<input>" using multiple alternatives:
<paths:{ it |  alt <it.alt> via NFA path <it.states; separator=","><\n>}>
<else>
Decision can match input such as "<input>" using multiple alternatives: <conflictingAlts; separator=", ">
<endif>
<if(disabled)><\n>As a result, alternative(s) <disabled; separator=","> were disabled for that
input<endif><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by
actions.<endif>
>>

DANGLING_STATE(danglingAlts,input) ::= <<
the decision cannot distinguish between alternative(s) <danglingAlts; separator=","> for input such as "<input>"
```

```
>>

UNREACHABLE_ALTS(alts) ::= <<
The following alternatives can never be matched: <alts; separator=","><\n>
>>

INSUFFICIENT_PREDICATES(upon,altToLocations,hasPredicateBlockedByAction)
 ::= <<
Input such as "<upon>" is insufficiently covered with predicates at locations: <altToLocations.keys:{alt|alt <alt>:
<altToLocations.(alt):{loc| line <loc.line>:<loc.column> at <loc.text>}; separator=", ">}; separator=",
"><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by actions.<endif>
>>

DUPLICATE_SET_ENTRY(arg) ::=
 "duplicate token type <arg> when collapsing subrule into set"

ANALYSIS_ABORTED(enclosingRule) ::= <<
ANTLR could not analyze this decision in rule <enclosingRule>; often this is because of recursive rule references
visible from the left edge of alternatives.  ANTLR will re-analyze the decision with a fixed lookahead of k=1.
Consider using "options {k=1;}" for that decision and possibly adding a syntactic predicate.
>>

RECURSION_OVERLOW(alt,input,targetRules,callSiteStates) ::= <<
Alternative <alt>: after matching input such as <input> decision
 cannot predict what comes next due to recursion overflow <targetRules,callSiteStates:{t,c|to <t> from
<c:{s|<s.enclosingRule.name>};separator=", ">}; separator=" and ">
>>

LEFT_RECURSION(targetRules,alt,callSiteStates) ::= <<
Alternative <alt> discovers infinite left-recursion <targetRules,callSiteStates:{t,c|to <t> from
<c:{s|<s.enclosingRule>};separator=", ">}; separator=" and ">
>>

UNREACHABLE_TOKENS(tokens) ::= <<
The following token definitions can never be matched because prior tokens match the same input: <tokens;
separator=",">
>>

TOKEN_NONDETERMINISM(input,conflictingTokens,paths,disabled,hasPredicateBlockedByAction) ::=
<<
<if(paths)>
Decision can match input such as "<input>" using multiple alternatives:
<paths:{ it | alt <it.alt> via NFA path <it.states; separator=","><\n>}>
<else>
Multiple token rules can match input such as "<input>": <conflictingTokens; separator=", "><\n>
<endif>
<if(disabled)><\n>As a result, token(s) <disabled; separator=","> were disabled for
```

that input<endif><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by actions.<endif>
>>

LEFT_RECURSION_CYCLES(listOfCycles) ::= <<
The following sets of rules are mutually left-recursive <listOfCycles:{c| [<c:{r|<r.name>}; separator=", ">]}; separator=" and ">
>>

NONREGULAR_DECISION(ruleName,alts) ::= <<
[fatal] rule <ruleName> has non-LL(*) decision due to recursive rule invocations reachable from alts <alts; separator=",">. Resolve by left-factoring or using syntactic predicates or using backtrack=true option.
>>

/* l10n for message levels */
warning() ::= "warning"
error() ::= "error"

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/tool/templates/messages/languages/en.stg
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```
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*/
group AST;

@outputFile.imports() ::= <<
<@super.imports()>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
<!protected TreeAdaptor adaptor = new CommonTreeAdaptor();<\n>!>
setTreeAdaptor: function(adaptor) {
  this.adaptor = adaptor;
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
},
getTreeAdaptor: function() {
  return this.adaptor;
},
>>

@returnScope.ruleReturnMembers()
 ::= <<
getTree: function() { return this.tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var root_0 = null;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{var <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{var <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleTokenStream(this.adaptor,"token <it>");};
separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"rule <it>");};
separator="\n">
>>
```

```
/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations()
 ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = this.adaptor.nil();<\n>
<endif>
<endif>
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite
 */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>
```

```
/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.getTree());
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.getTree());
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem=label+".getTree()",...)>
>>

//
 R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
```

```
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = this.adaptor.nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree
 = this.adaptor.rulePostProcessing(root_0);
this.input.replaceChildren(this.adaptor.getParent(retval.start),
                    this.adaptor.getChildIndex(retval.start),
                    this.adaptor.getChildIndex(_last),
                    retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRule<rewriteElementType>Stream(this.adaptor,"token
<it>",<it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRule<rewriteElementType>Stream(this.adaptor,"token
<it>", list_<it>);};
  separator="\n"
>
<referencedWildcardLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"wildcard
 <it>",<it>);};
  separator="\n"
>
<referencedWildcardListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"wildcard <it>",list_<it>);};
  separator="\n"
```

```
>
<referencedRuleLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"token
<it>",<it>!=null?<it>.tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"token <it>",list_<it>);};
  separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElementsDeep:{el
 | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
```

```
if ( !(<referencedElements:{el | stream_<el>.hasNext()}; separator="||">) ) {
  throw new org.antlr.runtime.tree.RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
  <a.alt>
}<\n>
<else>
{
  <a.alt>
}<\n>
<endif>
>>

/**
 For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
var root_<treeLevel> = this.adaptor.nil();
<root:rewriteElement()>
<children:rewriteElement()>
this.adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
this.adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>
```

```
/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/**
 Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<createRewriteNodeFromElement(...)>, root_<treeLevel>);<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this
 rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());<\n>
```

```
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
this.adaptor.addChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>,
 stream_<label>.nextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
this.adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
>>
```

```
createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>,
 <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
this.adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/JavaScript/AST.stg
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```
group Dbg;

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*/
```

```
@parserBody.mixins() ::= <<
include ANTLR3::<if(profile)>Profile<else>Debug<endif>::ParserEvents
>>


@parserBody.additionalMembers() ::= <<
<if(grammar.grammarIsRoot)>
RULE_NAMES = [
 :invalid_rule, <grammar.allImportedRules:{rST|:<rST.name>}; wrap="\n  ", separator=", ">
].freeze
<endif>
>>


@rule.body() ::= <<
in_rule(grammar_file_name, "<ruleName>") do
 @debug_listener.location(<ruleDescriptor.tree.line>, <ruleDescriptor.tree.column>)

 <@super.body()>

 @debug_listener.location(<ruleDescriptor.EORNode.line>,
 <ruleDescriptor.EORNode.column>)
end
>>


// Common debug event triggers used by region overrides below
enterSubRule() ::= <<
in_subrule(<decisionNumber>) do<\n>
>>


exitSubRule() ::= <<
end<\n>
>>


enterDecision() ::= <<
in_decision(<decisionNumber>) do<\n>
>>


exitDecision() ::= <<
end<\n>
>>


enterAlt(n) ::= <<
```

```
in_alternative(<n>)<\n>
>>


// Region overrides that tell various constructs to add debugging triggers
@block.body() ::= <<
in_subrule(<decisionNumber>) do
 <@super.body()>
end
>>


// @blockBody.predecision() ::= "<enterSubRule()>"
// @blockBody.postdecision() ::= "<exitDecision()>"
// @blockBody.postbranch() ::= "<exitSubRule()>"
@blockBody.decision() ::= <<
in_decision(<decisionNumber>) do
 <@super.decision()>
end
>>


@ruleBlock.decision() ::= <<
in_decision(<decisionNumber>) do
 <@super.decision()>
end<\n>
>>


@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n={1})>"


@blockSingleAlt.prealt() ::= "<enterAlt(n={1})>"


@positiveClosureBlock.loopBody()
 ::= <<
in_subrule(<decisionNumber>) do
 <@super.loopBody()>
end
>>


@positiveClosureBlockLoop.decisionBody() ::= <<
in_decision(<decisionNumber>) do
 <@super.decisionBody()>
end
>>
```

```
@positiveClosureBlockLoop.earlyExitException() ::= <<
@debug_listener.recognition_exception(eee)
>>


@closureBlock.loopBody() ::= <<
in_subrule(<decisionNumber>) do
 <@super.loopBody()>
end
>>


@closureBlockLoop.decisionBody() ::= <<
in_decision(<decisionNumber>) do
 <@super.decisionBody()>
end
>>


@altSwitchCase.prealt() ::= "<enterAlt(altNum)>"  // altNum is arg of altSwitchCase


element(e) ::= <<
@debug_listener.location(<e.line>, <e.pos>) // e is arg of element
<super.element(e)>
>>


@matchSet.mismatchedSetException() ::= "@debug_listener.recognition_exception(mse)"


@dfaState.noViableAltException() ::= <<
nvae = NoViableAlternative( "<description>", <decisionNumber>, <stateNumber> )
@debug_listener.recognition_exception( nvae )
raise( nvae )<\n>
>>

@dfaStateSwitch.noViableAltException()
 ::= <<
nvae = NoViableAlternative( "<description>", <decisionNumber>, <stateNumber> )
@debug_listener.recognition_exception( nvae )
raise( nvae )<\n>
>>

dfaDecision(decisionNumber,description) ::= <<
begin
```

```
 @state.cyclic_decision = true
 <super.dfaDecision(...)>
rescue ANTLR3::Error::NoViableAlternative => nvae
 @debug_listener.recognition_exception(nvae)
 raise
end
>>


@cyclicDFA.errorMethod() ::= <<
def error(nvae)
 @recognizer.debug_listener.recognition_exception(nvae)
 super
end
>>
/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
predicate?("<description>") { <pred> }
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Ruby/Dbg.stg
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*/

/*
*  Template group file for the Objective C code generator.
*  Heavily based on Java.stg
*
*  Written by Kay Roepke <kroepke(at)classdump.org>
*  Modified by Alan Condit <acondit(at)ipns.com>
*
*  This file is part of ANTLR and subject to the same license as ANTLR itself.
*/

objcTypeInitMap ::= [
   "int"          : "0",             // Integers     start out being 0
   "long"         : "0",              // Longs        start out being 0
   "float"
        : "0.0",           // Floats       start out being 0
   "double"       : "0.0",            // Doubles      start out being 0
   "BOOL"          : "NO",             // Booleans     start out being Antlr ObjC for false
   "byte"         : "0",              // Bytes        start out being 0
   "short"        : "0",              // Shorts       start out being 0
   "char"         : "0",              // Chars        start out being 0
   "id"           : "nil",            // ids          start out being nil
   default        : "nil"             // anything other than an atomic type
]

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
 "True":"true",
 "False":"false",
 "true":"YES",
 "false":"NO",
 default:"NO"
]


className() ::= "<name><!<if(LEXER)>Lexer<else><if(TREE_PARSER)>Tree<endif>Parser<endif>!>"
leadIn(type)
 ::=
<<
/** \file
*  This <type> file was generated by $ANTLR version <ANTLRVersion>
*
*     - From the grammar source file : <fileName>
```

```
*     -                       On : <generatedTimestamp>
<if(LEXER)>
*     -                for the lexer : <name>Lexer
<endif>
<if(PARSER)>
*     -                for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -           for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* ObjC language generator and runtime by Alan Condit, acondit|hereisanat|ipns|dotgoeshere|com.
*
*
>>

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,
            PARSER,
            TREE_PARSER,
            actionScope,
            actions,
            docComment,
            recognizer,
            name,
            tokens,
            tokenNames,
            rules,
            cyclicDFAs,
            bitsets,
             buildTemplate,
            buildAST,
            rewriteMode,
            profile,
            backtracking,
            synpreds,
            memoize,
            numRules,
            fileName,
            ANTLRVersion,
            generatedTimestamp,
            trace,
            scopes,
            superClass,
```

```
        literals
        ) ::=
<<
<leadIn("OBJC source")>
*/
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<! <if(actions.(actionScope).header)>
/* ============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ============================================================================
*/
<endif> !>

/* -----------------------------------------
* Include the ANTLR3 generated header file.
*/
#import "<name><!<if(LEXER)>Lexer<else><if(TREE_PARSER)>Tree<endif>Parser<endif>!>.h"
<actions.(actionScope).postinclude>
/*
 ----------------------------------------- */

<docComment>

<if(literals)>
/** String literals used by <name> that we must do things like MATCHS() with.
*  C will normally just lay down 8 bit characters, and you can use L"xxx" to
*  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
*  we perform this little trick of defining the literals as arrays of UINT32
*  and passing in the address of these.
*/
<literals:{it | static ANTLR3_UCHAR  lit_<i>[]  = <it>;}; separator="\n">

<endif>

/* ============================================================================= */
/* ============================================================================
* Start of recognizer
*/
<recognizer>
>>
headerFileExtension() ::= ".h"

headerFile( LEXER,
        PARSER,
```

```
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,

    tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
       ) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
<actions.(actionScope).preincludes>
/* ============================================================================
* Standard antlr OBJC runtime definitions
*/
#import \<Cocoa/Cocoa.h>
#import \<ANTLR/ANTLR.h>
/* End of standard antlr3 runtime definitions
* ============================================================================
*/
<actions.(actionScope).includes>
<@end>

<if(LEXER)>
<lexerHeaderFile(...)>
<endif>
<if(PARSER)>
```

```
<parserHeaderFile(...)>
<endif>
<if(TREE_PARSER)>
<treeParserHeaderFile(...)>
<endif>
<docComment>
>>

lexerHeaderFile(
 LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass="Lexer"
        ) ::=
<<

<if(actions.(actionScope).header)>
/* ============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ============================================================================
 */
<endif>

/* Start cyclicDFAInterface */
```

```
<cyclicDFAs:cyclicDFAInterface()>

#pragma mark Rule return scopes Interface start
<rules:{rule |
<rule.ruleDescriptor:{ruleDescriptor | <returnScopeInterface(scope=ruleDescriptor.returnScope)>}>}>
#pragma mark Rule return scopes Interface end
#pragma mark Tokens
#ifndef TOKENLISTAlreadyDefined
#define TOKENLISTAlreadyDefined 1
#ifdef EOF
#undef EOF
#endif
<tokens:{it | #define <it.name> <it.type>}; separator="\n">
#endif
/* interface lexer class */
@interface <className()> <@superClassName>: <superClass><@end> { // line 283
<cyclicDFAs:{dfa | DFA<dfa.decisionNumber> *dfa<dfa.decisionNumber>;}; separator="\n">
<synpreds:{pred | SEL <pred>Selector;}; separator="\n">
/* ObjC start of actions.lexer.memVars */
<actions.lexer.memVars>
/* ObjC end of actions.lexer.memVars */
}
+ (void) initialize;
+ (<className()> *)new<className()>WithCharStream:(id\<CharStream>)anInput;
/* ObjC start actions.lexer.methodsDecl */
<actions.lexer.methodsDecl>
/* ObjC
 end actions.lexer.methodsDecl */
<rules:{rule |
- (<rule.ruleDescriptor:{ruleDescriptor|<returnType()>}>)
<if(!rule.ruleDescriptor.isSynPred)>m<rule.ruleName><else><rule.ruleName>_fragment<endif>
<if(rule.ruleDescriptor.parameterScope)><rule.ruleDescriptor.parameterScope:parameterScope()><endif>; };
separator="\n"><\n>
@end /* end of <className()> interface */<\n>
>>

headerReturnScope(ruleDescriptor) ::= "<returnScopeInterface(...)>"
headerReturnType(ruleDescriptor) ::= <<
<if(LEXER)>
<if(!r.ruleDescriptor.isSynPred)>
void
<else>
<ruleDescriptor:returnType()>
<endif>
<else>
<ruleDescriptor:returnType()>
<endif>
>>
```

```
// Produce the lexer output
lexer(  grammar,
      name,
      tokens,
      scopes,
      rules,
      numRules,
      filterMode,
      labelType="CommonToken",
      superClass="Lexer"
      ) ::= <<
<cyclicDFAs:cyclicDFA()>

/** As per Terence: No returns for lexer rules! */
<!
#pragma mark Rule return scopes start
<rules:{rule | <rule.ruleDescriptor:{ruleDescriptor
|
<returnScopeImplementation(scope=ruleDescriptor.returnScope)>}>
}>
#pragma mark Rule return scopes end
!>
@implementation <grammar.recognizerName> // line 330

+ (void) initialize
{
  [BaseRecognizer setGrammarFileName:@"<fileName>"];
}

+ (NSString *) tokenNameForType:(NSInteger)aTokenType
{
  return [[self getTokenNames] objectAtIndex:aTokenType];
}

+ (<grammar.recognizerName> *)new<grammar.recognizerName>WithCharStream:(id\<CharStream>)anInput
{
  return [[<grammar.recognizerName> alloc] initWithCharStream:anInput];
}

- (id) initWithCharStream:(id\<CharStream>)anInput
{
  self = [super initWithCharStream:anInput State:[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1]];
  if ( self != nil ) {
<if(memoize)>
      if ( state.ruleMemo == nil ) {
          state.ruleMemo = [[RuleStack newRuleStackWithSize:<numRules>+1] retain];
      }
```

```
    if ( [state.ruleMemo count] == 0 ) {
        // initialize the memoization cache
 - the indices are 1-based in the runtime code!
        <! [state.ruleMemo addObject:[NSNull null]];     /* dummy entry to ensure 1-basedness. */ !>
        for (NSInteger i = 0; i \< <numRules>; i++) {
            [state.ruleMemo addObject:[HashRule newHashRuleWithLen:17]];
        }
    }
<endif>
    <synpreds:{pred | <lexerSynpred(name=pred)>};separator="\n">
    <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = [DFA<dfa.decisionNumber>
newDFA<dfa.decisionNumber>WithRecognizer:self];}; separator="\n">
    <actions.lexer.init>
  }
  return self;
}

- (void) dealloc
{
  <cyclicDFAs:{dfa | [dfa<dfa.decisionNumber> release];}; separator="\n">
<actions.lexer.dealloc>
  [super dealloc];
}

/* ObjC Start of actions.lexer.methods */
<actions.lexer.methods>
/* ObjC end of actions.lexer.methods */
/* ObjC start methods() */
<@methods()>
/* ObjC end methods() */

<if(actions.lexer.reset)>
- (void) reset
{
  <actions.lexer.reset>
  [super reset];
}
<endif>

<if(filterMode)>
<filteringNextToken()>
<endif>
/*
 Start of Rules */
<rules; separator="\n">

@end /* end of <grammar.recognizerName> implementation line 397 */
>>
```

```
/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
- (id\<Token>) nextToken
{
  while (YES) {
      if ( [input LA:1] == CharStreamEOF ) {
          return [<labelType> eofToken];
      }
      state.token = nil;
      state.channel = TokenChannelDefault;
      state.tokenStartCharIndex = input.index;
      state.tokenStartCharPositionInLine = input.charPositionInLine;
      state.tokenStartLine = input.line;
      state.text = nil;
      @try {
          NSInteger m = [input mark];
          state.backtracking
 = 1; /* means we won't throw slow exception */
          state.failed = NO;
          [self mTokens];
          state.backtracking = 0;
          /* mTokens backtracks with synpred at backtracking==2
             and we set the synpredgate to allow actions at level 1. */
          if ( state.failed ) {
              [input rewind:m];
              [input consume]; /* advance one char and try again */
          } else {
              [self emit];
              return state.token;
          }
      }
      @catch (RecognitionException *re) {
          // shouldn't happen in backtracking mode, but...
          [self reportError:re];
          [self recover:re];
      }
  }
}

- (void)memoize:(id\<IntStream\>)anInput
     RuleIndex:(NSInteger)ruleIndex
    StartIndex:(NSInteger)ruleStartIndex
```

```
{
  if ( state.backtracking > 1 ) [super memoize:anInput RuleIndex:ruleIndex StartIndex:ruleStartIndex];
}

- (BOOL)alreadyParsedRule:(id\<IntStream\>)anInput
 RuleIndex:(NSInteger)ruleIndex
{
  if ( state.backtracking > 1 ) return [super alreadyParsedRule:anInput RuleIndex:ruleIndex];
  return NO;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

parserHeaderFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        literals,
        superClass="Parser"
        ) ::= <<
/* parserHeaderFile */
<genericParserHeaderFile(inputStreamType="id\<TokenStream>",...)>
>>

treeParserHeaderFile(
```

```
 LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        literals,
        superClass="TreeParser"
        ) ::= <<
/* treeParserHeaderFile */
<genericParserHeaderFile(inputStreamType="id\<TreeNodeStream>",...)>
>>

genericParserHeaderFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
         buildTemplate,
        profile,
        backtracking,
        synpreds,
```

```
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals,
        inputStreamType
        ) ::=
<<
<if(actions.(actionScope).header)>
/* ============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ============================================================================
*/
<endif>

#ifndef ANTLR3TokenTypeAlreadyDefined
#define ANTLR3TokenTypeAlreadyDefined
typedef enum {
  ANTLR_EOF = -1,
  INVALID,
  EOR,
  DOWN,
  UP,
  MIN
} ANTLR3TokenType;
#endif

<cyclicDFAs:cyclicDFAInterface()>
#pragma mark Tokens
#ifndef TOKENLISTAlreadyDefined
#define TOKENLISTAlreadyDefined
 1
#ifdef EOF
#undef EOF
#endif
<tokens:{it | #define <it.name> <it.type>}; separator="\n">
#endif
#pragma mark Dynamic Global Scopes globalAttributeScopeInterface
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeInterface(scope=it)><endif>}>
#pragma mark Dynamic Rule Scopes ruleAttributeScopeInterface
<rules:{rule |
```

```
<rule.ruleDescriptor:{ ruleDescriptor | <ruleAttributeScopeInterface(scope=ruleDescriptor.ruleScope)>}>}>
#pragma mark Rule Return Scopes returnScopeInterface
<rules:{rule |<rule.ruleDescriptor:{ ruleDescriptor |
<returnScopeInterface(scope=ruleDescriptor.returnScope)>}>}>

/* Interface grammar class */
@interface <className()> <@superClassName> : <superClass><@end> { /* line 572 */
#pragma mark Dynamic Rule Scopes ruleAttributeScopeDecl
<rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScopeDecl(scope=rule.ruleDescriptor.ruleScope)>}>
#pragma mark Dynamic Global Rule Scopes globalAttributeScopeMemVar
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeMemVar(scope=it)><endif>}><\n>
/*
 ObjC start of actions.(actionScope).memVars */
<actions.(actionScope).memVars>
/* ObjC end of actions.(actionScope).memVars */
/* ObjC start of memVars */
<@memVars()>
/* ObjC end of memVars */

<cyclicDFAs:{dfa | DFA<dfa.decisionNumber> *dfa<dfa.decisionNumber>;}; separator="\n">
<synpreds:{pred | SEL <pred>Selector;}; separator="\n">
}

/* ObjC start of actions.(actionScope).properties */
<actions.(actionScope).properties>
/* ObjC end of actions.(actionScope).properties */
/* ObjC start of properties */
<@properties()>
/* ObjC end of properties */

+ (void) initialize;
+ (<className()> *) new<className()>:(<inputStreamType>)aStream;
/* ObjC start of actions.(actionScope).methodsDecl */
<actions.(actionScope).methodsDecl>
/* ObjC end of actions.(actionScope).methodsDecl */

/* ObjC start of methodsDecl */
<@methodsDecl()>
/* ObjC end of methodsDecl */

<rules:{rule |
-
(<rule.ruleDescriptor:{ruleDescriptor|<returnType()>}>)<if(!rule.ruleDescriptor.isSynPred)><rule.ruleName><else
><rule.ruleName>_fragment<endif><if(rule.ruleDescriptor.parameterScope)><rule.ruleDescriptor.parameterScope:
parameterScope()><endif>;
 }; separator="\n"><\n>

@end /* end of <className()> interface */<\n>
```

```
>>

parser( grammar,
      name,
      scopes,
      tokens,
      tokenNames,
      rules,
      numRules,
      bitsets,
      ASTLabelType="CommonTree",
      superClass="Parser",
      labelType="CommonToken",
      members={<actions.parser.members>}
      ) ::= <<
<genericParser(inputStreamType="id\<TokenStream>", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser( grammar,
      name,
      scopes,
      tokens,
      tokenNames,
      globalAction,
      rules,
      numRules,
      bitsets,
      filterMode,
      labelType={<ASTLabelType>},
      ASTLabelType="CommonTree",
       superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
      members={<actions.treeparser.members>}
      ) ::= <<
<genericParser(inputStreamType="id\<TreeNodeStream>", rewriteElementType="Node", ...)>
>>

/** How to generate a parser */
genericParser(  grammar,
      name,
      scopes,
      tokens,
      tokenNames,
      rules,
      numRules,
      cyclicDFAs,          // parser init -- initializes the DFAs
```

```
    bitsets,
    labelType,
    ASTLabelType,
    superClass,
    members,
    filterMode,
    rewriteElementType,
    inputStreamType
    ) ::= <<
<cyclicDFAs:cyclicDFA()>

#pragma mark Bitsets
<bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}>

#pragma mark Dynamic Global globalAttributeScopeImplementation
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeImplementation(scope=it)><endif>}>

#pragma mark Dynamic
 Rule Scopes ruleAttributeScopeImplementation
<rules:{rule |
<rule.ruleDescriptor:{ ruleDescriptor | <ruleAttributeScopeImplementation(scope=ruleDescriptor.ruleScope)>}>}>

#pragma mark Rule Return Scopes returnScopeImplementation
<rules:{rule | <rule.ruleDescriptor:{ ruleDescriptor |
<returnScopeImplementation(scope=ruleDescriptor.returnScope)>}>}>

@implementation <grammar.recognizerName>  // line 637

/* ObjC start of ruleAttributeScope */
#pragma mark Dynamic Rule Scopes ruleAttributeScope
<rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScope()>}>
/* ObjC end of ruleAttributeScope */
#pragma mark global Attribute Scopes globalAttributeScope
/* ObjC start globalAttributeScope */
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>
/* ObjC end globalAttributeScope */
/* ObjC start actions.(actionScope).synthesize */
<actions.(actionScope).synthesize>
/* ObjC start synthesize() */
<@synthesize()>

+ (void) initialize
{
  #pragma mark Bitsets

  <bitsets:{it | <bitsetInit(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}>
   [BaseRecognizer setTokenNames:[[AMutableArray arrayWithObjects:@"\<invalid>", @"\<EOR>",
@"\<DOWN>", @"\<UP>", <tokenNames:{it | @<it>}; separator=", ", wrap="\n ">, nil] retain]];
```

```
  [BaseRecognizer setGrammarFileName:@"<fileName>"];
  <synpreds:{pred | <synpred(pred)>}>
}

+ (<grammar.recognizerName> *)new<grammar.recognizerName>:(<inputStreamType>)aStream
{
<if(PARSER)>
  return [[<grammar.recognizerName> alloc] initWithTokenStream:aStream];
<else><! TREE_PARSER !>
  return [[<grammar.recognizerName> alloc] initWithStream:aStream];
<endif>
}

<if(PARSER)>
- (id) initWithTokenStream:(<inputStreamType>)aStream
{
  self = [super initWithTokenStream:aStream State:[[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1] retain]];
  if ( self != nil ) {
<else><! TREE_PARSER !>
- (id) initWithStream:(<inputStreamType>)aStream
{
  self = [super initWithStream:aStream
 State:[[RecognizerSharedState newRecognizerSharedStateWithRuleLen:<numRules>+1] retain]];
  if ( self != nil ) {
<endif>
      <! <parserCtorBody()> !>
      <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = [DFA<dfa.decisionNumber>
newDFA<dfa.decisionNumber>WithRecognizer:self];}; separator="\n">
      <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeInit(scope=it)><endif>}>
      <rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScopeInit()>}>
      /* start of actions-actionScope-init */
      <actions.(actionScope).init>
      /* start of init */
      <@init()>
  }
  return self;
}

- (void) dealloc
{
  <cyclicDFAs:{dfa | [dfa<dfa.decisionNumber> release];}; separator="\n">
  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDealloc(scope=it)><endif>}>
  <actions.(actionScope).dealloc>
  <@dealloc()>
  [super dealloc];
}
```

```
/* ObjC start actions.(actionScope).methods */
<actions.(actionScope).methods>
/* ObjC
 end actions.(actionScope).methods */
/* ObjC start methods() */
<@methods()>
/* ObjC end methods() */
/* ObjC start rules */
<rules; separator="\n">
/* ObjC end rules */

@end /* end of <grammar.recognizerName> implementation line 692 */<\n>
>>

parserCtorBody() ::= <<
<if(memoize)> /* parserCtorBody */
<if(grammar.grammarIsRoot)>
state.ruleMemo = [[RuleStack newRuleStack:<numRules>+1] retain];<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock)
 ::=
<<
// $ANTLR start <ruleName>_fragment
- (void) <ruleName>_fragment
{
  <ruleLabelDefs()>
  <if(trace)>
     [self traceIn:\@"<ruleName>_fragment" Index:<ruleDescriptor.index>];
  @try {
     <block>
  }
  @finally {
     [self traceOut:\@"<ruleName>_fragment" Index:<ruleDescriptor.index>];
  }
<else>
  <block>
```

```
<endif>
} // $ANTLR end <ruleName>_fragment
>>

synpred(name) ::= <<
SEL <name>Selector = @selector(<name>_fragment);
<! // $ANTLR start <name>
- (BOOL) <name>
{
  state.backtracking++;
  <@start()>
  NSInteger start = [input mark];
  @try {
     [self <name>_fragment]; // can never throw exception
  }
  @catch (RecognitionException *re) {
     NSLog(@"impossible: %@\n", re.name);
  }
  BOOL success = (state.failed == NO);
  [input rewind:start];
  <@stop()>
  state.backtracking--;
  state.failed=NO;
  return success;
} // $ANTLR end <name> <\n> !>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name)
 ::= <<
<if(memoize)>
if ( state.backtracking > 0 && [self alreadyParsedRule:input RuleIndex:<ruleDescriptor.index>] ) { return
<ruleReturnValue()>; }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if (backtracking)>if ( state.failed ) return <ruleReturnValue()>;<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if ( state.backtracking > 0 ) { state.failed = YES; return <ruleReturnValue()>; }<\n><endif>
>>
```

```
/** How to generate code for a rule.
*  The return type aggregates are declared in the header file (headerFile template)
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<

/*
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
- (<returnType()>) <ruleName><ruleDescriptor.parameterScope:parameterScope()>
{
  <if(trace)>[self traceIn:\@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
  <if(trace)>NSLog(@"enter
 <ruleName> %@ failed=%@ backtracking=%d", [input LT:1], (state.failed==YES)?@"YES":@"NO",
state.backtracking);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  @try {
     <ruleMemoization(name=ruleName)>
     <ruleLabelDefs()>
     <block>
     <ruleCleanUp()>
     <(ruleDescriptor.actions.after):execAction()>
  }
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else><if(!emptyRule)><if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  @catch (RecognitionException *re) {
     [self reportError:re];
     [self recover:input Exception:re];
     <@setErrorReturnValue()>
  }<\n>
<endif><endif><endif>
  @finally {
     <if(trace)>[self traceOut:@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
     <memoize()>
     <ruleScopeCleanUp()>
     <finally>
  }
  <@postamble()>
  return <ruleReturnValue()>;
}
/*
```

```
 $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
  <finalBlock>
}
>>

catch(decl,action) ::= <<
@catch (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<
/* ruleDeclarations */
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval = [<ruleDescriptor:returnStructName()> new<ruleDescriptor:returnStructName()>];
[retval setStart:[input LT:1]];<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
NSInteger <ruleDescriptor.name>_StartIndex = input.index;
<endif>
>>

ruleScopeSetUp() ::= <<
/* ruleScopeSetUp */
<ruleDescriptor.useScopes:{it | [<it>_stack push:[<it>_Scope new<it>_Scope]];}>
<ruleDescriptor.ruleScope:{it | [<it.name>_stack push:[<it.name>_Scope new<it.name>_Scope]];}>
>>

ruleScopeCleanUp() ::= <<
/* ruleScopeCleanUp */
<ruleDescriptor.useScopes:{it | [<it>_stack pop];}; separator="\n">
<ruleDescriptor.ruleScope:{it | [<it.name>_stack
 pop];}; separator="\n">
>>

ruleLabelDefs() ::= <%
/* ruleLabelDefs entry */<"\n">
<[ruleDescriptor.tokenLabels, ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |<labelType> *<it.label.text> = nil;}; separator="\n"><"\n">
```

```
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | AMutableArray *list_<it.label.text> = nil;}; separator="\n"><"\n">
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n"><"\n">
<ruleDescriptor.ruleListLabels:{ll|ParserRuleReturnScope *<ll.label.text> = nil;}; separator="\n"><"\n">
%>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<labelType> *<it.label.text>=nil;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |NSInteger <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]:{it |AMutableArray
 *list_<it.label.text>=nil; }; separator="\n">
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
/* token+rule list labels */
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{it |[list_<it.label.text> release];}; separator="\n">
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
[retval setStop:[input LT:-1]];<\n>
<endif><endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) [self memoize:input RuleIndex:<ruleDescriptor.index>
StartIndex:<ruleDescriptor.name>_StartIndex];
<endif><endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
```

```
*  fragment rules.
*/
lexerRule(ruleName, nakedBlock, ruleDescriptor, block, memoize) ::= <<
// $ANTLR start "<ruleName>"
- (void)
m<ruleName><if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope:parameterScope(scope=it)><en
dif>
{
   //<if(trace)>[self traceIn:\@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
  <if(trace)>NSLog(@"enter <ruleName> %C line=%d:%d failed=%@ backtracking=%d",
      [input LA:1],
      self.line,
      self.charPositionInLine,
      (state.failed==YES) ? @"YES" : @"NO",
      state.backtracking);
  <endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  @try {
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      NSInteger _type = <ruleName>;
      NSInteger _channel = TokenChannelDefault;
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block>
      <ruleCleanUp()>
      state.type = _type;
      state.channel = _channel;
      <(ruleDescriptor.actions.after):execAction()>
<endif>
  }
  @finally {

 //<if(trace)>[self traceOut:[NSString stringWithFormat:@"<ruleName> %d\n", <ruleDescriptor.index>]];<endif>
      <if(trace)>NSLog(@"exit <ruleName> %C line=%d:%d failed=%@ backtracking=%d",
            [input LA:1], self.line, self.charPositionInLine,
            (state.failed==YES) ? @"YES" : @"NO", state.backtracking);<endif>
      <ruleScopeCleanUp()>
      <memoize()>
  }
  return;
}
```

```
/* $ANTLR end "<ruleName>" */
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
- (void) mTokens
{
  <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> // block
NSInteger alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>)
 {
  <alts:{a | <altSwitchCase(i, a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> //ruleblock
NSInteger alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
  <alts:{a | <altSwitchCase(i, a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description> // ruleBlockSingleAlt
<decls>
<@prealt()>
```

```
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description> // blockSingleAlt
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n)
 ::= <<
// <fileName>:<description> // positiveClosureBlock
NSInteger cnt<decisionNumber> = 0;
<decls>
<@preloop()>
do {
  NSInteger alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
    <alts:{a | <altSwitchCase(i, a)>}>
    default :
      if ( cnt<decisionNumber> >= 1 )
        goto loop<decisionNumber>;
      <ruleBacktrackFailure()>
      EarlyExitException *eee =
        [EarlyExitException newException:input decisionNumber:<decisionNumber>];
      <@earlyExitException()>
      @throw eee;
  }
  cnt<decisionNumber>++;
} while (YES);
loop<decisionNumber>: ;
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 0 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
```

```
 <<
<decls>
<@preloop()>
do {
  NSInteger alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
     <alts:{a | <altSwitchCase(i, a)>}>
     default :
        goto loop<decisionNumber>;
  }
} while (YES);
loop<decisionNumber>: ;
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> : ;
  <@prealt()>
  <alt>
  break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew)
 ::= <<
// <fileName>:<description> // alt
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
```

```
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= << <@prematch()><\n><e.el><\n> >>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=(<labelType> *)<endif>[self match:input TokenType:<token>
Follow:FOLLOW_<token>_in_<ruleName><elementIndex>]; <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label> == nil) list_<label> = [[AMutableArray arrayWithCapacity:5] retain];
[list_<label> addObject:<elem>];<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>NSInteger <label> =
 [input LA:1];<\n><endif>
[self matchChar:<char>]; <checkRuleBacktrackFailure()><\n>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)><label> = [input LA:1];<\n><endif>
[self matchRangeFromChar:<a> to:<b>]; <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label> = [input LA:1];<\n>
<else>
```

```
<label> = (<labelType> *)[input LT:1]; /* matchSet */<\n>
<endif><endif>
if (<s>) {
  [input consume];
  <postmatchCode>
<if(!LEXER)>
  [state setIsErrorRecovery:NO];
<endif>
  <if(backtracking)>state.failed = NO;<\n><endif>
} else {
  <ruleBacktrackFailure()>
  MismatchedSetException *mse = [MismatchedSetException newException:nil stream:input];
  <@mismatchedSetException()>
<if(LEXER)>
<if(label)>
  mse.c = <label>;
<endif>
  [self recover:mse];
  @throw mse;
<else>
  @throw mse;
  <! use following code to
 make it recover inline; remove throw mse;
  [self recoverFromMismatchedSet:input exception:mse follow:FOLLOW_set_in_<ruleName><elementIndex>]; !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
NSInteger <label>Start = input.index;
[self matchString:<string>]; <checkRuleBacktrackFailure()>
NSInteger StartLine<elementIndex> = self.line;
NSInteger <label>StartCharPos<elementIndex> = self.charPositionInLine;
<label> = [[<labelType> newToken:input Type:TokenTypeInvalid Channel:TokenChannelDefault
Start:<label>Start Stop:input.index] retain];
[self setLine:<label>StartLine<elementIndex>];
[self setCharPositionInLine:<label>StartCharPos<elementIndex>];
<else>
[self matchString:<string>]; <checkRuleBacktrackFailure()><\n>
```

```
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions)
 ::= <<
<if(label)>
<label> = (<labelType> *)[input LT:1];<\n>
<endif>
[self matchAny:input]; <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
NSInteger <label> = [input LA:1];<\n>
<endif>
[self matchAny]; <checkRuleBacktrackFailure()><\n>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ruleRef */
[self pushFollow:FOLLOW_<rule.name>_in_<ruleName><elementIndex>];
<if(label)><label> = <endif>[self <if(scope)><scope:delegateName()>.<endif><rule.name><if(args)>:<first(args)>
 <rest(args):{ a | arg<i>:<rest(args)>}; separator=" "><endif>];<\n>
[self popFollow];
<checkRuleBacktrackFailure()><\n>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
```

```
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
NSInteger <label>Start<elementIndex> = input.index;
[self m<rule.name><if(args)>:<args; separator=" :"><endif>]; <checkRuleBacktrackFailure()><\n>
<label> = [[<labelType> newToken:input Type:TokenTypeInvalid Channel:TokenChannelDefault
Start:<label>Start<elementIndex> Stop:input.index-1] retain];
<label>.line = self.line;
<else>
[self <if(scope)><scope:delegateName()>.<endif>m<rule.name><if(args)>:<args; separator="
 :"><endif>]; <checkRuleBacktrackFailure()><\n>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
NSInteger <label>Start<elementIndex> = input.index;
[self matchChar:CharStreamEOF]; <checkRuleBacktrackFailure()><\n>
<labelType> <label> = [[<labelType> newToken:input Type:TokenTypeEOF Channel:TokenChannelDefault
Start:<label>Start<elementIndex> Stop:input.index-1] retain];
<label>.line = self.line;
<else>
[self matchChar:CharStreamEOF]; <checkRuleBacktrackFailure()><\n>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                   ::= "int <recRuleArg()>"
recRuleArg()                      ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()          ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::=
 "$<name>=$<src>.<name>;"
```

```
/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( [input LA:1] == DOWN ) {
  [self match:input TokenType:DOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:UP Follow:nil]; <checkRuleBacktrackFailure()>
}
<else>
  [self match:input TokenType:DOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:UP Follow:nil]; <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  @throw [FailedPredicateException newException:@"<ruleName>" predicate:@"<description>" stream:input];
}
>>

//
 F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];<\n>
<edges; separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  NoViableAltException *nvae = [NoViableAltException newException:<decisionNumber> state:<stateNumber>
stream:input];
  nvae.c = LA<decisionNumber>_<stateNumber>;
  <@noViableAltException()>
  @throw nvae;<\n>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
```

```
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];<\n>
<edges; separator="\nelse ">
>>

/**
 A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif><endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates
 for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
```

```
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
unichar charLA<decisionNumber> = [input LA:<k>];
switch (charLA<decisionNumber>) {
  <edges; separator="\n"><\n>
default: ;
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  NoViableAltException *nvae = [NoViableAltException newException:<decisionNumber> state:<stateNumber>
stream:input];
  nvae.c = charLA<decisionNumber>;
  <@noViableAltException()>
  @throw nvae;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ([input LA:<k>])
 { // dfaOptionalBlockStateSwitch
  <edges; separator="\n"><\n>
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ([input LA:<k>]) { // dfaLoopbackStateSwitch
  <edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber> = <eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it | case <it>: ;}; separator="\n">
  {
  <targetState>
  }
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
```

```
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = [dfa<decisionNumber> predict:input];
>>

/** Used in headerFile */
cyclicDFAInterface(dfa) ::= <<
#pragma mark Cyclic DFA interface start DFA<dfa.decisionNumber>
@interface DFA<dfa.decisionNumber> : DFA {
}
+ (DFA<dfa.decisionNumber>
 *) newDFA<dfa.decisionNumber>WithRecognizer:(BaseRecognizer *)theRecognizer;
- initWithRecognizer:(BaseRecognizer *)recognizer;
@end /* end of DFA<dfa.decisionNumber> interface  */<\n>
#pragma mark Cyclic DFA interface end DFA<dfa.decisionNumber><\n>
>>

/** Used in lexer/parser implementation files */
/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
#pragma mark Cyclic DFA implementation start DFA<dfa.decisionNumber>

@implementation DFA<dfa.decisionNumber>
const static NSInteger dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
  {<dfa.eot; wrap="\n     ", separator=",", null="-1">};
const
 static NSInteger dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
  {<dfa.eof; wrap="\n     ", separator=",", null="-1">};
const static unichar dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
  {<dfa.min; wrap="\n     ", separator=",", null="-1">};
const static unichar dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
  {<dfa.max; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
  {<dfa.accept; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
  {<dfa.special; wrap="\n     ", separator=",", null="-1">};

/** Used when there is no transition table entry for a particular state */
#define dfa<dfa.decisionNumber>_T_empty     nil
```

```
<dfa.edgeTransitionClassMap.keys:{ table |
const static NSInteger dfa<dfa.decisionNumber>_T<i0>[] =
{
    <table; separator=", ", wrap="\n ", null="-1">
\};
}; null="">

const static NSInteger *dfa<dfa.decisionNumber>_transition[]
 =
{
  <dfa.transitionEdgeTables:{whichTable|dfa<dfa.decisionNumber>_T<whichTable>}; separator=", ", wrap="\n",
null="nil">
};

+ (DFA<dfa.decisionNumber> *) newDFA<dfa.decisionNumber>WithRecognizer:(BaseRecognizer *)aRecognizer
{
  return [[[DFA<dfa.decisionNumber> alloc] initWithRecognizer:aRecognizer] retain];
}

- (id) initWithRecognizer:(BaseRecognizer *) theRecognizer
{
  self = [super initWithRecognizer:theRecognizer];
  if ( self != nil ) {
      decisionNumber = <dfa.decisionNumber>;
      eot = dfa<dfa.decisionNumber>_eot;
      eof = dfa<dfa.decisionNumber>_eof;
      min = dfa<dfa.decisionNumber>_min;
      max = dfa<dfa.decisionNumber>_max;
      accept = dfa<dfa.decisionNumber>_accept;
      special = dfa<dfa.decisionNumber>_special;
      transition = dfa<dfa.decisionNumber>_transition;
  }
  return self;
}

<if(dfa.specialStateSTs)>
/* start dfa.specialStateSTs */
- (NSInteger) specialStateTransition:(NSInteger)s
 Stream:(id\<IntStream\>)anInput
{
<if(LEXER)>
  id\<IntStream\> input = anInput;<\n>
<endif>
<if(PARSER)>
  id\<TokenStream\> input = (id\<TokenStream\>)anInput;<\n>
<endif>
<if(TREE_PARSER)>
  id\<TreeNodeStream\> input = (id\<TreeNodeStream\>)anInput;<\n>
```

```
<endif>
  switch (s) {
      <dfa.specialStateSTs:{state |
      case <i0> : ;<! compressed special state numbers 0..n-1 !>
          <state>}; separator="\n">
  }
<if(backtracking)>
  if ( [recognizer getBacktrackingLevel] > 0 ) { [recognizer setFailed:YES]; return -1; }<\n>
<endif>
  NoViableAltException *nvae = [NoViableAltException newException:<dfa.decisionNumber> state:s
stream:recognizer.input];
  // nvae.c = s;
  /* [self error:nvae]; */ <! for debugger - do later !>
  @throw nvae;
}<\n>
/* end dfa.specialStateSTs */
<endif>

- (void) dealloc
{
  //free(transition);
  [super dealloc];
}

- (NSString *) description
{
  return @"<dfa.description>";
}

<@errorMethod()>

@end /* end DFA<dfa.decisionNumber>
 implementation */<\n>
#pragma mark Cyclic DFA implementation end DFA<dfa.decisionNumber>
<\n>
>>
/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber, stateNumber, edges, needErrorClause, semPredState) ::= <<
/* cyclicDFAState */
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:1];<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
NSInteger index<decisionNumber>_<stateNumber> = input.index;
[input rewind];<\n>
<endif>
s = -1;
<edges; separator="\nelse ">
```

```
<if(semPredState)> <! return input cursor to state before we rewound !>
[input seek:index<decisionNumber>_<stateNumber>];<\n>
<endif>
if ( s >= 0 )
  return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
/* cyclicDFAEdge */
if (<labelExpr><if(predicates)> && (<predicates>)<endif>)
 { s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n> /* eotDFAEdge */
>>

// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

/*
* evalSynPredicate(pred,description) ::= "<pred>()"
*
* synpreds are broken in cyclic DFA special states
*  Damn! For now, work around with using the selectors directly, and by providing a trampoline evalSynPred
method in
*  DFA
*/
/* evalSynPredicate(pred,description) ::= "[self evaluateSyntacticPredicate:<pred>Selector stream:input]" */
evalSynPredicate(pred,description) ::= "[self evaluateSyntacticPredicate:@selector(<pred>_fragment)]"
/* evalSynPredicate(pred,description)
 ::= "[recognizer <pred>]" */

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"
```

```
/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "[input LA:<k>] == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(([input LA:<k>] >=
<lower>) && ([input LA:<k>] \<= <upper>))"

setTest(ranges) ::= <%
<ranges; separator="||">
%>

// A T T R I B U T E S

memVars(scope) ::= <% <scope.attributes:{a|<a.type> <a.name>;<\n>}; separator="\n"> %>

properties(scope) ::= <%
<scope.attributes:{a|@property (assign, getter=get<a.name>, setter=set<a.name>:) <a.type> <a.name>;<\n>};
separator="\n">
%>

methodsDecl(scope) ::= <%
<scope.attributes:{a|-
 (<a.type>)get<a.name>;<\n>- (void)set<a.name>:(<a.type>)aVal;<\n>}; separator="\n">
%>

synthesize(scope) ::= <% <scope.attributes:{a|@synthesize <a.name>;}; separator="\n"> %>

methods(scope) ::= <%
<scope.attributes:{a|
- (<a.type>)get<a.name> { return( <a.name> ); \}<\n>
- (void)set<a.name>:(<a.type>)aVal { <a.name> = aVal; \}<\n>}; separator="\n">
%>

globalAttributeScopeInterface(scope) ::= <%
/* globalAttributeScopeInterface */<\n>
@interface <scope.name>_Scope : SymbolsScope {<\n>
<if(scope.attributes)>
<memVars(scope)>
<endif>
}<\n>
<if(scope.attributes)>
/* start of globalAttributeScopeInterface properties */<\n>
```

```
<properties(scope)>
/* end globalAttributeScopeInterface properties */<\n>
<endif>

+ (<scope.name>_Scope *)new<scope.name>_Scope;<\n>
- (id) init;<\n>
<if(scope.attributes)>
/* start of globalAttributeScopeInterface methodsDecl */<\n>
<methodsDecl(scope)>
/* End of globalAttributeScopeInterface methodsDecl */<\n>
<endif>
@end /* end of <scope.name>_Scope interface
 */<\n>
%>

globalAttributeScopeMemVar(scope) ::= <%
/* globalAttributeScopeMemVar */<\n>
SymbolStack *<scope.name>_stack;<\n>
<scope.name>_Scope *<scope.name>_scope;<\n>
%>

globalAttributeScopeImplementation(scope) ::= <%
@implementation <scope.name>_Scope  /* globalAttributeScopeImplementation */<\n>
<if(scope.attributes)>
/* start of synthesize -- OBJC-Line 1750 */<\n>
<synthesize(scope)><\n>
<endif>
<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope<\n>
{<\n>
  return [[<scope.name>_Scope alloc] init];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
  self = [super init];<\n>
  return self;<\n>
}<\n>
<\n>
<if(scope.attributes)>
/* start of iterate get and set functions */<\n>
<methods(scope)><\n>
/* End of iterate get and set functions */<\n>
<endif>
@end /* end of <scope.name>_Scope implementation */<\n><\n>
%>

globalAttributeScopeInit(scope) ::= <<
```

```
/* globalAttributeScopeInit */<\n>
<scope.name>_scope = [<scope.name>_Scope new<scope.name>_Scope];<\n>
<scope.name>_stack = [SymbolStack
 newSymbolStackWithLen:30];<\n>
>>

globalAttributeScopeDealloc(scope) ::= <% [<scope.name>_stack release];<\n> %>

globalAttributeScope(scope) ::= <%
<if(scope.name)>
static <scope.name>_stack;<\n>
<endif>
%>

ruleAttributeScopeMemVar(scope) ::= <%
/* ObjC ruleAttributeScopeMemVar */<\n>
<if(scope.attributes)>
<scope.name>_Scope *<scope.name>_scope; /* ObjC ruleAttributeScopeMemVar */<\n>
<endif>
%>

ruleAttributeScopeInterface(scope) ::= <%
<if(scope.attributes)>
/* start of ruleAttributeScopeInterface */<\n>
@interface <scope.name>_Scope : SymbolsScope {<\n>
  <memVars(scope)><\n>
}<\n>
<\n>
/* start property declarations */<\n>
<properties(scope)><\n>
/* start method declarations */<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope;<\n>
- (id) init;<\n>
<methodsDecl(scope)><\n>
@end /* end of ruleAttributeScopeInterface */<\n><\n>
<endif>
%>

ruleAttributeScopeImplementation(scope) ::= <%
<if(scope.attributes)>
@implementation <scope.name>_Scope  /* start of ruleAttributeScopeImplementation
 */<\n>
<synthesize(scope)><\n>
<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope<\n>
{<\n>
  return [[<scope.name>_Scope alloc] init];<\n>
}<\n>
```

```
<\n>
- (id) init<\n>
{<\n>
  self = [super init];<\n>
  return self;<\n>
}<\n>
<\n>
/* start of <scope.name>_Scope get and set functions */<\n>
<methods(scope)><\n>
/* End of <scope.name>_Scope get and set functions */<\n>
@end /* end of ruleAttributeScopeImplementation */<\n><\n>
<endif>
%>

ruleAttributeScopeInit(scope) ::= <%
/* ruleAttributeScopeInit */<\n>
<scope.name>_scope = [<scope.name>_Scope new<scope.name>_Scope];<\n>
<scope.name>_stack = [SymbolStack newSymbolStackWithLen:30];<\n>
%>

ruleAttributeScopeDealloc(scope) ::= <% [<scope.name>_Scope release];<\n> %>

ruleAttributeScope(scope) ::= <%
<if(scope.attributes)>
/* ruleAttributeScope */<\n>
static SymbolStack *<scope.name>_stack;<\n>
static <scope.name>_Scope *<scope.name>_scope;
<endif>
%>

ruleAttributeScopeDecl(scope) ::= <%
/* ruleAttributeScopeDecl
 */<\n>
<if(scope.attributes)>
<scope.name>_Scope *<scope.name>_scope;<\n>
<endif>
%>

returnStructName(r) ::= "<className()>_<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()> *
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
```

```
void
<endif>
<endif>
<else>
void
<endif>
%>

/** Generate the Objective-C type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<className()>_<referencedRule.name>_return *<else>
<if(referencedRule.hasSingleReturnValue)><referencedRule.singleValueReturnType><else>
void<endif>
<endif>
%>

delegateName(d) ::= <% <if(d.label)><d.label><else>g<d.name><endif> %>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <% <objcTypeInitMap.(typeName)>
 %>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScopeInterface(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
/* returnScopeInterface <ruleDescriptor:returnStructName()> */
@interface <ruleDescriptor:returnStructName()> :
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope { /* returnScopeInterface line 1838 */
<@memVars()> /* ObjC start of memVars() */<\n>
<if(scope.attributes)>
<memVars(scope)><\n>
<endif>
}
/* start property declarations */
```

```
<@properties()><\n>
<if(scope.attributes)>
<properties(scope)><\n>
<endif>
/* start of method declarations */<\n>
+ (<ruleDescriptor:returnStructName()> *)new<ruleDescriptor:returnStructName()>;
/*
 this is start of set and get methods */
<@methodsDecl()>  /* methodsDecl */<\n>
<if(scope.attributes)>
/* start of iterated get and set functions */<\n>
<methodsDecl(scope)><\n>
<endif>
@end /* end of returnScopeInterface interface */<\n>
<endif>
>>

returnScopeImplementation(scope) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
@implementation <ruleDescriptor:returnStructName()> /* returnScopeImplementation */<\n>
<@synthesize()> /* start of synthesize -- OBJC-Line 1837 */<\n>
<if(scope.attributes)>
  <synthesize(scope)><\n>
<endif>
+ (<ruleDescriptor:returnStructName()> *)new<ruleDescriptor:returnStructName()><\n>
{<\n>
  return [[[<ruleDescriptor:returnStructName()> alloc] init] retain];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
  self = [super init];<\n>
  return self;<\n>
}<\n>
<\n>
<@methods()><\n>
<if(scope.attributes)>
/* start of iterate get and set functions */<\n>
<methods(scope)><\n>
/* End of iterate get and set functions
 */<\n>
<endif>
<actions.(actionScope).ruleReturnMethods>
<@ruleReturnMembers()><\n>
@end /* end of returnScope implementation */<\n><\n>
<endif>
%>
```

```
parameterScope(scope) ::= <<
<! <scope.attributes:{it | :(<it.type>)<it.name>}; separator=" "> !>
<first(scope.attributes):{ a | :(<a.type>)<a.name>}> <rest(scope.attributes):{ a | arg<i>:(<a.type>)<a.name> };
separator=" ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>;"

/** Note that the scopeAttributeRef does not have access to the
* grammar name directly
*/
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
([((<scope>_Scope *)[<scope>_stack objectAtIndex:[<scope>_stack size]-<negIndex>-1)]).<attr.name>
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name>
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
/* scopeSetAttributeRef */
<if(negIndex)>
((<scope>_Scope
 *)[<scope>_stack objectAtIndex:([<scope>_stack size]-<negIndex>-1)]).<attr.name> = <expr>;
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name> = <expr>;
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name> = <expr>;
<endif>
<endif>
%>

scopeAttributeRefStack() ::= <<
/* scopeAttributeRefStack */
<if(negIndex)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:[<scope>_stack count]-<negIndex>-1]).<attr.name> = <expr>;
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name> = <expr>;
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name> = <expr>;
<endif>
```

```
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return
 value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=nil?<scope>.<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>  /* added to returnAttributeRef */<\n>
<else>
<attr.name><\n>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>; /* added to returnSetAttributeRef */<\n>
<else>
<attr.name> = <expr>;<\n>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


/* not sure the next are the right approach; and they are evaluated early; */
/* they cannot see TREE_PARSER or PARSER attributes for example. :( */

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=nil?<scope>.text:nil)"
tokenLabelPropertyRef_type(scope,attr)
```

```
 ::= "(<scope>!=nil?<scope>.type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=nil?<scope>.line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=nil?<scope>.charPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=nil?<scope>.channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=nil?[<scope> getTokenIndex]:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=nil?[<scope>.text integerValue]:0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=nil?((<labelType> *)<scope>.start):nil)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=nil?((<labelType> *)<scope>.stopToken):nil)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=nil?((<ASTLabelType> *)<scope>.tree):nil)"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=nil?[[input getTokenStream] toStringFromStart:[[input getTreeAdaptor] getTokenStartIndex:[<scope>
getStart]]

   ToEnd:[[input getTreeAdaptor] getTokenStopIndex:[<scope> getStart]]]:0)
<else>
(<scope>!=nil?([input toStringFromToken:[<scope> getStart] ToToken:[<scope> getStop]]:0)
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=nil?[<scope> st]:nil)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>!=nil?<scope>.type:0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>!=nil?<scope>.line:0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=nil?<scope>.charPositionInLine:-1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=nil?<scope>.channel:0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>!=nil?[<scope> getTokenIndex]:0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>!=nil?<scope>.text:nil)"
lexerRuleLabelPropertyRef_int(scope,attr) ::="(<scope>!=nil?[<scope>.text integerValue]:0)"

// Somebody may ref $template or $tree or $stop within
 a rule:
rulePropertyRef_start(scope,attr) ::= "((<labelType> *)retval.start)"
rulePropertyRef_stop(scope,attr) ::= "((<labelType> *)retval.stopToken)"
rulePropertyRef_tree(scope,attr) ::= "((<ASTLabelType> *)retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
[[input getTokenStream] toStringFromStart:[[input getTreeAdaptor]
getTokenStartIndex:retval.start.token.startIndex]
                        ToEnd:[[input getTreeAdaptor] getTokenStopIndex:retval.start.token.stopIndex]]
<else>
[input toStringFromToken:retval.start ToToken:[input LT:-1]]
<endif>
>>
```

```
rulePropertyRef_st(scope,attr) ::= "retval.st"

/* hideous: find a way to cut down on the number of templates to support read/write access */
/* TODO: also, which ones are valid to write to? ask Ter */
lexerRuleSetPropertyRef_text(scope,attr,expr) ::= "state.text = <expr>;"
lexerRuleSetPropertyRef_type(scope,attr,expr) ::= "_type"
lexerRuleSetPropertyRef_line(scope,attr,expr) ::= "state.tokenStartLine"
lexerRuleSetPropertyRef_pos(scope,attr,expr)
 ::= "state.tokenStartCharPositionInLine"
lexerRuleSetPropertyRef_index(scope,attr,expr) ::= "-1" /* undefined token index in lexer */
lexerRuleSetPropertyRef_channel(scope,attr,expr) ::= "state.channel=<expr>;"
lexerRuleSetPropertyRef_start(scope,attr,expr) ::= "state.tokenStartCharIndex"
lexerRuleSetPropertyRef_stop(scope,attr,expr) ::= "(input.index-1)"


lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "state.type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(input.index-1)"
lexerRulePropertyRef_int(scope,attr) ::= "[<scope>.text integerValue]"

//
 setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.start =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;" /* "<\n>#error StringTemplates are
unsupported<\n>" */


/** How to execute an action */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
  <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)
```

bitset(name, words64) ::= <<
static ANTLRBitSet *<name>;
static const unsigned long long <name>_data[] = { <words64:{it | <it>LL};separator=", ">};<\n>
>>

bitsetInit(name, words64) ::= <<
<name> = [[ANTLRBitSet newBitSetWithBits:(const unsigned long long *)<name>_data
Count:(NSUInteger)<length(words64)>] retain];<\n>
>>

codeFileExtension() ::= ".m"

true_value() ::= "YES"
false_value() ::= "NO"

Found in path(s):
*
/antlr-3-5-3-jar/org/antlr/codegen/templates/ObjC/ObjC.stg
No license file was found, but licenses were detected in source scan.

/*
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```
*/

/** The API version of the runtime that recognizers generated by this runtime
*  need.
*/
apiVersion() ::= "1"

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
        "True":"true",
        "False":"false",
        "true":"true",
        "false":"false",
        default:"false"
]

/** The overall file structure
 of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
          docComment, recognizer,
          name, tokens, tokenNames, rules, cyclicDFAs,
          bitsets, buildTemplate, buildAST, rewriteMode, profile,
          backtracking, synpreds, memoize, numRules,
          fileName, ANTLRVersion, generatedTimestamp, trace,
          scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
import sys
from antlr3 import *
<if(TREE_PARSER)>
from antlr3.tree import *<\n>
<endif>
from antlr3.compat import set, frozenset
<@end>

<actions.(actionScope).header>

<! <docComment> !>

# for convenience in actions
HIDDEN = BaseRecognizer.HIDDEN

# token types
```

```
<tokens:{it | <it.name>=<it.type>}; separator="\n">

<recognizer>

<if(actions.(actionScope).main)>
<actions.(actionScope).main>
<else>
def main(argv, stdin=sys.stdin, stdout=sys.stdout, stderr=sys.stderr):
<if(LEXER)>
    from antlr3.main import LexerMain
  main = LexerMain(<recognizer.name>)<\n>
<endif>
<if(PARSER)>
  from antlr3.main import ParserMain
  main = ParserMain("<recognizer.grammar.name>Lexer", <recognizer.name>)<\n>
<endif>
<if(TREE_PARSER)>
  from antlr3.main import WalkerMain
  main = WalkerMain(<recognizer.name>)<\n>
<endif>
  main.stdin = stdin
  main.stdout = stdout
  main.stderr = stderr
  main.execute(argv)<\n>
<endif>

<actions.(actionScope).footer>

if __name__ == '__main__':
  main(sys.argv)

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode,
    labelType="CommonToken", superClass="Lexer") ::= <<
<grammar.directDelegates:
{g|from <g.recognizerName> import <g.recognizerName>}; separator="\n">

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
  <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>

  grammarFileName = "<fileName>"
  api_version = <apiVersion()>

   def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input=None, state=None):
      if state is None:
          state = RecognizerSharedState()
      super(<grammar.recognizerName>, self).__init__(input, state)
```

```
<if(memoize)>
<if(grammar.grammarIsRoot)>
    self._state.ruleMemo = {}
<endif>
<endif>

    <grammar.directDelegates:
     {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
    <grammar.directDelegates:
     {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
    <grammar.delegators:
     {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
    <last(grammar.delegators):
   {g|self.gParent = <g:delegateName()>}; separator="\n">
    self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

    <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>};
 separator="\n">

    <actions.lexer.init>


  <actions.lexer.members>


<if(filterMode)>
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>


>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
def nextToken(self):
```

```
  while True:
      if self.input.LA(1) == EOF:
          return self.makeEOFToken()

      self._state.token = None
      self._state.channel = DEFAULT_CHANNEL
      self._state.tokenStartCharIndex = self.input.index()
      self._state.tokenStartCharPositionInLine = self.input.charPositionInLine
      self._state.tokenStartLine
= self.input.line
      self._state._text = None
      try:
          m = self.input.mark()
          try:
              # means we won't throw slow exception
              self._state.backtracking = 1
              try:
                  self.mTokens()
              finally:
                  self._state.backtracking = 0

          except BacktrackingFailed:
              # mTokens backtracks with synpred at backtracking==2
              # and we set the synpredgate to allow actions at level 1.
              self.input.rewind(m)
              self.input.consume() # advance one char and try again

          else:
              self.emit()
              return self._state.token

      except RecognitionException, re:
          # shouldn't happen in backtracking mode, but...
          self.reportError(re)
          self.recover(re)


def memoize(self, input, ruleIndex, ruleStartIndex, success):
  if self._state.backtracking > 1:
      #
 is Lexer always superclass?
      super(<grammar.recognizerName>, self).memoize(input, ruleIndex, ruleStartIndex, success)


def alreadyParsedRule(self, input, ruleIndex):
  if self._state.backtracking > 1:
      return super(<grammar.recognizerName>, self).alreadyParsedRule(input, ruleIndex)
  return False
```

```
>>

actionGate() ::= "self._state.backtracking == 0"

filteringActionGate() ::= "self._state.backtracking == 1"

/** How to generate a parser */

genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass, labelType, members,
      rewriteElementType, filterMode, init, ASTLabelType="Object") ::= <<
<if(grammar.grammarIsRoot)>
# token names
tokenNames = [
   "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
   <tokenNames; wrap, separator=", ">
]<\n>
<else>
from <grammar.composite.rootGrammar.recognizerName> import tokenNames<\n>
<endif>
<scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScopeClass(scope=it)><endif>}>

<grammar.directDelegates:
 {g|from <g.recognizerName> import <g.recognizerName>}; separator="\n">

<rules:{it|<ruleAttributeScopeClass(scope=it.ruleDescriptor.ruleScope)>}>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
   grammarFileName = "<fileName>"
   api_version = <apiVersion()>
   tokenNames = tokenNames

   def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input, state=None, *args, **kwargs):
      if state is None:
         state = RecognizerSharedState()

      <@args()>
      super(<grammar.recognizerName>, self).__init__(input, state, *args, **kwargs)

<if(memoize)>
<if(grammar.grammarIsRoot)>
      self._state.ruleMemo = {}
<endif>
<endif>

      <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">
```

```
    <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeStack(scope=it)><endif>}>
 <rules:{it | <ruleAttributeScopeStack(scope=it.ruleDescriptor.ruleScope)>}>

    <init>

    <grammar.delegators:
      {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
    <grammar.directDelegates:
     {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
    <grammar.directDelegates:
     {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
    <last(grammar.delegators):
   {g|self.gParent = self.<g:delegateName()>}; separator="\n">
    self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

 <@init><@end>


  <@members><@end>

  <members>

  <rules; separator="\n\n">

  <! generate rule/method definitions for imported rules so they
    appear to be defined in this recognizer. !>
  <grammar.delegatedRules:{ruleDescriptor| <delegateRule(ruleDescriptor)> }; separator="\n">

  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump
 tables for all DFA !>

  <bitsets:{it | FOLLOW_<it.name>_in_<it.inName><it.tokenIndex> = frozenset([<it.tokenTypes:{it |
<it>};separator=", ">])<\n>}>

>>

delegateRule(ruleDescriptor) ::= <<
def <ruleDescriptor.name>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<\ >   <if(ruleDescriptor.hasReturnValue)>return
<endif>self.<ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)
><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>)
```

```
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="Object", superClass="Parser", labelType="Token",
    members={<actions.parser.members>},
    init={<actions.parser.init>}
    ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, "TokenStream", superClass,
          labelType, members, "Token",
          false, init, ASTLabelType)>
>>

/** How to generate a tree
 parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>},
   init={<actions.treeparser.init>}
        ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, "TreeNodeStream", superClass,
          labelType, members, "Node",
          filterMode, init, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates
 cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start "<ruleName>"
def <ruleName>_fragment(self, <ruleDescriptor.parameterScope:parameterScope()>):
  <ruleLabelDefs()>
<if(trace)>
  self.traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
  try:
      <block>

  finally:
```

```
        self.traceOut("<ruleName>_fragment", <ruleDescriptor.index>)

<else>
  <block>
<endif>
# $ANTLR end "<ruleName>"


>>

synpred(name) ::= <<
def <name>(self):
  self._state.backtracking += 1
  <@start()>
  start = self.input.mark()
  try:
     self.<name>_fragment()
  except BacktrackingFailed:
     success = False
  else:
     success = True
  self.input.rewind(start)
  <@stop()>
  self._state.backtracking -= 1
  return success


>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if self._state.backtracking
 > 0 and self.alreadyParsedRule(self.input, <ruleDescriptor.index>):
  # for cached failed rules, alreadyParsedRule will raise an exception
  success = True
  return <ruleReturnValue()>

<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if self._state.backtracking > 0:
```

```
  raise BacktrackingFailed

<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start "<ruleName>"
# <fileName>:<description>
<ruleDescriptor.actions.decorate>
def <ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
  self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
   <@preamble()>
  <@body><ruleBody()><@end>
  <@postamble()>
  return <ruleReturnValue()>

# $ANTLR end "<ruleName>"
>>

ruleBody() ::= <<
<if(memoize)>
<if(backtracking)>
success = False<\n>
<endif>
<endif>
try:
  try:
      <ruleMemoization(name=ruleName)>
      <block>
      <ruleCleanUp()>
      <(ruleDescriptor.actions.after):execAction()>

<if(memoize)>
<if(backtracking)>
      success = True<\n>
<endif>
<endif>
```

```
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  except RecognitionException, re:
      self.reportError(re)
      self.recover(self.input, re)
      <@setErrorReturnValue()>

<endif>
<else>
  finally:
      pass

<endif>
<endif>
finally:
<if(trace)>
  self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  pass
>>

catch(decl,action)
 ::= <<
except <e.decl>:
  <e.action>

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval = self.<ruleDescriptor.name>_return()
retval.start = self.input.LT(1)<\n>
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> = <if(a.initValue)><a.initValue><else>None<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = self.input.index()
<endif>
```

```
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.append(<it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.append(<it.name>_scope())}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.pop()}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
    :{it | <it.label.text> = None}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,
 ruleDescriptor.wildcardTreeListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{it | <it.label.text> = None}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it | <it.label.text> = None}; separator="\n"
>
<ruleDescriptor.charLabels:{it | <it.label.text> = None}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
```

```
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop
 = self.input.LT(-1)<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if self._state.backtracking > 0:
  self.memoize(self.input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex, success)

<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start "<ruleName>"
def m<ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
  self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
<if(memoize)>
<if(backtracking)>
  success = False<\n>
<endif>
<endif>
  try:
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      _type = <ruleName>
      _channel = DEFAULT_CHANNEL

      <ruleMemoization(name=ruleName)>
```

```
        <lexerRuleLabelDefs()>
       <ruleDescriptor.actions.init>
       <block>
       <ruleCleanUp()>
       self._state.type = _type
       self._state.channel = _channel
       <(ruleDescriptor.actions.after):execAction()>
<endif>
<if(memoize)>
<if(backtracking)>
       success = True<\n>
<endif>
<endif>

   finally:
<if(trace)>
       self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
 <ruleScopeCleanUp()>
       <memoize()>
       pass

# $ANTLR end "<ruleName>"


>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
def mTokens(self):
   <block><\n>


>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@body><blockBody()><@end>
>>

blockBody()
```

```
 ::= <<
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<@prebranch()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n)
 ::= <<
# <fileName>:<description>
cnt<decisionNumber> = 0
<decls>
<@preloop()>
<@loopBody>
<positiveClosureBlockLoop()>
<@end>
```

```
<@postloop()>
>>

positiveClosureBlockLoop() ::= <<
while True: #loop<decisionNumber>
  alt<decisionNumber> = <maxAlt>
  <@predecision()>
  <@decisionBody><decision><@end>
  <@postdecision()>
  <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
  else:
     if cnt<decisionNumber> >= 1:
        break #loop<decisionNumber>

     <ruleBacktrackFailure()>
     eee = EarlyExitException(<decisionNumber>, self.input)
     <@earlyExitException()>
     raise eee

  cnt<decisionNumber> += 1
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
<@loopBody>
<closureBlockLoop()>
<@end>
<@postloop()>
>>

closureBlockLoop()
 ::= <<
while True: #loop<decisionNumber>
  alt<decisionNumber> = <maxAlt>
  <@predecision()>
  <@decisionBody><decision><@end>
  <@postdecision()>
  <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
  else:
     break #loop<decisionNumber>
>>
```

```
closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
if alt<decisionNumber> == <altNum>:
   <@prealt()>
   <alt>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,
 treeLevel,rew) ::= <<
# <fileName>:<description>
pass <! so empty alternatives are a valid block !>
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label> = <endif>self.match(self.input, <token>,
self.FOLLOW_<token>_in_<ruleName><elementIndex>)
>>
```

```
/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label, elem) ::= <<
if list_<label> is None:
  list_<label> = []
list_<label>.append(<elem>)<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label>
 = self.input.LA(1)<\n>
<endif>
self.match(<char>)
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchRange(<a>, <b>)
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
if <s>:
  self.input.consume()
  <postmatchCode>
<if(!LEXER)>
  self._state.errorRecovery = False<\n>
<endif>

else:
  <ruleBacktrackFailure()>
  mse = MismatchedSetException(None, self.input)
  <@mismatchedSetException()>
<if(LEXER)>
  self.recover(mse)
```

```
  raise mse
<else>
  raise mse
  <! use following code to make it recover inline; remove throw mse;
  self.recoverFromMismatchedSet(
     self.input, mse, self.FOLLOW_set_in_<ruleName><elementIndex>
     )
  !>
<endif>
<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label,
 label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
<label>Start = self.getCharIndex()
self.match(<string>)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(input=self.input, type=INVALID_TOKEN_TYPE, channel=DEFAULT_CHANNEL,
start=<label>Start, stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.match(<string>)
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
self.matchAny(self.input)
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label,label)>
>>
```

```
/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchAny()
>>

wildcardCharListLabel(label,
 elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
self._state.following.append(self.FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label> = <endif>self.<if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=",
">)<\n>
self._state.following.pop()
>>

/** ids+=rule */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access
 full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(
  input=self.input,
  type=INVALID_TOKEN_TYPE,
```

```
  channel=DEFAULT_CHANNEL,
  start=<label>Start<elementIndex>,
  stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
<label>Start<elementIndex>
 = self.getCharIndex()
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
self.match(EOF)
<label> = <labelType>(input=self.input, type=EOF, channel=DEFAULT_CHANNEL,
start=<label>Start<elementIndex>, stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.match(EOF)
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                 ::= "<recRuleArg()>"
recRuleArg()                    ::= "_p"
recRuleAltPredicate(ruleName, opPrec) ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()        ::= "root_0 = $<ruleName>_primary.tree"
recRuleSetReturnAction(src, name)    ::= "$<name> = $<src>.<name>"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if
```

```
 self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if not (<evalPredicate(pred, description)>):
   <ruleBacktrackFailure()>
   raise FailedPredicateException(self.input, "<ruleName>", "<description>")

>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>

  <@noViableAltException()>
   raise nvae<\n>
<endif>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
>>
```

```
/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>
 = <eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else:
  alt<decisionNumber> = <eotPredictsAlt>
<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if (<labelExpr>) <if(predicates)>and (<predicates>)<endif>:
  <targetState>
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
<!
 FIXME: this is one of the few occasion, where I miss a switch statement
 in Python.
 ATM this is implemented as a list of if .. elif ..
 This may be replaced by faster a dictionary lookup, when I find a solution
 for the cases when an edge is not a plain dfaAcceptState.
!>
LA<decisionNumber> = self.input.LA(<k>)
```

```
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
  <@noViableAltException()>
  raise nvae<\n>
<endif>

>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
<if(eotPredictsAlt)>
else:
  alt<decisionNumber> = <eotPredictsAlt>
<endif>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
if <labels:{it | LA<decisionNumber>
 == <it>}; separator=" or ">:
  <targetState>
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = self.dfa<decisionNumber>.predict(self.input)
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
```

```
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
# lookup tables for DFA #<dfa.decisionNumber>

DFA<dfa.decisionNumber>_eot = DFA.unpack(
  u"<dfa.javaCompressedEOT; wrap="\"\n    u\"">"
  )

DFA<dfa.decisionNumber>_eof
 = DFA.unpack(
  u"<dfa.javaCompressedEOF; wrap="\"\n    u\"">"
  )

DFA<dfa.decisionNumber>_min = DFA.unpack(
  u"<dfa.javaCompressedMin; wrap="\"\n    u\"">"
  )

DFA<dfa.decisionNumber>_max = DFA.unpack(
  u"<dfa.javaCompressedMax; wrap="\"\n    u\"">"
  )

DFA<dfa.decisionNumber>_accept = DFA.unpack(
  u"<dfa.javaCompressedAccept; wrap="\"\n    u\"">"
  )

DFA<dfa.decisionNumber>_special = DFA.unpack(
  u"<dfa.javaCompressedSpecial; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_transition = [
  <dfa.javaCompressedTransition:{s|DFA.unpack(u"<s; wrap="\"\nu\"">")}; separator=",\n">
]

# class definition for DFA #<dfa.decisionNumber>

class DFA<dfa.decisionNumber>(DFA):
  pass

  <@errorMethod()>

<if(dfa.specialStateSTs)>
  def specialStateTransition(self_, s, input):
      # convince pylint that my self_ magic is ok ;)
      # pylint: disable-msg=E0213
```

```
    # pretend we are a member of the recognizer
    # thus semantic predicates
 can be evaluated
    self = self_.recognizer

    _s = s

    <dfa.specialStateSTs:{state | if s == <i0>: <! compressed special state numbers 0..n-1 !>
  <state>}; separator="\nel">

<if(backtracking)>
    if self._state.backtracking > 0:
        raise BacktrackingFailed

<endif>
    nvae = NoViableAltException(self_.getDescription(), <dfa.decisionNumber>, _s, input)
    self_.error(nvae)
    raise nvae<\n>
<endif>

>>

cyclicDFAInit(dfa) ::= <<
self.dfa<dfa.decisionNumber> = self.DFA<dfa.decisionNumber>(
  self, <dfa.decisionNumber>,
  eot = self.DFA<dfa.decisionNumber>_eot,
  eof = self.DFA<dfa.decisionNumber>_eof,
  min = self.DFA<dfa.decisionNumber>_min,
  max = self.DFA<dfa.decisionNumber>_max,
  accept = self.DFA<dfa.decisionNumber>_accept,
  special = self.DFA<dfa.decisionNumber>_special,
  transition = self.DFA<dfa.decisionNumber>_transition
  )<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch
 on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
index<decisionNumber>_<stateNumber> = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nel">
<if(semPredState)> <! return input cursor to state before we rewound !>
```

```
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if s >= 0:
  return s
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if (<labelExpr>)<if(predicates)> and (<predicates>)<endif>:
  s = <targetStateNumber><\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
se:
  s = <targetStateNumber><\n>
>>


// D
 F A  E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands; separator=\" or \">)"

notPredicate(pred) ::= "not (<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "self.<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "self.input.LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(<lower> \<= LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(<lower> \<=
```

```
self.input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= "<ranges; separator=\" or \">"

// A T T R I B U T E S

globalAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class
 <scope.name>_scope(object):
   def __init__(self):
      <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

globalAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

ruleAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
   def __init__(self):
      <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

ruleAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>
```

```
/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> = None
>>

returnStructName(r) ::= "<r.name>_return"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave
 a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
class <ruleDescriptor:returnStructName()>(<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope):
  def __init__(self):
      super(<grammar.recognizerName>.<ruleDescriptor:returnStructName()>, self).__init__()

      <if(scope)><scope.attributes:{it | self.<it.decl> = None}; separator="\n"><endif>
      <@ruleReturnInit()>


  <@ruleReturnMembers()>

<endif>
>>

parameterScope(scope) ::= <<
<if(scope)><scope.attributes:{it | <it.decl>}; separator=", "><endif>
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
self.<scope>_stack[-<negIndex>].<attr.name>
<else>
<if(index)>
self.<scope>_stack[<index>].<attr.name>
<else>
self.<scope>_stack[-1].<attr.name>
<endif>
<endif>
%>

/* not applying patch because of bug in action parser!
```

```
<if(negIndex)>
((len(self.<scope>_stack)
 - <negIndex> - 1) >= 0 and [self.<scope>_stack[-<negIndex>].<attr.name>] or [None])[0]
<else>
<if(index)>
((<index> \< len(self.<scope>_stack)) and [self.<scope>_stack[<index>].<attr.name>] or [None])[0]
<else>
((len(self.<scope>_stack) > 0) and [self.<scope>_stack[-1].<attr.name>] or [None])[0]
<endif>
<endif>

*/

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[-<negIndex>].<attr.name> = <expr>
<else>
<if(index)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[<index>].<attr.name> = <expr>
<else>
self.<scope>_stack[-1].<attr.name> = <expr>
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "self.<scope>_stack"

/**
 reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
((<scope> is not None) and [<scope>.<attr.name>] or [None])[0]
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
```

```
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> = <expr>
<else>
<attr.name> = <expr>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach; and they are evaluated early;
// they cannot see TREE_PARSER or PARSER attributes for example. :(

tokenLabelPropertyRef_text(scope,attr) ::= "<scope>.text"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.type"
tokenLabelPropertyRef_line(scope,attr)
 ::= "<scope>.line"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.charPositionInLine"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.channel"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.index"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "<scope>.start"
ruleLabelPropertyRef_stop(scope,attr) ::= "<scope>.stop"
ruleLabelPropertyRef_tree(scope,attr) ::= "<scope>.tree"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
((<scope> is not None) and [self.input.getTokenStream().toString(
  self.input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
  self.input.getTreeAdaptor().getTokenStopIndex(<scope>.start)
  )] or [None])[0]
<else>
((<scope> is not None) and [self.input.toString(<scope>.start,<scope>.stop)] or [None])[0]
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> is not None) and [<scope>.st] or [None])[0]"

/** Isolated $RULE ref ok in lexer as
```

```
 it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "((<scope> is not None) and [<scope>.type] or [0])[0]"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "((<scope> is not None) and [<scope>.line] or [0])[0]"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "((<scope> is not None) and [<scope>.charPositionInLine] or
[0])[0]"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "((<scope> is not None) and [<scope>.channel] or [0])[0]"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "((<scope> is not None) and [<scope>.index] or [0])[0]"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "((<scope> is not None) and [<scope>.text] or [None])[0]"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "((<scope> is not None) and [int(<scope>.text)] or [0])[0]"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop" //mmm... or input.LT(-1)??
rulePropertyRef_tree(scope,attr)
 ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= "self.input.toString(retval.start, self.input.LT(-1))"
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "self._state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "self._state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "self._state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(self.getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"


/**
 How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<else>
if <actions.(actionScope).synpredgate>:
  pass
```

<action>

<endif>
<else>
#action start
<action>
#action end
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

codeFileExtension() ::= ".py"

true_value() ::= "True"
false_value() ::= "False"

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python/Python.stg
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*/

/** How to generate rules derived from left-recursive rules.
*  These rely on recRuleDefArg(), recRuleAltPredicate(),
*  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
*  templates in main language.stg
*/
group LeftRecursiveRules;

recRuleName(ruleName) ::= "<ruleName>_"
recPrimaryName(ruleName) ::= "<ruleName>_primary"

recRuleStart(ruleName, minPrec, userRetvals, userRetvalAssignments) ::= <<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
 : <recRuleName(...)>[<minPrec>]
   <if(userRetvals)>
  {
     <userRetvalAssignments; separator="\n">
  }
  <endif>
 ;
>>

recRule(ruleName, precArgDef, argName, alts, setResultAction, buildAST,
      userRetvals, userRetvalAssignments) ::= <<
<recRuleName(...)>[<precArgDef>]<if(userRetvals)> returns [<userRetvals>]<endif>
  :   <recPrimaryName(...)>
      <if(buildAST)>
      {
         <setResultAction>
      }
      <endif>
      <if(userRetvals)>
      {
         <userRetvalAssignments; separator="\n">
      }
      <endif>
      ( options {backtrack=false;}
      : ( options {backtrack=false;}
        : <alts; separator="\n          | ">
        )
      )*
  ;
>>
```

```
recPrimaryRule(ruleName, alts, userRetvals) ::= <<
<recPrimaryName(...)><if(userRetvals)> returns [<userRetvals>]<endif>
options {backtrack=true;}
  : <alts; separator="\n    | ">
  ;
>>

recRuleAlt(alt, pred) ::= "{<pred>}?=> <alt>"

recRuleRef(ruleName, arg) ::= "<recRuleName(...)>[<arg>]"

Found
 in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/LeftRecursiveRules.stg
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*/
```

```
/*
* This code generating template and the associated C runtime was produced by:
* Jim Idle jimi|hereisanat|idle|dotgoeshere|ws.
* If it causes the destruction of the Universe, it will be pretty cool so long as
* I am in a different one at the time.
*/
cTypeInitMap ::= [
 "int"      : "0",             // Integers     start out being 0
 "long"     : "0",             // Longs        start out
 being 0
 "float"    : "0.0",           // Floats       start out being 0
 "double"   : "0.0",           // Doubles      start out being 0
 "ANTLR3_BOOLEAN"    : "ANTLR3_FALSE",   // Booleans     start out being Antlr C for false
 "byte"     : "0",             // Bytes        start out being 0
 "short"    : "0",             // Shorts       start out being 0
 "char"     : "0"              // Chars        start out being 0
]

leadIn(type) ::=
<<
/** \file
*  This <type> file was generated by $ANTLR version <ANTLRVersion>
*
*     -  From the grammar source file : <fileName>
*     -                          On : <generatedTimestamp>
<if(LEXER)>
*     -                for the lexer : <name>Lexer
<endif>
<if(PARSER)>
*     -               for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -          for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* C language generator and runtime by Jim Idle, jimi|hereisanat|idle|dotgoeshere|ws.
 *
*
>>

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,
          PARSER,
          TREE_PARSER,
```

```
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
        ) ::=
<<
<leadIn("C source")>
*/
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<if(actions.(actionScope).header)>

/* ============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ============================================================================
*/
<endif>

/* -----------------------------------------
* Include the ANTLR3 generated header file.
*/
#include    "<name>.h"
<actions.(actionScope).postinclude>
/* ----------------------------------------- */

<docComment>

<if(literals)>
/** String
 literals used by <name> that we must do things like MATCHS() with.
*  C will normally just lay down 8 bit characters, and you can use L"xxx" to
*  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
*  we perform this little trick of defining the literals as arrays of UINT32
*  and passing in the address of these.
*/
<literals:{it | static ANTLR3_UCHAR lit_<i>[]  = <it>;}; separator="\n">

<endif>




/* MACROS that hide the C interface implementations from the
```

```
* generated code, which makes it a little more understandable to the human eye.
* I am very much against using C pre-processor macros for function calls and bits
* of code as you cannot see what is happening when single stepping in debuggers
* and so on. The exception (in my book at least) is for generated code, where you are
* not maintaining it, but may wish to read and understand it. If you single step it, you know that input()
* hides some indirect calls, but is always referring to the input
 stream. This is
* probably more readable than ctx->input->istream->input(snarfle0->blarg) and allows me to rejig
* the runtime interfaces without changing the generated code too often, without
* confusing the reader of the generated output, who may not wish to know the gory
* details of the interface inheritance.
*/

#define  CTX ctx

/* Aids in accessing scopes for grammar programmers
*/
#undef SCOPE_TYPE
#undef SCOPE_STACK
#undef SCOPE_TOP
#define SCOPE_TYPE(scope)   p<name>_##scope##_SCOPE
#define SCOPE_STACK(scope)  p<name>_##scope##Stack
#define SCOPE_TOP(scope)    ctx->p<name>_##scope##Top
#define SCOPE_SIZE(scope)  ctx->p<name>_##scope##Stack_limit
#define SCOPE_INSTANCE(scope, i) (ctx->SCOPE_STACK(scope)->get(ctx->SCOPE_STACK(scope),i))

<if(LEXER)>

/* Macros for accessing things in a lexer
*/
#undef    LEXER
#undef    RECOGNIZER
#undef    RULEMEMO
#undef    GETCHARINDEX
#undef    GETLINE
#undef    GETCHARPOSITIONINLINE
#undef    EMIT
#undef    EMITNEW
#undef
  MATCHC
#undef    MATCHS
#undef    MATCHRANGE
#undef    LTOKEN
#undef    HASFAILED
#undef    FAILEDFLAG
#undef    INPUT
#undef    STRSTREAM
#undef    LA
```

```
#undef    HASEXCEPTION
#undef    EXCEPTION
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    LRECOVER
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
#undef    BACKTRACKING
#undef  MATCHANY
#undef  MEMOIZE
#undef  HAVEPARSEDRULE
#undef  GETTEXT
#undef  INDEX
#undef  SEEK
#undef  PUSHSTREAM
#undef  POPSTREAM
#undef  SETTEXT
#undef  SETTEXT8

#define    LEXER     ctx->pLexer
#define    RECOGNIZER      LEXER->rec
#define  LEXSTATE    RECOGNIZER->state
#define  TOKSOURCE    LEXSTATE->tokSource
#define    GETCHARINDEX()   LEXER->getCharIndex(LEXER)
#define    GETLINE()    LEXER->getLine(LEXER)
#define    GETTEXT()    LEXER->getText(LEXER)
#define    GETCHARPOSITIONINLINE() LEXER->getCharPositionInLine(LEXER)
#define    EMIT()     LEXSTATE->type = _type; LEXER->emit(LEXER)
#define    EMITNEW(t)    LEXER->emitNew(LEXER,
 t)
#define    MATCHC(c)    LEXER->matchc(LEXER, c)
#define    MATCHS(s)    LEXER->matchs(LEXER, s)
#define    MATCHRANGE(c1,c2)     LEXER->matchRange(LEXER, c1, c2)
#define    MATCHANY()    LEXER->matchAny(LEXER)
#define    LTOKEN      LEXSTATE->token
#define    HASFAILED()    (LEXSTATE->failed == ANTLR3_TRUE)
#define    BACKTRACKING   LEXSTATE->backtracking
#define    FAILEDFLAG    LEXSTATE->failed
#define    INPUT     LEXER->input
#define    STRSTREAM    INPUT
#define  ISTREAM     INPUT->istream
#define  INDEX()     ISTREAM->index(ISTREAM)
#define  SEEK(n)     ISTREAM->seek(ISTREAM, n)
#define    EOF_TOKEN    &(LEXSTATE->tokSource->eofToken)
#define    HASEXCEPTION()   (LEXSTATE->error == ANTLR3_TRUE)
#define    EXCEPTION    LEXSTATE->exception
#define    CONSTRUCTEX()   RECOGNIZER->exConstruct(RECOGNIZER)
```

```
#define     LRECOVER()    LEXER->recover(LEXER)
#define     MARK()     ISTREAM->mark(ISTREAM)
#define     REWIND(m)    ISTREAM->rewind(ISTREAM, m)
#define
   REWINDLAST()   ISTREAM->rewindLast(ISTREAM)
#define  MEMOIZE(ri,si)   RECOGNIZER->memoize(RECOGNIZER, ri, si)
#define  HAVEPARSEDRULE(r)  RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define  PUSHSTREAM(str)   LEXER->pushCharStream(LEXER, str)
#define  POPSTREAM()    LEXER->popCharStream(LEXER)
#define  SETTEXT(str)   LEXSTATE->text = str
#define  SKIP()     LEXSTATE->token = &(TOKSOURCE->skipToken)
#define  USER1     LEXSTATE->user1
#define  USER2     LEXSTATE->user2
#define  USER3     LEXSTATE->user3
#define  CUSTOM     LEXSTATE->custom
#define  RULEMEMO    LEXSTATE->ruleMemo
#define  DBG      RECOGNIZER->debugger

/* If we have been told we can rely on the standard 8 bit or UTF16 input
* stream, then we can define our macros to use the direct pointers
* in the input object, which is much faster than indirect calls. This
* is really only significant to lexers with a lot of fragment rules (which
* do not place LA(1) in a temporary at the moment) and even then
* only if there is
 a lot of input (order of say 1M or so).
*/
#if defined(ANTLR3_INLINE_INPUT_8BIT) || defined(ANTLR3_INLINE_INPUT_UTF16)

# ifdef ANTLR3_INLINE_INPUT_8BIT

/* 8 bit character set */

#  define     NEXTCHAR ((pANTLR3_UINT8)(INPUT->nextChar))
#  define     DATAP ((pANTLR3_UINT8)(INPUT->data))

# else

#  define     NEXTCHAR ((pANTLR3_UINT16)(INPUT->nextChar))
#  define     DATAP ((pANTLR3_UINT16)(INPUT->data))

# endif

# define     LA(n) ((NEXTCHAR + n) > (DATAP + INPUT->sizeBuf) ? ANTLR3_CHARSTREAM_EOF :
(ANTLR3_UCHAR)(*(NEXTCHAR + n - 1)))
# define           CONSUME()                                  \\
{                                                             \\
  if       (NEXTCHAR \< (DATAP + INPUT->sizeBuf))                  \\
  {                                                           \\
```

```
    INPUT->charPositionInLine++;                                \\
    if  ((ANTLR3_UCHAR)(*NEXTCHAR) == INPUT->newlineChar)       \\
     {                                                          \\
       INPUT->line++;                                           \\
       INPUT->charPositionInLine       = 0;                     \\
       INPUT->currentLine              = (void *)(NEXTCHAR + 1); \\
    }                                                           \\
    INPUT->nextChar = (void *)(NEXTCHAR + 1);                   \\
  }                                                             \\
}

#else

// Pick up the input character by calling the input stream implementation.
//
#define    CONSUME()   INPUT->istream->consume(INPUT->istream)
#define    LA(n)       INPUT->istream->_LA(INPUT->istream, n)

#endif
<endif>

<if(PARSER)>
/* Macros for accessing things in the parser
*/

#undef    PARSER
#undef    RECOGNIZER
#undef    HAVEPARSEDRULE
#undef  MEMOIZE
#undef    INPUT
#undef    STRSTREAM
#undef    HASEXCEPTION
#undef    EXCEPTION
#undef    MATCHT
#undef
   MATCHANYT
#undef    FOLLOWSTACK
#undef    FOLLOWPUSH
#undef    FOLLOWPOP
#undef    PRECOVER
#undef    PREPORTERROR
#undef    LA
#undef    LT
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
```

```
#undef    PERRORRECOVERY
#undef    HASFAILED
#undef    FAILEDFLAG
#undef    RECOVERFROMMISMATCHEDSET
#undef    RECOVERFROMMISMATCHEDELEMENT
#undef  INDEX
#undef     ADAPTOR
#undef  SEEK
#undef    RULEMEMO
#undef  DBG

#define    PARSER    ctx->pParser
#define    RECOGNIZER    PARSER->rec
#define    PSRSTATE    RECOGNIZER->state
#define    HAVEPARSEDRULE(r)   RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define    MEMOIZE(ri,si)   RECOGNIZER->memoize(RECOGNIZER, ri, si)
#define    INPUT    PARSER->tstream
#define    STRSTREAM    INPUT
#define    ISTREAM    INPUT->istream
#define    INDEX()    ISTREAM->index(INPUT->istream)
#define    HASEXCEPTION()   (PSRSTATE->error == ANTLR3_TRUE)
#define    EXCEPTION    PSRSTATE->exception
#define
   MATCHT(t, fs)   RECOGNIZER->match(RECOGNIZER, t, fs)
#define    MATCHANYT()    RECOGNIZER->matchAny(RECOGNIZER)
#define    FOLLOWSTACK    PSRSTATE->following
#ifdef  SKIP_FOLLOW_SETS
#define    FOLLOWPUSH(x)
#define    FOLLOWPOP()
#else
#define    FOLLOWPUSH(x)   FOLLOWSTACK->push(FOLLOWSTACK, ((void *)(&(x))), NULL)
#define    FOLLOWPOP()    FOLLOWSTACK->pop(FOLLOWSTACK)
#endif
#define    PRECOVER()    RECOGNIZER->recover(RECOGNIZER)
#define    PREPORTERROR()   RECOGNIZER->reportError(RECOGNIZER)
#define    LA(n)    INPUT->istream->_LA(ISTREAM, n)
#define    LT(n)    INPUT->_LT(INPUT, n)
#define    CONSTRUCTEX()   RECOGNIZER->exConstruct(RECOGNIZER)
#define    CONSUME()    ISTREAM->consume(ISTREAM)
#define    MARK()    ISTREAM->mark(ISTREAM)
#define    REWIND(m)    ISTREAM->rewind(ISTREAM, m)
#define    REWINDLAST()   ISTREAM->rewindLast(ISTREAM)
#define    SEEK(n)    ISTREAM->seek(ISTREAM, n)
#define    PERRORRECOVERY   PSRSTATE->errorRecovery
#define
   FAILEDFLAG    PSRSTATE->failed
#define    HASFAILED()    (FAILEDFLAG == ANTLR3_TRUE)
#define    BACKTRACKING   PSRSTATE->backtracking
```

```
#define    RECOVERFROMMISMATCHEDSET(s)  RECOGNIZER->recoverFromMismatchedSet(RECOGNIZER,
s)
#define    RECOVERFROMMISMATCHEDELEMENT(e) RECOGNIZER-
>recoverFromMismatchedElement(RECOGNIZER, s)
#define    ADAPTOR                    ctx->adaptor
#define  RULEMEMO     PSRSTATE->ruleMemo
#define  DBG       RECOGNIZER->debugger

<endif>

<if(TREE_PARSER)>
/* Macros for accessing things in the parser
*/

#undef    PARSER
#undef    RECOGNIZER
#undef    HAVEPARSEDRULE
#undef    INPUT
#undef    STRSTREAM
#undef    HASEXCEPTION
#undef    EXCEPTION
#undef    MATCHT
#undef    MATCHANYT
#undef    FOLLOWSTACK
#undef    FOLLOWPUSH
#undef    FOLLOWPOP
#undef    PRECOVER
#undef    PREPORTERROR
#undef    LA
#undef    LT
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
#undef    PERRORRECOVERY
#undef
  HASFAILED
#undef    FAILEDFLAG
#undef    RECOVERFROMMISMATCHEDSET
#undef    RECOVERFROMMISMATCHEDELEMENT
#undef    BACKTRACKING
#undef     ADAPTOR
#undef    RULEMEMO
#undef  SEEK
#undef  INDEX
#undef  DBG
```

```
#define    PARSER      ctx->pTreeParser
#define    RECOGNIZER     PARSER->rec
#define  PSRSTATE     RECOGNIZER->state
#define    HAVEPARSEDRULE(r)    RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define    INPUT      PARSER->ctnstream
#define  ISTREAM      INPUT->tnstream->istream
#define    STRSTREAM     INPUT->tnstream
#define    HASEXCEPTION()    (PSRSTATE->error == ANTLR3_TRUE)
#define    EXCEPTION     PSRSTATE->exception
#define    MATCHT(t, fs)    RECOGNIZER->match(RECOGNIZER, t, fs)
#define    MATCHANYT()     RECOGNIZER->matchAny(RECOGNIZER)
#define    FOLLOWSTACK        PSRSTATE->following
#define    FOLLOWPUSH(x)    FOLLOWSTACK->push(FOLLOWSTACK, ((void *)(&(x))), NULL)
#define    FOLLOWPOP()     FOLLOWSTACK->pop(FOLLOWSTACK)
#define
  PRECOVER()     RECOGNIZER->recover(RECOGNIZER)
#define    PREPORTERROR()    RECOGNIZER->reportError(RECOGNIZER)
#define    LA(n)      ISTREAM->_LA(ISTREAM, n)
#define    LT(n)      INPUT->tnstream->_LT(INPUT->tnstream, n)
#define    CONSTRUCTEX()    RECOGNIZER->exConstruct(RECOGNIZER)
#define    CONSUME()     ISTREAM->consume(ISTREAM)
#define    MARK()      ISTREAM->mark(ISTREAM)
#define    REWIND(m)     ISTREAM->rewind(ISTREAM, m)
#define    REWINDLAST()    ISTREAM->rewindLast(ISTREAM)
#define    PERRORRECOVERY    PSRSTATE->errorRecovery
#define    FAILEDFLAG     PSRSTATE->failed
#define    HASFAILED()     (FAILEDFLAG == ANTLR3_TRUE)
#define    BACKTRACKING    PSRSTATE->backtracking
#define    RECOVERFROMMISMATCHEDSET(s)  RECOGNIZER->recoverFromMismatchedSet(RECOGNIZER,
s)
#define    RECOVERFROMMISMATCHEDELEMENT(e) RECOGNIZER-
>recoverFromMismatchedElement(RECOGNIZER, s)
#define    ADAPTOR                    INPUT->adaptor
#define  RULEMEMO     PSRSTATE->ruleMemo
#define  SEEK(n)      ISTREAM->seek(ISTREAM,
 n)
#define  INDEX()      ISTREAM->index(ISTREAM)
#define  DBG       RECOGNIZER->debugger


<endif>

#define  TOKTEXT(tok, txt)    tok, (pANTLR3_UINT8)txt

/* The 4 tokens defined below may well clash with your own #defines or token types. If so
* then for the present you must use different names for your defines as these are hard coded
* in the code generator. It would be better not to use such names internally, and maybe
* we can change this in a forthcoming release. I deliberately do not #undef these
```

```
* here as this will at least give you a redefined error somewhere if they clash.
*/
#define    UP     ANTLR3_TOKEN_UP
#define    DOWN    ANTLR3_TOKEN_DOWN
#define    EOR     ANTLR3_TOKEN_EOR
#define    INVALID ANTLR3_TOKEN_INVALID


/* ============================================================================
* Functions to create and destroy scopes. First come the rule scopes, followed
* by the global
 declared scopes.
*/

<rules: {r |<if(r.ruleDescriptor.ruleScope)>
<ruleAttributeScopeFuncDecl(scope=r.ruleDescriptor.ruleScope)>
<ruleAttributeScopeFuncs(scope=r.ruleDescriptor.ruleScope)>
<endif>}>

<recognizer.scopes:{it | <if(it.isDynamicGlobalScope)>
<globalAttributeScopeFuncDecl(it)>
<globalAttributeScopeFuncs(it)>
<endif>}>

/* ============================================================================ */

/* ============================================================================
* Start of recognizer
*/

<recognizer>

/* End of code
* ============================================================================
*/

>>
headerFileExtension() ::= ".h"

headerFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
```

```
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,

    buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
  superClass,
        literals
      ) ::=
<<
<leadIn("C header")>
<if(PARSER)>
* The parser <mainName()>
<endif>
<if(LEXER)>
* The lexer <mainName()>
<endif>
<if(TREE_PARSER)>
* The tree parser <mainName()>
<endif>
has the callable functions (rules) shown below,
* which will invoke the code for the associated rule in the source grammar
* assuming that the input stream is pointing to a token/text stream that could begin
* this rule.
*
* For instance if you call the first (topmost) rule in a parser grammar, you will
* get the results of a full parse, but calling a rule half way through the grammar will
* allow you to pass part of a full token stream to the parser, such as for syntax checking
* in editors
 and so on.
*
* The parser entry points are called indirectly (by function pointer to function) via
* a parser context typedef p<name>, which is returned from a call to <name>New().
*
<if(LEXER)>
* As this is a generated lexer, it is unlikely you will call it 'manually'. However
```

```
* the methods are provided anyway.
*
<endif>
* The methods in p<name> are  as follows:
*
* <rules:{r | <if(!r.ruleDescriptor.isSynPred)> - <headerReturnType(ruleDescriptor=r.ruleDescriptor,...)>
p<name>-><r.ruleDescriptor.name>(p<name>)<endif>}; separator="\n * ">
*
* The return type for any particular rule is of course determined by the source
* grammar file.
*/
// [The "BSD license"]
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// http://www.temporal-wave.com
// http://www.linkedin.com/in/jimidle
//
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// THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
// (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
// THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#ifndef _<name>_H
#define _<name>_H
<actions.(actionScope).preincludes>
/* =============================================================================
* Standard antlr3 C runtime definitions
*/
```

```
#include    \<antlr3.h>

/* End of standard antlr 3 runtime definitions
* ============================================================================
*/
<actions.(actionScope).includes>

#ifdef __cplusplus
extern "C" {
#endif

// Forward declare the context typedef so that we can use it before it is
// properly defined. Delegators and delegates (from import statements) are
// interdependent and their context structures contain pointers to each other
// C only allows such things to be declared if you pre-declare the typedef.
//
typedef struct <name>_Ctx_struct
 <name>, * p<name>;

<if(recognizer.grammar.delegates)>
// Include delegate definition header files
//
<recognizer.grammar.delegates: {g|#include \<<g.recognizerName>.h>}; separator="\n">

<endif>


<actions.(actionScope).header>

#ifdef ANTLR3_WINDOWS
// Disable: Unreferenced parameter,       - Rules with parameters that are not used
//          constant conditional,       - ANTLR realizes that a prediction is always true (synpred usually)
//          initialized but unused variable     - tree rewrite variables declared but not needed
//          Unreferenced local variable      - lexer rule declares but does not always use _type
//          potentially unitialized variable used   - retval always returned from a rule
//   unreferenced local function has been removed - susually getTokenNames or freeScope, they can go without
warnigns
//
// These are only really displayed at warning level /W4 but that is the code ideal I am aiming at
// and the codegen must generate some of these
 warnings by necessity, apart from 4100, which is
// usually generated when a parser rule is given a parameter that it does not use. Mostly though
// this is a matter of orthogonality hence I disable that one.
//
#pragma warning( disable : 4100 )
#pragma warning( disable : 4101 )
#pragma warning( disable : 4127 )
#pragma warning( disable : 4189 )
```

```
#pragma warning( disable : 4505 )
#pragma warning( disable : 4701 )
#endif
<if(backtracking)>

/* =========================
* BACKTRACKING IS ENABLED
* =========================
*/
<endif>

<rules:{r |<headerReturnScope(ruleDescriptor=r.ruleDescriptor,...)>}>

<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDecl(it)><endif>}>
<rules:{r |<ruleAttributeScopeDecl(scope=r.ruleDescriptor.ruleScope)>}>
<if(recognizer.grammar.delegators)>
// Include delegator definition header files
//
<recognizer.grammar.delegators: {g|#include \<<g.recognizerName>.h>}; separator="\n">

<endif>

/** Context tracking structure for <mainName()>
*/
struct
 <name>_Ctx_struct
{
   /** Built in ANTLR3 context tracker contains all the generic elements
    *  required for context tracking.
    */
<if(PARSER)>
   pANTLR3_PARSER   pParser;
<endif>
<if(LEXER)>
   pANTLR3_LEXER    pLexer;
<endif>
<if(TREE_PARSER)>
   pANTLR3_TREE_PARSER     pTreeParser;
<endif>

<if(recognizer.grammar.delegates)>
 <recognizer.grammar.delegates:
        {g|p<g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(recognizer.grammar.delegators)>
 <recognizer.grammar.delegators:
        {g|p<g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
```

```
<scopes:{it | <if(it.isDynamicGlobalScope)>
  <globalAttributeScopeDef(it)>
<endif>}; separator="\n\n">
<rules: {r |<if(r.ruleDescriptor.ruleScope)>
  <ruleAttributeScopeDef(scope=r.ruleDescriptor.ruleScope)>
<endif>}>

<if(LEXER)>
  <rules:{r | <if(!r.ruleDescriptor.isSynPred)><headerReturnType(ruleDescriptor=r.ruleDescriptor)>
(*m<r.ruleDescriptor.name>) (struct <name>_Ctx_struct
 * ctx<if(r.ruleDescriptor.parameterScope)>,
<endif><r.ruleDescriptor.parameterScope:parameterScope()>);<endif>}; separator="\n">
<endif>
<if(!LEXER)>
  <rules:{r | <headerReturnType(ruleDescriptor=r.ruleDescriptor)> (*<r.ruleDescriptor.name>) (struct
<name>_Ctx_struct * ctx<if(r.ruleDescriptor.parameterScope)>,
<endif><r.ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">
<! generate rule/method definitions for imported rules so they
 appear to be defined in this recognizer. !>
  // Delegated rules
<recognizer.grammar.delegatedRules:{ruleDescriptor|
  <headerReturnType(ruleDescriptor)> (*<ruleDescriptor.name>)(struct <name>_Ctx_struct *
ctx<if(ruleDescriptor.parameterScope)>, <endif><ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
<endif>

  const char * (*getGrammarFileName)();
  void           (*reset)  (struct <name>_Ctx_struct * ctx);
  void     (*free)   (struct <name>_Ctx_struct * ctx);
  <@members>
  <@end>
  <actions.(actionScope).context>
};

//
 Function protoypes for the constructor functions that external translation units
// such as delegators and delegates may wish to call.
//
ANTLR3_API p<name> <name>New         (<inputType()> instream<recognizer.grammar.delegators:{g|,
p<g.recognizerName> <g:delegateName()>}>);
ANTLR3_API p<name> <name>NewSSD      (<inputType()> instream,
pANTLR3_RECOGNIZER_SHARED_STATE state<recognizer.grammar.delegators:{g|, p<g.recognizerName>
<g:delegateName()>}>);
<if(!recognizer.grammar.grammarIsRoot)>
extern pANTLR3_UINT8   <recognizer.grammar.composite.rootGrammar.recognizerName>TokenNames[];
<endif>
```

```
/** Symbolic definitions of all the tokens that the <grammarType()> will work with.
* \{
*
* Antlr will define EOF, but we can't use that as it it is too common in
* in C header files and that would be confusing. There is no way to filter this out at the moment
* so we just undef it here for now. That isn't the value we get back from C recognizers
* anyway. We are looking
 for ANTLR3_TOKEN_EOF.
*/
#ifdef EOF
#undef EOF
#endif
#ifdef Tokens
#undef Tokens
#endif
<tokens:{it | #define <it.name>      <it.type>}; separator="\n">
#ifdef EOF
#undef EOF
#define EOF ANTLR3_TOKEN_EOF
#endif

#ifndef TOKENSOURCE
#define TOKENSOURCE(lxr) lxr->pLexer->rec->state->tokSource
#endif

/* End of token definitions for <name>
* =============================================================================
*/
/** \} */

#ifdef __cplusplus
}
#endif

#endif

/* END - Note:Keep extra line feed to satisfy UNIX systems */

>>

inputType() ::=<<
<if(LEXER)>
pANTLR3_INPUT_STREAM
<endif>
<if(PARSER)>
pANTLR3_COMMON_TOKEN_STREAM
<endif>
<if(TREE_PARSER)>
```

```
pANTLR3_COMMON_TREE_NODE_STREAM
<endif>
>>

grammarType() ::= <<
<if(PARSER)>
parser
<endif>
<if(LEXER)>
lexer
<endif>
<if(TREE_PARSER)>
tree parser
<endif>
>>

mainName() ::= <<
<if(PARSER)>
<name>
<endif>
<if(LEXER)>
<name>
<endif>
<if(TREE_PARSER)>
<name>
<endif>
>>

headerReturnScope(ruleDescriptor) ::= "<returnScope(...)>"

headerReturnType(ruleDescriptor)
 ::= <<
<if(LEXER)>
<if(!ruleDescriptor.isSynPred)>
void
<else>
<returnType()>
<endif>
<else>
<returnType()>
<endif>
>>

// Produce the lexer output
//
lexer(  grammar,
  name,
       tokens,
```

```
    scopes,
    rules,
    numRules,
    filterMode,
    superClass,
    labelType="pANTLR3_COMMON_TOKEN") ::= <<

<if(filterMode)>
/* Forward declare implementation function for ANTLR3_TOKEN_SOURCE interface when
* this is a filter mode lexer.
*/
static pANTLR3_COMMON_TOKEN <name>NextToken   (pANTLR3_TOKEN_SOURCE toksource);

/* Override the normal MEMOIZE and HAVEALREADYPARSED macros as this is a filtering
* lexer. In filter mode, the memoizing and backtracking are gated at BACKTRACKING > 1 rather
* than just BACKTRACKING. In some cases this might generate code akin to:
*   if (BACKTRACKING) if (BACKTRACKING > 1) memoize.
* However, I assume that the C compilers/optimizers are smart enough to work this one out
* these days -
 Jim
*/
#undef  MEMOIZE
#define  MEMOIZE(ri,si)   if (BACKTRACKING>1) { RECOGNIZER->memoize(RECOGNIZER, ri, si) }
#undef  HAVEPARSEDRULE
#define  HAVEPARSEDRULE(r)  if (BACKTRACKING>1) { RECOGNIZER->alreadyParsedRule(RECOGNIZER,
r) }
<endif>

/* Forward declare the locally static matching functions we have generated and any predicate functions.
*/
<rules:{r | static ANTLR3_INLINE <headerReturnType(ruleDescriptor=r.ruleDescriptor)>
<if(!r.ruleDescriptor.isSynPred)>m<endif><r.ruleDescriptor.name>    (p<name>
ctx<if(r.ruleDescriptor.parameterScope)>, <endif><r.ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
static void <name>Free(p<name> ctx);

/* =============================================================================
* Lexer matching rules end.
* =============================================================================
*/

<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<actions.lexer.members>

static void
<name>Free  (p<name> ctx)
{
```

```
<if(memoize)>
 if (RULEMEMO
 != NULL)
 {
  RULEMEMO->free(RULEMEMO);
  RULEMEMO = NULL;
 }
<endif>
<if(grammar.directDelegates)>
 // Free the lexers that we delegated to
 // functions to. NULL the state so we only free it once.
 //
 <grammar.directDelegates:
       {g|ctx-><g:delegateName()>->pLexer->rec->state = NULL;
       ctx-><g:delegateName()>->free(ctx-><g:delegateName()>);}; separator="\n">
<endif>
   LEXER->free(LEXER);

   ANTLR3_FREE(ctx);
}

static void
<name>Reset (p<name> ctx)
{
   RECOGNIZER->reset(RECOGNIZER);
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
static const char * getGrammarFileName()
{
 return fileName;
}

<if(filterMode)>
   <filteringNextToken()>
<endif>

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \return
*     - Success p<name> initialized
```

```
 for the lex start
*     - Fail NULL
*/
ANTLR3_API p<name> <name>New
(<inputType()> instream<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
 // See if we can create a new lexer with the standard constructor
 //
 return <name>NewSSD(instream, NULL<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \param[state] state Previously created shared recognizer stat
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
ANTLR3_API p<name> <name>NewSSD
(pANTLR3_INPUT_STREAM instream, pANTLR3_RECOGNIZER_SHARED_STATE
state<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
  p<name> ctx; // Context structure we will build and return

  ctx = (p<name>) ANTLR3_CALLOC(1, sizeof(<name>));

  if  (ctx == NULL)
  {
     // Failed to allocate memory for lexer context
     return  NULL;
  }

  /*
 ------------------------------------------------------------------
   * Memory for basic structure is allocated, now to fill in
   * in base ANTLR3 structures. We initialize the function pointers
   * for the standard ANTLR3 lexer function set, but upon return
   * from here, the programmer may set the pointers to provide custom
   * implementations of each function.
   *
   * We don't use the macros defined in <name>.h here so you can get a sense
   * of what goes where.
   */

  /* Create a base lexer, using the supplied input stream
   */
  ctx->pLexer = antlr3LexerNewStream(ANTLR3_SIZE_HINT, instream, state);
```

```
   /* Check that we allocated the memory correctly
    */
   if (ctx->pLexer == NULL)
   {
  ANTLR3_FREE(ctx);
  return  NULL;
   }
<if(memoize)>
<if(grammar.grammarIsRoot)>
   // Create a LIST for recording rule memos.
   //
   ctx->pLexer->rec->ruleMemo    = antlr3IntTrieNew(15); /* 16 bit depth is enough for 32768 rules! */
<endif>
<endif>

    /* Install the implementation of our <name> interface
    */
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)>ctx->m<r.ruleDescriptor.name> =
m<r.ruleDescriptor.name>;<endif>}; separator="\n">

   /** When the nextToken() call is made to this lexer's pANTLR3_TOKEN_SOURCE
    *  it will call mTokens() in this generated code, and will pass it the ctx
    * pointer of this lexer, not the context of the base lexer, so store that now.
    */
   ctx->pLexer->ctx     = ctx;

   /**Install the token matching function
    */
   ctx->pLexer->mTokens = (void (*) (void *))(mTokens);

   ctx->getGrammarFileName = getGrammarFileName;
   ctx->free  = <name>Free;
   ctx->reset         = <name>Reset;

<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
       {g|ctx-><g:delegateName()> = <g.recognizerName>NewSSD(instream, ctx->pLexer->rec->state,
ctx<grammar.delegators:{g|, <g:delegateName()>}>);};
 separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to lexers that will delegate us to perform certain functions
 // for them.
 //
```

```
 <grammar.delegators:
      {g|ctx-><g:delegateName()>   = <g:delegateName()>;}; separator="\n">
<endif>
<if(filterMode)>
  /* We have filter mode turned on, so install the filtering nextToken function
   */
  ctx->pLexer->rec->state->tokSource->nextToken = <name>NextToken;
<endif>
  <actions.lexer.apifuncs>

  /* Return the newly built lexer to the caller
   */
  return  ctx;
}
<if(cyclicDFAs)>

/* =============================================================================
* DFA tables for the lexer
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* =============================================================================
* End of DFA tables for the lexer
*/
<endif>

/* =============================================================================
* Functions to match the lexer grammar defined tokens from
 the input stream
*/

<rules; separator="\n\n">

/* =============================================================================
* Lexer matching rules end.
* =============================================================================
*/
<if(synpreds)>

/* =============================================================================
* Lexer syntactic predicates
*/
<synpreds:{p | <lexerSynpred(predname=p)>}>
/* =============================================================================
* Lexer syntactic predicates end.
* =============================================================================
*/
<endif>
```

```
/* End of Lexer code
* =============================================
* =============================================
*/

>>


filteringNextToken() ::= <<
/** An override of the lexer's nextToken() method that backtracks over mTokens() looking
*  for matches in lexer filterMode.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  BACKTRACKING
 needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at BACKTRACKING==1.
*/
static pANTLR3_COMMON_TOKEN
<name>NextToken(pANTLR3_TOKEN_SOURCE toksource)
{
  pANTLR3_LEXER   lexer;
 pANTLR3_RECOGNIZER_SHARED_STATE state;

  lexer   = (pANTLR3_LEXER)(toksource->super);
  state = lexer->rec->state;

  /* Get rid of any previous token (token factory takes care of
   * any deallocation when this token is finally used up.
   */
  state  ->token     = NULL;
  state  ->error     = ANTLR3_FALSE;     /* Start out without an exception */
  state  ->failed    = ANTLR3_FALSE;

  /* Record the start of the token in our input stream.
   */
  state->tokenStartCharIndex   = lexer->input->istream->index(lexer->input->istream);
  state->tokenStartCharPositionInLine = lexer->input->getCharPositionInLine(lexer->input);
  state->tokenStartLine    = lexer->input->getLine(lexer->input);
  state->text       = NULL;

  /*
 Now call the matching rules and see if we can generate a new token
   */
  for (;;)
  {
 if  (lexer->input->istream->_LA(lexer->input->istream, 1) == ANTLR3_CHARSTREAM_EOF)
 {
  /* Reached the end of the stream, nothing more to do.
   */
```

```
  pANTLR3_COMMON_TOKEN    teof = &(toksource->eofToken);

  teof->setStartIndex (teof, lexer->getCharIndex(lexer));
  teof->setStopIndex  (teof, lexer->getCharIndex(lexer));
  teof->setLine  (teof, lexer->getLine(lexer));
  return  teof;
 }

 state->token  = NULL;
 state->error  = ANTLR3_FALSE;     /* Start out without an exception */

 {
  ANTLR3_MARKER   m;

  m      = lexer->input->istream->mark(lexer->input->istream);
  state->backtracking  = 1;    /* No exceptions */
  state->failed   = ANTLR3_FALSE;

  /* Call the generated lexer, see if it can get a new token together.
   */
  lexer->mTokens(lexer->ctx);
    state->backtracking = 0;

    <! mTokens backtracks with synpred at BACKTRACKING==2
   and we set the synpredgate
to allow actions at level 1. !>

  if (state->failed == ANTLR3_TRUE)
  {
   lexer->input->istream->rewind(lexer->input->istream, m);
   lexer->input->istream->consume(lexer->input->istream); <! advance one char and try again !>
  }
  else
  {
   lexer->emit(lexer);     /* Assemble the token and emit it to the stream */
   return state->token;
  }
 }
  }
}
>>

actionGate() ::= "BACKTRACKING==0"

filteringActionGate() ::= "BACKTRACKING==1"

/** How to generate a parser */
genericParser(  grammar,
```

```
    name,
            scopes,
            tokens,
            tokenNames,
            rules,
            numRules,
            bitsets,
            inputStreamType,
            superClass,
            labelType,
    members,
    rewriteElementType, filterMode,
            ASTLabelType="pANTLR3_BASE_TREE"
           ) ::= <<


<if(grammar.grammarIsRoot)>
/** \brief Table of all token names in symbolic order, mainly used for
*
  error reporting.
*/
pANTLR3_UINT8   <name>TokenNames[<length(tokenNames)>+4]
    = {
      (pANTLR3_UINT8) "\<invalid>",       /* String to print to indicate an invalid token */
      (pANTLR3_UINT8) "\<EOR>",
      (pANTLR3_UINT8) "\<DOWN>",
      (pANTLR3_UINT8) "\<UP>",
      <tokenNames:{it |(pANTLR3_UINT8) <it>}; separator=",\n">
     };
<endif>

  <@members>

  <@end>
<rules:{r |<ruleAttributeScopeFuncMacro(scope=r.ruleDescriptor.ruleScope)>}>
<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScopeFuncMacro(it)><endif>}>

// Forward declare the locally static matching functions we have generated.
//
<rules:{r | static <headerReturnType(ruleDescriptor=r.ruleDescriptor)> <r.ruleDescriptor.name>    (p<name>
ctx<if(r.ruleDescriptor.parameterScope)>, <endif><r.ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
static void <name>Free(p<name> ctx);
static void     <name>Reset (p<name> ctx);

<if(!LEXER)>
<! generate rule/method definitions for
```

```
 imported rules so they
  appear to be defined in this recognizer. !>
<if(recognizer.grammar.delegatedRules)>
// Delegated rules
//
<recognizer.grammar.delegatedRules:{ruleDescriptor|static <headerReturnType(ruleDescriptor)>
<ruleDescriptor.name>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">

<endif>
<endif>

/* For use in tree output where we are accumulating rule labels via label += ruleRef
* we need a function that knows how to free a return scope when the list is destroyed.
* We cannot just use ANTLR3_FREE because in debug tracking mode, this is a macro.
*/
static void ANTLR3_CDECL freeScope(void * scope)
{
   ANTLR3_FREE(scope);
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
static const char * getGrammarFileName()
{
 return fileName;
}
/** \brief Create a
 new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
ANTLR3_API p<name>
<name>New   (<inputStreamType> instream<grammar.delegators:{g|, p<g.recognizerName>
<g:delegateName()>}>)
{
 // See if we can create a new parser with the standard constructor
 //
 return <name>NewSSD(instream, NULL<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new <name> parser and return a context for it.
```

```
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
ANTLR3_API p<name>
<name>NewSSD   (<inputStreamType> instream, pANTLR3_RECOGNIZER_SHARED_STATE
state<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
  p<name> ctx;     /* Context structure we will build and return   */

  ctx = (p<name>) ANTLR3_CALLOC(1, sizeof(<name>));

  if (ctx == NULL)
  {
 // Failed to allocate memory
 for parser context
 //
     return  NULL;
  }

  /* -------------------------------------------------------------------
   * Memory for basic structure is allocated, now to fill in
   * the base ANTLR3 structures. We initialize the function pointers
   * for the standard ANTLR3 parser function set, but upon return
   * from here, the programmer may set the pointers to provide custom
   * implementations of each function.
   *
   * We don't use the macros defined in <name>.h here, in order that you can get a sense
   * of what goes where.
   */

<if(PARSER)>
  /* Create a base parser/recognizer, using the supplied token stream
   */
  ctx->pParser     = antlr3ParserNewStream(ANTLR3_SIZE_HINT, instream->tstream, state);
<endif>
<if(TREE_PARSER)>
  /* Create a base Tree parser/recognizer, using the supplied tree node stream
   */
  ctx->pTreeParser  = antlr3TreeParserNewStream(ANTLR3_SIZE_HINT, instream, state);
<endif>

  /* Install the implementation
 of our <name> interface
   */
  <rules:{r | ctx-><r.ruleDescriptor.name> = <r.ruleDescriptor.name>;}; separator="\n">
<if(grammar.delegatedRules)>
```

```
 // Install the delegated methods so that they appear to be a part of this
 // parser
 //
   <grammar.delegatedRules:{ruleDescriptor | ctx-><ruleDescriptor.name> = <ruleDescriptor.name>;};
separator="\n">
<endif>

   ctx->free   = <name>Free;
   ctx->reset   = <name>Reset;
   ctx->getGrammarFileName = getGrammarFileName;

   /* Install the scope pushing methods.
    */
   <rules: {r |<if(r.ruleDescriptor.ruleScope)>
<ruleAttributeScope(scope=r.ruleDescriptor.ruleScope)><\n>
<endif>}>
   <recognizer.scopes:{it |<if(it.isDynamicGlobalScope)>
<globalAttributeScope(it)><\n>
<endif>}>
   <@apifuncs>

   <@end>
<if(grammar.directDelegates)>
 // Initialize the parsers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
       {g|ctx-><g:delegateName()> = <g.recognizerName>NewSSD(instream, PSRSTATE,
 ctx<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to parsers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
       {g|ctx-><g:delegateName()>   = <g:delegateName()>;}; separator="\n">
<endif>
   <actions.parser.apifuncs>
   <actions.treeparser.apifuncs>
<if(memoize)>
<if(grammar.grammarIsRoot)>
   /* Create a LIST for recording rule memos.
    */
    RULEMEMO    = antlr3IntTrieNew(15); /* 16 bit depth is enough for 32768 rules! */<\n>
<endif>
<endif>
   /* Install the token table
    */
```

```
  PSRSTATE->tokenNames   = <grammar.composite.rootGrammar.recognizerName>TokenNames;

  <@debugStuff()>

  /* Return the newly built parser to the caller
   */
  return  ctx;
}

static void
<name>Reset (p<name> ctx)
{
  RECOGNIZER->reset(RECOGNIZER);
}

/** Free the parser resources
*/
static void
<name>Free(p<name> ctx)
{
  /* Free any scope memory
    */
  <rules: {r
|<if(r.ruleDescriptor.ruleScope)><ruleAttributeScopeFree(scope=r.ruleDescriptor.ruleScope)><\n><endif>}>
  <recognizer.scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScopeFree(it)><\n><endif>}>

  <@cleanup>
  <@end>
<if(grammar.directDelegates)>
 // Free the parsers that we delegated to
 // functions to.NULL the state so we only free it once.
 //
 <grammar.directDelegates:
      {g| ctx-><g:delegateName()>-><if(TREE_PARSER)>pTreeParser<else>pParser<endif>->rec->state = NULL;
      ctx-><g:delegateName()>->free(ctx-><g:delegateName()>);}; separator="\n">
<endif>
<if(memoize)>
<if(grammar.grammarIsRoot)>
 if (RULEMEMO != NULL)
 {
  RULEMEMO->free(RULEMEMO);
  RULEMEMO = NULL;
 }
<endif>
<endif>
 // Free this parser
 //
<if(TREE_PARSER)>
```

```
  ctx->pTreeParser->free(ctx->pTreeParser);<\n>
<else>
  ctx->pParser->free(ctx->pParser);<\n>
<endif>

  ANTLR3_FREE(ctx);

  /* Everything is released, so we can return
   */
  return;
}

/**
 Return token names used by this <grammarType()>
*
* The returned pointer is used as an index into the token names table (using the token
* number as the index).
*
* \return Pointer to first char * in the table.
*/
static pANTLR3_UINT8    *getTokenNames()
{
      return <grammar.composite.rootGrammar.recognizerName>TokenNames;
}

  <members>

/* Declare the bitsets
*/
<bitsets:{it | <bitsetDeclare(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                words64=it.bits)>}>


<if(cyclicDFAs)>

/* ============================================================================
* DFA tables for the parser
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* ============================================================================
* End of DFA tables for the parser
*/
<endif>

/* ============================================
* Parsing rules
*/
<rules; separator="\n\n">
```

```
<if(grammar.delegatedRules)>
 // Delegated methods that appear to be a part of this
 //
 parser
 //
<grammar.delegatedRules:{ruleDescriptor|
   <returnType()> <ruleDescriptor.name>(p<name> ctx<if(ruleDescriptor.parameterScope.attributes)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
   \{
      <if(ruleDescriptor.hasReturnValue)>return <endif>ctx-><ruleDescriptor.grammar:delegateName()>-
><ruleDescriptor.name>(ctx-
><ruleDescriptor.grammar:delegateName()><if(ruleDescriptor.parameterScope.attributes)>,
<endif><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", ">);
 \}}; separator="\n">

<endif>
/* End of parsing rules
* ============================================
*/

/* ============================================
* Syntactic predicates
*/
<synpreds:{p | <synpred(predname=p)>}>
/* End of syntactic predicates
* ============================================
*/




>>

parser( grammar,
  name,
  scopes,
  tokens,
  tokenNames,
  rules,
  numRules,
  bitsets,
  ASTLabelType,
  superClass="Parser",
  labelType="pANTLR3_COMMON_TOKEN",
  members={<actions.parser.members>}
  )
```

```
 ::= <<
<genericParser(inputStreamType="pANTLR3_COMMON_TOKEN_STREAM", rewriteElementType="TOKEN",
...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser( grammar,
  name,
  scopes,
  tokens,
  tokenNames,
  globalAction,
  rules,
  numRules,
  bitsets,
  filterMode,
  labelType={<ASTLabelType>},
  ASTLabelType="pANTLR3_BASE_TREE",
  superClass="TreeParser",
  members={<actions.treeparser.members>}
  ) ::= <<
<genericParser(inputStreamType="pANTLR3_COMMON_TREE_NODE_STREAM",
rewriteElementType="NODE", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule,
 they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
static void <ruleName>_fragment(p<name> ctx <ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs()>
 <ruleLabelInitializations()>
<if(trace)>
  ANTLR3_PRINTF("enter <ruleName> %d failed = %d, backtracking = %d\\n",LT(1),failed,BACKTRACKING);
  <block>
  ANTLR3_PRINTF("exit <ruleName> %d, failed = %d, backtracking = %d\\n",LT(1),failed,BACKTRACKING);

<else>
```

```
  <block>
<endif>
<ruleCleanUp()>
}
// $ANTLR end <ruleName>
>>

synpred(predname) ::= <<
static ANTLR3_BOOLEAN <predname>(p<name> ctx)
{
  ANTLR3_MARKER   start;
  ANTLR3_BOOLEAN  success;

  BACKTRACKING++;
  <@start()>
  start = MARK();
  <predname>_fragment(ctx);     // can never throw exception
  success = !(FAILEDFLAG);
  REWIND(start);
  <@stop()>
  BACKTRACKING--;
  FAILEDFLAG = ANTLR3_FALSE;
  return success;
}<\n>
>>

lexerSynpred(predname)
 ::= <<
<synpred(predname)>
>>

ruleMemoization(rname) ::= <<
<if(memoize)>
if ( (BACKTRACKING>0) && (HAVEPARSEDRULE(<ruleDescriptor.index>)) )
{
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
 retval.start = 0;<\n>
<endif>
<endif>
  <(ruleDescriptor.actions.after):execAfter()>
  <finalCode(finalBlock=finally)>
<if(!ruleDescriptor.isSynPred)>
  <scopeClean()><\n>
<endif>
  return <ruleReturnValue()>;
}
<endif>
```

```
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
if  (HASEXCEPTION())
{
  goto rule<ruleDescriptor.name>Ex;
}
<if(backtracking)>
if (HASFAILED())
{
  <scopeClean()>
  <@debugClean()>
  return <ruleReturnValue()>;
}
<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if (BACKTRACKING>0)
{
  FAILEDFLAG = <true_value()>;
  <scopeClean()>
  return <ruleReturnValue()>;
}
<endif>
>>

/** How to generate
 code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
/**
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
static <returnType()>
<ruleName>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
{
  <if(trace)>ANTLR3_PRINTF("enter <ruleName> %s failed=%d, backtracking=%d\n", LT(1),
BACKTRACKING);<endif>
  <ruleDeclarations()>
  <ruleDescriptor.actions.declarations>
  <ruleLabelDefs()>
```

```
  <ruleInitializations()>
  <ruleDescriptor.actions.init>
  <ruleMemoization(rname=ruleName)>
  <ruleLabelInitializations()>
  <@preamble()>
  {
     <block>
  }

  <ruleCleanUp()>
<if(exceptions)>
  if (HASEXCEPTION())
  {
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
  }
  else
  {
 <(ruleDescriptor.actions.after):execAfter()>
  }
<else>
  <if(!emptyRule)>
      <if(actions.(actionScope).rulecatch)>
        <actions.(actionScope).rulecatch>
     <else>
        if (HASEXCEPTION())
        {
           PREPORTERROR();
           PRECOVER();
           <@setErrorReturnValue()>
        }
        <if(ruleDescriptor.actions.after)>
        else
        {
           <(ruleDescriptor.actions.after):execAfter()>
        }<\n>
        <endif>
     <endif>
  <endif>
<endif>

  <if(trace)>ANTLR3_PRINTF("exit <ruleName> %d failed=%s backtracking=%s\n", LT(1), failed,
BACKTRACKING);<endif>
  <memoize()>
<if(finally)>
  <finalCode(finalBlock=finally)>
<endif>
  <scopeClean()>
  <@postamble()>
```

```
  return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
  <finalBlock>
}

>>

catch(decl,action) ::= <<
/* catch(decl,action)
*/
{
  <e.action>
}

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()>
 retval;<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name>;
}>
<endif>
<if(memoize)>
ANTLR3_MARKER <ruleDescriptor.name>_StartIndex;
<endif>
>>

ruleInitializations() ::= <<
/* Initialize rule variables
*/
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.returnScope.attributes:{ a |
<if(a.initValue)>retval.<a.name> = <a.initValue>;<endif>
}>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<if(a.initValue)><a.name> = <a.initValue>;<endif>
}>
<endif>
<if(memoize)>
```

```
<ruleDescriptor.name>_StartIndex = INDEX();<\n>
<endif>
<ruleDescriptor.useScopes:{it |<scopeTop(it)> = <scopePush(it)>;}; separator="\n">
<ruleDescriptor.ruleScope:{it |<scopeTop(it.name)> = <scopePush(it.name)>;}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
  :{it |<labelType>    <it.label.text>;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{it |pANTLR3_VECTOR    list_<it.label.text>;};
 separator="\n"
>
<[ruleDescriptor.ruleLabels,ruleDescriptor.ruleListLabels]
  :ruleLabelDef(); separator="\n"
>
>>

ruleLabelInitializations() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
  :{it |<it.label.text>       = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{it |list_<it.label.text>     = NULL;}; separator="\n"
>
<[ruleDescriptor.ruleLabels,ruleDescriptor.ruleListLabels]
  :ruleLabelInitVal(); separator="\n"
>
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
retval.start = LT(1); retval.stop = retval.start;<\n>
<endif>
<endif>
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<labelType> <it.label.text>;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |ANTLR3_UINT32 <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |pANTLR3_INT_TRIE list_<it.label.text>;}; separator="\n"
>
```

```
>>

lexerRuleLabelInit() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text> = antlr3IntTrieNew(31);}; separator="\n"
>
>>

lexerRuleLabelFree() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text>->free(list_<it.label.text>);}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

memoize()
 ::= <<
<if(memoize)>
<if(backtracking)>
if ( BACKTRACKING>0 ) { MEMOIZE(<ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>
```

```
ruleCleanUp() ::= <<

// This is where rules clean up and exit
//
goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
<if(!ruleDescriptor.isSynPred)>
retval.stop = LT(-1);<\n>
<endif>
<endif>
<endif>
>>

scopeClean() ::= <<
<ruleDescriptor.useScopes:{it |<scopePop(it)>}; separator="\n">
<ruleDescriptor.ruleScope:{it |<scopePop(it.name)>}; separator="\n">

>>
/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules, which do not produce tokens.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
//   Comes from: <block.description>
/** \brief Lexer rule generated by ANTLR3
*
* $ANTLR start <ruleName>
*
* Looks to match the characters the constitute the
 token <ruleName>
* from the attached input stream.
*
*
* \remark
*  - lexer->error == ANTLR3_TRUE if an exception was thrown.
*/
static ANTLR3_INLINE
void m<ruleName>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
{
 ANTLR3_UINT32 _type;
   <ruleDeclarations()>
   <ruleDescriptor.actions.declarations>
   <lexerRuleLabelDefs()>
   <if(trace)>System.out.println("enter <ruleName> '"+(char)LA(1)+"'
line="+GETLINE()+":"+GETCHARPOSITIONINLINE()+" failed="+failed+"
```

```
backtracking="+BACKTRACKING);<endif>

<if(nakedBlock)>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  <ruleDescriptor.actions.init>

  <block><\n>
<else>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  _type     = <ruleName>;

  <ruleDescriptor.actions.init>

  <block>
 LEXSTATE->type = _type;
<endif>
  <if(trace)> ANTLR3_FPRINTF(stderr, "exit <ruleName> '%c' line=%d:%d failed = %d, backtracking
=%d\n",LA(1),GETLINE(),GETCHARPOSITIONINLINE(),failed,BACKTRACKING);<endif>
   <ruleCleanUp()>
  <lexerRuleLabelFree()>
  <(ruleDescriptor.actions.after):execAfter()>
  <memoize>
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
/** This is the entry point in to the lexer from an object that
*  wants to generate the next token, such as a pCOMMON_TOKEN_STREAM
*/
static void
mTokens(p<name> ctx)
{
  <block><\n>

  goto ruleTokensEx; /* Prevent compiler warnings */
ruleTokensEx: ;
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
```

```
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<

// <fileName>:<description>
{
  int alt<decisionNumber>=<maxAlt>;
  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  <@prebranch()>
  switch (alt<decisionNumber>)
   {
 <alts:{a | <altSwitchCase(i,a)>}>
  }
  <@postbranch()>
}
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
{
  //  <fileName>:<description>

  ANTLR3_UINT32 alt<decisionNumber>;

  alt<decisionNumber>=<maxAlt>;

  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
 <alts:{a | <altSwitchCase(i,a)>}>
  }
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
```

```
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n)
 ::= <<
// <fileName>:<description>
{
  int cnt<decisionNumber>=0;
  <decls>
  <@preloop()>

  for (;;)
  {
     int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
    <alts:{a | <altSwitchCase(i,a)>}>
    default:

 if ( cnt<decisionNumber> >= 1 )
 {
    goto loop<decisionNumber>;
 }
 <ruleBacktrackFailure()>
 <earlyExitEx()>
 <@earlyExitException()>
 goto rule<ruleDescriptor.name>Ex;
 }
 cnt<decisionNumber>++;
  }
  loop<decisionNumber>: ; /* Jump to here if this rule does not match */
  <@postloop()>
}
>>

earlyExitEx() ::= <<
/* mismatchedSetEx()
*/
CONSTRUCTEX();
```

```
EXCEPTION->type = ANTLR3_EARLY_EXIT_EXCEPTION;
EXCEPTION->name = (void *)ANTLR3_EARLY_EXIT_NAME;
<\n>
>>
positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description)
 ::= <<

// <fileName>:<description>
<decls>

<@preloop()>
for (;;)
{
  int alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
 <alts:{a | <altSwitchCase(i,a)>}>
 default:
    goto loop<decisionNumber>; /* break out of the loop */
    break;
  }
}
loop<decisionNumber>: ; /* Jump out to here if this rule does not match */
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by antlr before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
  <@prealt()>
```

```
   <alt>
  break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
  <@declarations()>
  <@initializations()>
  <elements:element()>
  <rew>
  <@cleanup()>
}
>>

// E L E M E N T S
/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> = (<labelType>)<endif> MATCHT(<token>,
&FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label> == NULL)
{
  list_<label>=ctx->vectors->newVector(ctx->vectors);
}
list_<label>->add(list_<label>,
```

```
 <elem>, NULL);
>>


/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHC(<char>);
<checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHRANGE(<a>, <b>);
<checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= LA(1);<\n>
<else>
<label>=(<labelType>)LT(1);<\n>
<endif>
<endif>
if ( <s> )
{
  CONSUME();
  <postmatchCode>
<if(!LEXER)>
  PERRORRECOVERY=ANTLR3_FALSE;
<endif>
  <if(backtracking)>FAILEDFLAG=ANTLR3_FALSE;<\n><endif>
}
else
{
  <ruleBacktrackFailure()>
  <mismatchedSetEx()>
  <@mismatchedSetException()>
<if(LEXER)>
  LRECOVER();
<else>
```

```
  RECOVERFROMMISMATCHEDSET(&FOLLOW_set_in_<ruleName><elementIndex>);
<endif>

  goto rule<ruleDescriptor.name>Ex;
}<\n>
>>

mismatchedSetEx() ::= <<
CONSTRUCTEX();
EXCEPTION->type         = ANTLR3_MISMATCHED_SET_EXCEPTION;
EXCEPTION->name         = (void *)ANTLR3_MISMATCHED_SET_NAME;
<if(PARSER)>
EXCEPTION->expectingSet = &FOLLOW_set_in_<ruleName><elementIndex>;
<endif>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
<label>Start = GETCHARINDEX();
MATCHS(<string>);
<checkRuleBacktrackFailure()>
<label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
<label>->setType(<label>, ANTLR3_TOKEN_INVALID);
<label>->setStartIndex(<label>, <label>Start);
<label>->setStopIndex(<label>, GETCHARINDEX()-1);
<label>->input = INPUT->tnstream->istream;
<else>
MATCHS(<string>);
<checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=(<labelType>)LT(1);<\n>
<endif>
MATCHANYT();
<checkRuleBacktrackFailure()>
>>
```

```
wildcardAndListLabel(token,label,elementIndex,terminalOptions)
 ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHANY();
<checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
FOLLOWPUSH(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)>ctx-><scope:delegateName()>-><endif><rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif><if(args)>,
 <args; separator=", "><endif>);<\n>
FOLLOWPOP();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
/* <description> */
```

```
<if(label)>
{
  ANTLR3_MARKER <label>Start<elementIndex> = GETCHARINDEX();
  <if(scope)>ctx-><scope:delegateName()>-><endif>m<rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif> <if(args)>, <endif><args; separator=", ">);
  <checkRuleBacktrackFailure()>
  <label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
  <label>->setType(<label>, ANTLR3_TOKEN_INVALID);
  <label>->setStartIndex(<label>, <label>Start<elementIndex>);
  <label>->setStopIndex(<label>, GETCHARINDEX()-1);

  <label>->input = INPUT;
}
<else>
<if(scope)>ctx-><scope:delegateName()>-><endif>m<rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif> <if(args)>, <endif><args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
{
  ANTLR3_UINT32 <label>Start<elementIndex>;
  <labelType> <label>;
  <label>Start<elementIndex> = GETCHARINDEX();
  MATCHC(ANTLR3_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
  <label>->setType(<label>, ANTLR3_TOKEN_EOF);
  <label>->setStartIndex(<label>, <label>Start<elementIndex>);
  <label>->setStopIndex(<label>, GETCHARINDEX()-1);
  <label>->input = INPUT->tnstream->istream;
}
<else>
  MATCHC(ANTLR3_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
   <endif>
>>

// used for left-recursive rules
```

```
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                       ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()           ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( LA(1)==ANTLR3_TOKEN_DOWN ) {
  MATCHT(ANTLR3_TOKEN_DOWN, NULL);
  <checkRuleBacktrackFailure()>
  <children:element()>
  MATCHT(ANTLR3_TOKEN_UP, NULL);
  <checkRuleBacktrackFailure()>
}
<else>
MATCHT(ANTLR3_TOKEN_DOWN, NULL);
<checkRuleBacktrackFailure()>
<children:element()>
MATCHT(ANTLR3_TOKEN_UP, NULL);
<checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate
 (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) )
{
  <ruleBacktrackFailure()>
  <newFPE(...)>
}
>>

newFPE() ::= <<
  CONSTRUCTEX();
  EXCEPTION->type         = ANTLR3_FAILED_PREDICATE_EXCEPTION;
  EXCEPTION->message      = (void *)"<description>";
  EXCEPTION->ruleName  = (void *)"<ruleName>";
  <\n>
>>

// F i x e d  D F A  (if-then-else)
```

```
dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<

{
  int LA<decisionNumber>_<stateNumber> = LA(<k>);
  <edges; separator="\nelse ">
  else
  {
<if(eotPredictsAlt)>
    alt<decisionNumber>=<eotPredictsAlt>;
<else>
    <ruleBacktrackFailure()>

    <newNVException()>
    goto rule<ruleDescriptor.name>Ex;

<endif>
  }
}
>>

newNVException() ::= <<
CONSTRUCTEX();
EXCEPTION->type         = ANTLR3_NO_VIABLE_ALT_EXCEPTION;
EXCEPTION->message      = (void *)"<description>";
EXCEPTION->decisionNum
  = <decisionNumber>;
EXCEPTION->state        = <stateNumber>;
<@noViableAltException()>
<\n>
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  int LA<decisionNumber>_<stateNumber> = LA(<k>);
  <edges; separator="\nelse ">
}
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
```

```
*  anything other than 'a' predicts exiting.
*/

dfaLoopbackStateDecls()::= <<
ANTLR3_UINT32   LA<decisionNumber>_<stateNumber>;
>>
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
 ::= <<
{
  /* dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
   */
   int LA<decisionNumber>_<stateNumber> = LA(<k>);
   <edges; separator="\nelse "><\n>
   <if(eotPredictsAlt)>
   <if(!edges)>
 alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
 <else>
   else
   {
 alt<decisionNumber>=<eotPredictsAlt>;
   }<\n>
   <endif>
   <endif>
}
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( <if(predicates)>(<predicates>) && <endif>(<labelExpr>))
{
   <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.
  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
```

```
{
<edges; separator="\n">

default:
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  <newNVException()>
  goto rule<ruleDescriptor.name>Ex;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
  <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber>=<eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
  <targetState>
 }
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of
 a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
```

```
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(ctx, RECOGNIZER, ISTREAM,
&cdfa<decisionNumber>);
<checkRuleBacktrackFailure()>
>>

/* Dump DFA tables as static initialized arrays of shorts(16 bits)/characters(8 bits)
* which are then used to statically initialize the dfa structure, which means that there
* is no runtime initialization whatsoever, other than anything the C compiler might
* need to generate. In general the C compiler will lay out memory such that there is no
* runtime code required.
*/
cyclicDFA(dfa) ::= <<
/** Static dfa state tables for Cyclic dfa:
*    <dfa.description>
*/
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
   {
 <dfa.eot; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>]
 =
   {
 <dfa.eof; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
   {
 <dfa.min; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
   {
 <dfa.max; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
   {
 <dfa.accept; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
   {
 <dfa.special; wrap="\n", separator=", ", null="-1">
   };

/** Used when there is no transition table entry for a particular state */
#define dfa<dfa.decisionNumber>_T_empty     NULL

<dfa.edgeTransitionClassMap.keys:{ table |
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_T<i0>[] =
   {
```

```
 <table; separator=", ", wrap="\n", null="-1">
  \};}; null = "">

/* Transition tables are
 a table of sub tables, with some tables
* reused for efficiency.
*/
static const ANTLR3_INT32 * const dfa<dfa.decisionNumber>_transitions[] =
{
  <dfa.transitionEdgeTables:{xref|dfa<dfa.decisionNumber>_T<xref>}; separator=", ", wrap="\n", null="_empty">
};

<if(dfa.specialStateSTs)>
static ANTLR3_INT32 dfa<dfa.decisionNumber>_sst(p<name> ctx, pANTLR3_BASE_RECOGNIZER recognizer,
pANTLR3_INT_STREAM is, pANTLR3_CYCLIC_DFA dfa, ANTLR3_INT32 s)
{
  ANTLR3_INT32    _s;

  _s     = s;
  switch  (s)
  {
  <dfa.specialStateSTs:{state |
  case <i0>:

 <state>}; separator="\n">
  }
<if(backtracking)>
  if (BACKTRACKING > 0)
  {
 FAILEDFLAG = ANTLR3_TRUE;
 return -1;
  }
<endif>

  CONSTRUCTEX();
  EXCEPTION->type         = ANTLR3_NO_VIABLE_ALT_EXCEPTION;
  EXCEPTION->message      = (void *)"<dfa.description>";
  EXCEPTION->decisionNum  = <dfa.decisionNumber>;
  EXCEPTION->state        = _s;
  <@noViableAltException()>
  return -1;
}
<endif>

<@errorMethod()>

/*
```

```
 Declare tracking structure for Cyclic DFA <dfa.decisionNumber>
*/
static
ANTLR3_CYCLIC_DFA cdfa<dfa.decisionNumber>
  = {
    <dfa.decisionNumber>,      /* Decision number of this dfa     */
    /* Which decision this represents:   */
    (const pANTLR3_UCHAR)"<dfa.description>",
<if(dfa.specialStateSTs)>
    (CDFA_SPECIAL_FUNC) dfa<dfa.decisionNumber>_sst,
<else>
    (CDFA_SPECIAL_FUNC) antlr3dfaspecialStateTransition, /* Default special state transition function */
<endif>

    antlr3dfaspecialTransition,  /* DFA specialTransition is currently just a default function in the runtime */
    antlr3dfapredict,   /* DFA simulator function is in the runtime */
    dfa<dfa.decisionNumber>_eot,     /* EOT table       */
    dfa<dfa.decisionNumber>_eof,     /* EOF table       */
    dfa<dfa.decisionNumber>_min,     /* Minimum tokens for each state    */
    dfa<dfa.decisionNumber>_max,     /* Maximum tokens for each state    */
    dfa<dfa.decisionNumber>_accept, /* Accept
 table       */
    dfa<dfa.decisionNumber>_special, /* Special transition states     */
    dfa<dfa.decisionNumber>_transitions /* Table of transition tables     */

 };
/* End of Cyclic DFA <dfa.decisionNumber>
* ---------------------
*/
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
  ANTLR3_UINT32 LA<decisionNumber>_<stateNumber>;<\n>
  ANTLR3_MARKER index<decisionNumber>_<stateNumber>;<\n>

 LA<decisionNumber>_<stateNumber> = LA(1);<\n>
  <if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
  index<decisionNumber>_<stateNumber> = INDEX();<\n>
  REWINDLAST();<\n>
  <endif>
  s = -1;
  <edges; separator="\nelse ">
 <if(semPredState)> <! return input cursor to state before we rewound !>
 SEEK(index<decisionNumber>_<stateNumber>);<\n>
```

```
 <endif>
   if ( s>=0 )
   {
 return s;
   }
}
break;
>>

/** Just like
 a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( <if(predicates)>(<predicates>) && <endif>(<labelExpr>) )
{
   s = <targetStateNumber>;
}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "( (<left>) && (<right>) )"

orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\"||\">)"

notPredicate(pred) ::= "!( <evalPredicate(pred,{})> )"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>(ctx)"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead
 directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "LA(<k>) == <atom>"
```

```
lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
((LA<decisionNumber>_<stateNumber> >= <lower>) && (LA<decisionNumber>_<stateNumber> \<= <upper>))
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "((LA(<k>) >= <lower>) &&
(LA(<k>) \<= <upper>))"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

makeScopeSet() ::= <<
/* makeScopeSet()
*/
/** Definition of the <scope.name> scope variable tracking
*  structure. An instance of this structure is created by calling
*  <name>_<scope.name>Push().
*/
typedef struct  <scopeStruct(sname=scope.name,...)>_struct
{
  /** Function that the user may provide to be called when the
   *  scope is destroyed (so you can free pANTLR3_HASH_TABLES and so on)
   *
   * \param POinter to an instance of this typedef/struct
   */
  void    (ANTLR3_CDECL *free) (struct <scopeStruct(sname=scope.name,...)>_struct
 * frame);

  /* ============================================================================
   * Programmer defined variables...
   */
  <scope.attributes:{it |<it.decl>;}; separator="\n">

  /* End of programmer defined variables
   * ============================================================================
   */
}
  <scopeStruct(sname=scope.name,...)>, * <scopeType(sname=scope.name,...)>;

>>

globalAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>
```

```
ruleAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

globalAttributeScopeFuncDecl(scope) ::=
<<
/* globalAttributeScopeFuncDecl(scope)
*/
<if(scope.attributes)>
/* -----------------------------------------------------------------------------
* Function declaration for creating a <name>_<scope.name> scope set
*/
static <scopeType(sname=scope.name,...)>
   <scopePushName(sname=scope.name,...)>(p<name> ctx);
static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope);
/* ----------------------------------------------------------------------------- */

<endif>
>>

globalAttributeScopeFuncMacro(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeFuncMacro(scope)
*/
/** Function  for popping the top value from a <scopeStack(sname=scope.name)>
*/
void
<scopePopName(sname=scope.name,...)>(p<name> ctx)
{
   // First see if the user defined a function they want to be called when a
   // scope is popped/freed.
   //
 // If the user supplied the scope entries with a free function,then call it first
 //
   if (SCOPE_TOP(<scope.name>)->free != NULL)
 {
       SCOPE_TOP(<scope.name>)->free(SCOPE_TOP(<scope.name>));
 }

   // Now we decrement the scope's upper limit bound. We do not actually pop the scope as
   // we want to reuse scope entries if we do continuous push and pops. Most scopes don't
    // next too far so we don't want to keep freeing and allocating them
   //
```

```
  ctx-><scopeStack(sname=scope.name,...)>_limit--;
  SCOPE_TOP(<scope.name>) = (<scopeType(sname=scope.name)>)(ctx-><scopeStack(sname=scope.name,...)>-
>get(ctx-><scopeStack(sname=scope.name,...)>, ctx-><scopeStack(sname=scope.name,...)>_limit - 1));
}
<endif>
>>

ruleAttributeScopeFuncDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncDecl(scope)
*/
/* ------------------------------------------------------------------------
* Function declarations for creating a <name>_<scope.name> scope set
*/
static <scopeType(sname=scope.name,...)>   <scopePushName(sname=scope.name,...)>(p<name> ctx);
static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope);
/* ------------------------------------------------------------------------ */

<endif>
>>

ruleAttributeScopeFuncMacro(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncMacro(scope)
*/
/** Function
 for popping the top value from a <scopeStack(sname=scope.name,...)>
*/
void
<scopePopName(sname=scope.name,...)>(p<name> ctx)
{
  // First see if the user defined a function they want to be called when a
  // scope is popped/freed.
  //
 // If the user supplied the scope entries with a free function,then call it first
 //
  if (SCOPE_TOP(<scope.name>)->free != NULL)
 {
     SCOPE_TOP(<scope.name>)->free(SCOPE_TOP(<scope.name>));
 }

  // Now we decrement the scope's upper limit bound. We do not actually pop the scope as
  // we want to reuse scope entries if we do continuous push and pops. Most scopes don't
  // next too far so we don't want to keep freeing and allocating them
  //
  ctx-><scopeStack(sname=scope.name,...)>_limit--;
  SCOPE_TOP(<scope.name>) = (<scopeType(sname=scope.name)>)(ctx-><scopeStack(sname=scope.name,...)>-
>get(ctx-><scopeStack(sname=scope.name,...)>, ctx-><scopeStack(sname=scope.name,...)>_limit - 1));
```

```
}

<endif>
>>

globalAttributeScopeDef(scope)
 ::=
<<
/* globalAttributeScopeDef(scope)
*/
<if(scope.attributes)>
/** Pointer to the  <scope.name> stack for use by <scopePushName(sname=scope.name)>()
*  and <scopePopName(sname=scope.name,...)>()
*/
pANTLR3_STACK <scopeStack(sname=scope.name)>;
ANTLR3_UINT32 <scopeStack(sname=scope.name)>_limit;
/** Pointer to the top of the stack for the global scope <scopeStack(sname=scope.name)>
*/
<scopeType(sname=scope.name,...)>    (*<scopePushName(sname=scope.name,...)>)(struct <name>_Ctx_struct *
ctx);
<scopeType(sname=scope.name,...)>    <scopeTopDecl(sname=scope.name,...)>;

<endif>
>>

ruleAttributeScopeDef(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDef(scope)
*/
/** Pointer to the  <scope.name> stack for use by <scopePushName(sname=scope.name)>()
*  and <scopePopName(sname=scope.name,...)>()
*/
pANTLR3_STACK <scopeStack(sname=scope.name,...)>;
ANTLR3_UINT32 <scopeStack(sname=scope.name,...)>_limit;
<scopeType(sname=scope.name,...)>   (*<scopePushName(sname=scope.name,...)>)(struct
 <name>_Ctx_struct * ctx);
<scopeType(sname=scope.name,...)>   <scopeTopDecl(sname=scope.name,...)>;

<endif>
>>

globalAttributeScopeFuncs(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeFuncs(scope)
*/
<attributeFuncs(scope)>
<endif>
>>
```

```
ruleAttributeScopeFuncs(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncs(scope)
*/
<attributeFuncs(scope)>
<endif>
>>

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScope(scope)
*/
ctx-><scopePushName(sname=scope.name,...)>     = <scopePushName(sname=scope.name,...)>;
ctx-><scopeStack(sname=scope.name,...)>    = antlr3StackNew(0);
ctx-><scopeStack(sname=scope.name,...)>_limit    = 0;
<scopeTop(sname=scope.name,...)>      = NULL;
<endif>
>>

ruleAttributeScope(scope) ::=
<<
<if(scope.attributes)>
/* ruleAttributeScope(scope)
*/
ctx-><scopePushName(sname=scope.name,...)>     = <scopePushName(sname=scope.name,...)>;
ctx-><scopeStack(sname=scope.name,...)>    = antlr3StackNew(0);
ctx-><scopeStack(sname=scope.name,...)>_limit
   = 0;
<scopeTop(sname=scope.name,...)>      = NULL;
<endif>
>>
globalAttributeScopeFree(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScope(scope)
*/
ctx-><scopeStack(sname=scope.name,...)>->free(ctx-><scopeStack(sname=scope.name,...)>);
<endif>
>>

ruleAttributeScopeFree(scope) ::=
<<
<if(scope.attributes)>
/* ruleAttributeScope(scope)
*/
ctx-><scopeStack(sname=scope.name,...)>->free(ctx-><scopeStack(sname=scope.name,...)>);
<endif>
>>
```

```
scopeTopDecl(sname) ::= <<
p<name>_<sname>Top
>>

scopeTop(sname) ::= <<
ctx-><scopeTopDecl(sname=sname,...)>
>>

scopePop(sname) ::= <<
<scopePopName(sname=sname,...)>(ctx);
>>

scopePush(sname) ::= <<
p<name>_<sname>Push(ctx)
>>

scopePopName(sname) ::= <<
p<name>_<sname>Pop
>>

scopePushName(sname) ::= <<
p<name>_<sname>Push
>>

scopeType(sname) ::= <<
p<name>_<sname>_SCOPE
>>

scopeStruct(sname) ::= <<
<name>_<sname>_SCOPE
>>

scopeStack(sname) ::= <<
p<name>_<sname>Stack
>>

attributeFuncs(scope)
 ::= <<
<if(scope.attributes)>
/* attributeFuncs(scope)
*/

static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope)
{
   ANTLR3_FREE(scope);
}
```

```
/** \brief Allocate initial memory for a <name> <scope.name> scope variable stack entry and
*         add it to the top of the stack.
*
* \remark
* By default the structure is freed with ANTLR_FREE(), but you can use the
* the \@init action to install a pointer to a custom free() routine by
* adding the code:
* \code
*    <scopeTop(sname=scope.name)>->free = myroutine;
* \endcode
*
* With lots of comments of course! The routine should be declared in
* \@members { } as:
* \code
*    void ANTLR3_CDECL myfunc( <scopeType(sname=scope.name)> ptr).
* \endcode
*
* It should perform any custom freeing stuff that you need (call ANTLR_FREE3, not free()
* NB: It should not free the pointer it is given, which is the scope stack entry itself
* and will be freed by the function that calls your custom
 free routine.
*
*/
static <scopeType(sname=scope.name)>
<scopePushName(sname=scope.name)>(p<name> ctx)
{
   /* Pointer used to create a new set of attributes
    */
   <scopeType(sname=scope.name)>      newAttributes;

   /* Allocate the memory for a new structure if we need one.
    */
   if (ctx-><scopeStack(sname=scope.name)>->size(ctx-><scopeStack(sname=scope.name)>) > ctx-
><scopeStack(sname=scope.name)>_limit)
   {
      // The current limit value was less than the number of scopes available on the stack so
      // we can just reuse one. Our limit tracks the stack count, so the index of the entry we want
      // is one less than that, or conveniently, the current value of limit.
      //
      newAttributes = (<scopeType(sname=scope.name)>)ctx-><scopeStack(sname=scope.name)>->get(ctx-
><scopeStack(sname=scope.name)>, ctx-><scopeStack(sname=scope.name)>_limit);
   }
   else
   {
      // Need a new allocation
      //
      newAttributes = (<scopeType(sname=scope.name)>)
```

```
 ANTLR3_MALLOC(sizeof(<scopeStruct(sname=scope.name)>));
      if  (newAttributes != NULL)
      {
         /* Standard ANTLR3 library implementation
          */
         ctx-><scopeStack(sname=scope.name)>->push(ctx-><scopeStack(sname=scope.name)>, newAttributes,
(void (*)(void *))<scope.name>Free);
      }
  }

  // Blank out any previous free pointer, the user might or might install a new one.
  //
  newAttributes->free = NULL;

  // Indicate the position in the available stack that the current level is at
  //
  ctx-><scopeStack(sname=scope.name)>_limit++;

 /* Return value is the pointer to the new entry, which may be used locally
  * without de-referencing via the context.
   */
  return  newAttributes;
}<\n>

<endif>
>>
returnStructName(r) ::= "<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
ANTLR3_BOOLEAN
<endif>
%>

/**
 Generate the C type associated with a single or multiple return
*  value(s).
*/
```

```
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.grammar.recognizerName>_<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "0".
*/
initValue(typeName) ::= <<
= <cTypeInitMap.(typeName)>
>>

/** Define a rule label  */
ruleLabelDef(label) ::= <<
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text>;
#undef RETURN_TYPE_<label.label.text>
#define RETURN_TYPE_<label.label.text> <ruleLabelType(referencedRule=label.referencedRule)><\n>
>>
/**
  Rule label default value */
ruleLabelInitVal(label) ::= <<
>>

ASTLabelType() ::=
"<if(recognizer.ASTLabelType)><recognizer.ASTLabelType><else>pANTLR3_BASE_TREE<endif>"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
typedef struct <ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>_struct
{
<if(!TREE_PARSER)>
  /** Generic return elements for ANTLR3 rules that are not in tree parsers or returning trees
```

```
   */
  pANTLR3_COMMON_TOKEN    start;
  pANTLR3_COMMON_TOKEN    stop;
<else>
  <recognizer.ASTLabelType>       start;
  <recognizer.ASTLabelType>       stop;
<endif>
  <@ruleReturnMembers()>
  <ruleDescriptor.returnScope.attributes:{it |<it.type> <it.name>;}; separator="\n">
}
   <ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>;<\n><\n>
<endif>
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name>=<expr>;"

/** Note that the scopeAttributeRef does not have access to the
* grammar name directly
*/
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get( ctx->SCOPE_STACK(<scope>), ctx-
>SCOPE_STACK(<scope>)->size(ctx->SCOPE_STACK(<scope>)) - <negIndex> - 1) ))-><attr.name>
<else>
<if(index)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get(ctx->SCOPE_STACK(<scope>),
(ANTLR3_UINT32)<index> ) ))-><attr.name>
<else>
 (SCOPE_TOP(<scope>))-><attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get( ctx->SCOPE_STACK(<scope>),
 ctx->SCOPE_STACK(<scope>)->size(ctx->SCOPE_STACK(<scope>)) - <negIndex> - 1) ))-><attr.name> =
<expr>;
<else>
<if(index)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get(ctx->SCOPE_STACK(<scope>),
(ANTLR3_UINT32)<index> ) ))-><attr.name> = <expr>;
```

```
<else>
 (SCOPE_TOP(<scope>))-><attr.name>=<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "ctx->SCOPE_STACK(<scope>)"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<scope>.<attr.name>
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr)
 ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>=<expr>;
<else>
<attr.name>=<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach
//
tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText(<scope>))"
```

```
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>->getType(<scope>))"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>->getLine(<scope>))"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>->getCharPositionInLine(<scope>))"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>->getChannel(<scope>))"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>->getTokenIndex(<scope>))"
tokenLabelPropertyRef_tree(scope,attr) ::= "(<scope>->tree)"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>->getText(<scope>)->toInt32(<scope>->getText(<scope>)))"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr)
 ::= "(<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(STRSTREAM->toStringSS(STRSTREAM, <scope>.start, <scope>.start))
<else>
(STRSTREAM->toStringTT(STRSTREAM, <scope>.start, <scope>.stop))
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>->getType(<scope>))"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>->getLine(<scope>))"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>->getCharPositionInLine(<scope>))"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>->getChannel(<scope>))"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>->getTokenIndex(<scope>))"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText(<scope>))"

// Somebody may ref $template
 or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
INPUT->toStringSS(INPUT, ADAPTOR->getTokenStartIndex(ADAPTOR, retval.start), ADAPTOR-
>getTokenStopIndex(ADAPTOR, retval.start))
<else>
STRSTREAM->toStringTT(STRSTREAM, retval.start, LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "LEXER->getText(LEXER)"
```

```
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "LEXSTATE->tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "LEXSTATE->tokenStartCharPositionInLine"
lexerRulePropertyRef_channel(scope,attr) ::= "LEXSTATE->channel"
lexerRulePropertyRef_start(scope,attr) ::= "LEXSTATE->tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(LEXER->getCharIndex(LEXER)-1)"
lexerRulePropertyRef_index(scope,attr)
 ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_int(scope,attr) ::= "LEXER->getText(LEXER)->toInt32(LEXER->getText(LEXER))"


// setting $st and $tree is allowed in local rule. everything else is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree=<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st=<expr>;"


/** How to deal with an @after for C targets. Because we cannot rely on
*  any garbage collection, after code is executed even in backtracking
*  mode. Must be documented clearly.
*/
execAfter(action) ::= <<
{
  <action>
}
>>

/** How to execute an action (when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> )
{
  <action>
}
<else>
if ( BACKTRACKING == 0 )
{
  <action>
}
<endif>
<else>
{
  <action>
}
<endif>
>>

// M I S C (properties, etc...)
```

bitsetDeclare(name, words64) ::= <<

/** Bitset defining follow
 set for error recovery in rule state: <name> */
static ANTLR3_BITWORD <name>_bits[] = { <words64:{it |ANTLR3_UINT64_LIT(<it>)}; separator=", "> };
static ANTLR3_BITSET_LIST <name> = { <name>_bits, <length(words64)> };
>>

bitset(name, words64) ::= <<
antlr3BitsetSetAPI(&<name>);<\n>
>>

codeFileExtension() ::= ".c"

true_value() ::= "ANTLR3_TRUE"
false_value() ::= "ANTLR3_FALSE"

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/C/C.stg
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*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@returnScopeInterface.memVars() ::= <<
<@super.memVars()>
/* ST returnInterface.memVars */
ST *st;
>>

@returnScopeInterface.properties() ::= <<
<@super.properties()>
/* ST returnScope.properties */
@property (retain, getter=getST, setter=setST:) ST *st;
>>

@returnScopeInterface.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST AST returnScopeInterface.methodsDecl */
-
 (id) getTemplate;
- (NSString *) toString;
- (NSString *) description;
>>

@returnScopeInterface() ::= <<
/* ST returnScopeInterface */
@interface <returnScopeInterface.name> : ReturnScope {
<returnScopeInterface.memVars()>
}
<returnScopeInterface.properties()>

<returnScopeInterface.methods()>
@end
>>

@returnScopeImplementation.synthesize() ::= <<
<@super.synthesize()>
/* ST returnScope.synthesize */
@synthesize st;
>>

@returnScopeImplementation.methods() ::= <<
<@super.methods()>
/* ST returnScope.methods */
- (id) getTemplate { return st; }
```

```
- (NSString *) toString { return st==nil?nil:[st toString]; }
- (NSString *) description { [self toString]; }
>>

@returnScopeImplementation() ::= <<
@implementation <returnScopeImplementation.name>
<returnScopeImplementation.synthesize()>

<returnScopeImplementation.methods()>
@end
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
<@super.ruleReturnMembers()>
/* ST returnScope.ruleReturnMembers --
 empty */
>>

@genericParserHeaderFile.memVars() ::= <<
<@super.memVars()>
/* ST genericParserHeaderFile.memVars -- empty now */
STGroup *templateLib; /* ST -- really a part of STAttrMap */
>>

@genericParserHeaderFile.properties() ::= <<
<@super.properties()>
/* ST genericParser.properties */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
>>

@genericParserHeaderFile.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST genericParser.methodsDecl */
- init;
- (STGroup *) getTemplateLib;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
@end
>>

@genericParser.synthesize() ::= <<
<@super.synthesize()>
/* ST genericParserImplementation.synthesize */
@synthesize templateLib;
>>

@genericParser.methods() ::= <<
<@super.methods()>
```

```
/* ST genericParser.methods */

- (STGroup *)getTemplateLib
{
  return templateLib;
}

- (void) setTemplateLib:(STGroup *)aTemplateLib
{
  templateLib = aTemplateLib;
}

>>

@genericParser.members() ::= <<
<@super.members()>
STGroup
 *templateLib = [STGroup  newSTGroup:@"<name>Templates"];

- (STGroup *) getTemplateLib
{
 return templateLib;
}

- (void) setTemplateLib:(STGroup *) templateLib
{
 this.templateLib = templateLib;
}

/** allows convenient multi-value initialization:
*  "new STAttrMap().put(...).put(...)"
*/
/* REPLACE THIS STATIC CLASS
static class STAttrMap extends HashMap {
- (STAttrMap *) setObject:(id)aValue forKey:(NS*)String attrName
{
  [super setObject:value forKey:attrName];
  return self;
}
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName
{
  [super setObject:[NSNumber numberWithInteger:value] forKey:attrName];
  return self;
 }
}
*/
>>
```

```
@STAttrMap() ::= <<
/* -------- ST start STAttrMap ------------ */
<@STAttrMap.interface()>
<@STAttrMap.implementation()>
/* -------- ST end STAttrMap ------------ */
>>

@STAttrMap.interface() ::= <<
/* -------- ST start STAttrMap.interface ------------ */
@interface STAttrMap : HashMap {
/*    <@STAttrMap.memVars()>
 */
  STGroup *templateLib;
}

/*    <@STAttrMap.properties()> */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
/* <@STAttrMap.methodsDecl()> */
- (id) init;
- (STAttrMap *) setObject:(id)value forKey:(NSString *)attrName;
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
- (STGroup *) getTemplateLib;
@end
/* -------- ST end STAttrMap.interface ------------ */
>>

@STAttrMap.implementation() ::= <<
/* -------- ST start STAttrMap.implementation ------------ */
/** allows convenient multi-value initialization:
*  "new STAttrMap().put(...).put(...)"
*/
@implementation STAttrMap
@synthesize templateLib;

<@STAttrMap.methods()>
@end
/* -------- ST end STAttrMap.implementation ------------ */
>>

@STAttrMap.memVars() ::= <<
/* -------- ST start STAttrMap.memVars ------------ */
  STGroup *templateLib;
/* -------- ST end STAttrMap.memVars ------------ */
>>

@STAttrMap.properties()
```

```
 ::= <<
/* -------- ST start STAttrMap.properties ------------ */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
/* -------- ST end STAttrMap.properties ------------ */
>>

@STAttrMap.methodsDecl() ::= <<
/* -------- ST start STAttrMap.methodsDecl ------------ */
- (id) init;
- (STAttrMap *) setObject:(id)value forKey:(NSString *)attrName;
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
- (STGroup *) getTemplateLib;
/* -------- ST end STAttrMap.methodsDecl ------------ */
>>

@STAttrMap.methods() ::= <<
/* -------- ST start STAttrMap.methods ------------ */
- (id) init
{
  self = [super initWithLen:16];
  if ( self != nil ) {
     templateLib = [STGroup newSTGroup:"<name>Templates"];
  }
  return self;
}

- (STAttrMap *) setObject:(id)aValue forKey:(NSString *)aAttrName
{
  [super setObject:aValue forKey:aAttrName];
  return self;
}

-
 (STAttrMap *) setObjectWithInt:(NSInteger)aValue forKey:(NSString *)aAttrName
{
  [super setObject:[NSNumber numberWithInteger:aValue] forKey:aAttrName];
  return self;
}
- (void) setTemplateLib:(STGroup *)aTemplateLib
{
  templateLib = aTemplateLib;
}

- (STGroup *)getTemplateLib
{
  return templateLib;
}
```

```
/* -------- ST end STAttrMap.methods ------------ */
>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ST ruleRefAndListLable */
<ruleRef(...)>
<listLabel(elem=[label getTemplate,...]>
>>

rewriteTemplate(alts) ::= <<
/* -------- ST start rewriteTemplate ------------ */
// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
  <alts:rewriteTemplateAlt(); separator="else ">
  <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
/* -------- ST end rewriteTemplate ------------ */
>>

replaceTextInLine()
 ::= <<
/* -------- ST start replaceTextInLine ------------ */
<if(TREE_PARSER)>
[[(TokenRewriteStream *)input getTokenStream]
  replaceFromIndex:[[input getTreeAdaptor] getTokenStartIndex:retval.start]
           ToIndex:[[input getTreeAdaptor] getTokenStopIndex:retval.start]
             Text:retval.st];
<else>
[(TokenRewriteStream *)input)
      replaceFromIndex:[((CommonToken *)retval.start) getTokenIndex]
               ToIndex:[[input LT:-1] getTokenIndex]
                 Text:retval.st];
<endif>
/* -------- ST end replaceTextInLine ------------ */
>>

rewriteTemplateAlt() ::= <<
/* -------- ST start rewriteTemplateAlt ------------ */
/* ST <it.description> */
<if(it.pred)>
if (<it.pred>) {
  retval.st = <it.alt>;
```

```
}<\n>
<else>
{
  retval.st = <it.alt>;
}<\n>
<endif>
/* -------- ST end rewriteTemplateAlt ------------ */
>>

rewriteEmptyTemplate(alts) ::= <<
nil;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value
 of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <<
/* -------- ST start rewriteExternalTemplate ------------ */
[templateLib getInstanceOf:@"<name>"
<if(args)>[[STAttrMap newSTAttrMap] <args:{a | setObject:<a.value> forKey:@"<a.name>"]}><endif>]
/* -------- ST end rewriteExternalTemplate ------------ */
>>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <<
/* -------- ST start rewriteIndirectTemplate ------------ */
[templateLib getInstanceOf:<expr>
<if(args)> [[STAttrMap newSTAttrMap]<args:{a | setObject:<a.value> forKey:@"<a.name>"]}>]
<else>]<endif>
/* -------- ST end rewriteIndirectTemplate ------------ */
>>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <<
/* -------- ST
 start rewriteInlineTemplate ------------ */
STGroup *templateLib;
templateLib.templates = [STAttrMap newSTAttrMap];
<if(args)> [templateLib.templates <args:{a | setObject:<a.value> forKey:@"<a.name>"];}><endif>
[ST newST:templateLib template:@"<template>"];
/* -------- ST end rewriteInlineTemplate ------------ */
>>

/** plain -> {foo} action */
```

```
rewriteAction(action) ::= <<
/* -------- ST start rewriteAction ------------ */
<action>
/* -------- ST end rewriteAction ------------ */
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
/* -------- ST start actionSetAttribute ------------ */
[[ST attributes] setObject:<expr> forKey:@"<attrName>"];
<![<st> setAttribute:<expr> name:@"<attrName>"];!>
/* -------- ST end actionSetAttribute ------------ */
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
/* -------- ST start actionStringConstructor ------------ */
[ST newSTWithTemplate:<stringExpr>]
/* --------
 ST end actionStringConstructor ------------ */
>>
```

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/ObjC/ST.stg
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/
group ASTTreeParser;

/** Add a variable to track last element matched */
ruleDeclarations()
 ::= <<
<super.ruleDeclarations()>
<ASTLabelType> _first_0 = null;
<ASTLabelType> _last = null;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType>)_first_0;
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
  retval.tree = (<ASTLabelType>)adaptor.getParent(retval.tree);
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
_last = (<ASTLabelType>)input.LT(1);
```

```
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = null;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if
 ( state.backtracking==0 )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
  match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
>>

/**
 ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
```

```
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( state.backtracking==0 )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if
 ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST
```

```
matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<endif>
}
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0")
 ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
}
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
```

```
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( state.backtracking==0 ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.getTree());
<else>
 <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>.tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.becomeRoot(<label>.getTree(), root_<treeLevel>);
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp()
 ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
```

<if(backtracking)>if (state.backtracking==0) {<\n><endif>
retval.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
>>

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/Perl5/ASTTreeParser.stg
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*/

/** Template overrides to add debugging to AST stuff. Dynamic inheritance
* hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/

parserMembers() ::= <<

```
 // Implement this function in your helper file to use a custom tree adaptor
 partial void InitializeTreeAdaptor();
 protected DebugTreeAdaptor adaptor;

 public
 ITreeAdaptor TreeAdaptor
 {
  get
  {
   return adaptor;
  }
  set
  {
<if(grammar.grammarIsRoot)>
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
   this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif><\n>
   <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
  }
 }<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port,
<if(TREE_PARSER)>input.TreeAdaptor<else>adaptor<endif> );
DebugListener = proxy;
<inputStreamType> = new Debug<inputStreamType>( input, proxy );
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@ctorForRootGrammar.finally() ::= <<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
proxy.TreeAdaptor = adap;
>>
```

```
@ctorForProfilingRootGrammar.finally() ::=<<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
>>

@ctorForPredefinedListener.superClassRef()
 ::= ": base( input, dbg )"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)><! don't create new adaptor for delegates !>
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;<\n>
<endif>
>>

//@rewriteElement.pregen() ::= "dbg.Location( <e.line>, <e.pos> );"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/ASTDbg.stg
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* /antlr-3-5-3-jar/org/antlr/codegen/templates/ActionScript/ASTParser.stg
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python/Dbg.stg
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python3/Dbg.stg
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python/ST.stg
*
 /antlr-3-5-3-jar/org/antlr/codegen/templates/Python3/ST.stg
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Java/ASTParser.stg
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```
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* THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
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* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template overrides to add debugging to normal Java output;
* If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/

@outputFile.debugPreprocessor() ::= "#define ANTLR_DEBUG"

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.Runtime.Debug;
using IOException = System.IO.IOException;
>>

@genericParser.members()
 ::= <<
<if(grammar.grammarIsRoot)>
public static readonly string[] ruleNames =
 new string[]
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>

```
<if(grammar.grammarIsRoot)><! grammar imports other grammar(s) !>
int ruleLevel = 0;
public virtual int RuleLevel { get { return ruleLevel; } }
public virtual void IncRuleLevel() { ruleLevel++; }
public virtual void DecRuleLevel() { ruleLevel--; }
<if(profile)>
<ctorForProfilingRootGrammar()>
<else>
<ctorForRootGrammar()>
<endif>
<ctorForPredefinedListener()>
<else><! imported grammar !>
public int RuleLevel { get { return <grammar.delegators:{g| <g:delegateName()>}>.RuleLevel; } }
public void IncRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.IncRuleLevel(); }
public void DecRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.DecRuleLevel(); }
<ctorForDelegateGrammar()>
<endif>
<if(profile)>
public override bool AlreadyParsedRule( IIntStream input, int
 ruleIndex )
{
 int stopIndex = GetRuleMemoization(ruleIndex, input.Index);
 ((Profiler)dbg).ExamineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 return base.AlreadyParsedRule(input, ruleIndex);
}<\n>
public override void Memoize( IIntStream input, int ruleIndex, int ruleStartIndex )
{
 ((Profiler)dbg).Memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 base.Memoize(input, ruleIndex, ruleStartIndex);
}<\n>
<endif>
protected virtual bool EvalPredicate( bool result, string predicate )
{
 dbg.SemanticPredicate( result, predicate );
 return result;
}<\n>
>>

ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, DebugEventSocketProxy.DefaultDebuggerPort, new
 RecognizerSharedState() )
{
}
```

```
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, int port,
RecognizerSharedState state )
 : base( input, state )
{
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, new Profiler(null), new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state )
 : base( input, dbg, state )
{
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
 this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}
<\n>
>>

/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : base( input, dbg, state )
{
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
}<\n>
>>

ctorForPredefinedListener() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg
```

```
)
 <@superClassRef>: base( input, dbg, new RecognizerSharedState() )<@end>
{
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <grammar.directDelegates:{g|<g:delegateName()>
 = new <g.recognizerName>(input, dbg, this.state, this<grammar.delegators:{g|, <g:delegateName()>}>);};
separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, input.TreeAdaptor );<\n>
<else>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, null );<\n>
<endif>
DebugListener = proxy;
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

/*
* Many of the following rules were merged into CSharp2.stg.
*/

@rule.preamble() ::= <<
if (RuleLevel == 0)
 DebugListener.Commence();
IncRuleLevel();
>>
//@rule.preamble() ::= <<
//try
//{
// dbg.EnterRule( GrammarFileName, "<ruleName>" );
// if ( RuleLevel == 0 )
```

```
// {
//  dbg.Commence();
// }
// IncRuleLevel();
// dbg.Location( <ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine> );<\n>
//>>

@rule.postamble()
 ::= <<
DecRuleLevel();
if (RuleLevel == 0)
 DebugListener.Terminate();
>>
//@rule.postamble() ::= <<
//dbg.Location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
//}
//finally
//{
// dbg.ExitRule( GrammarFileName, "<ruleName>" );
// DecRuleLevel();
// if ( RuleLevel == 0 )
// {
//  dbg.Terminate();
// }
//}<\n>
//>>

//@insertSynpreds.start() ::= "dbg.BeginBacktrack( state.backtracking );"
//@insertSynpreds.stop() ::= "dbg.EndBacktrack( state.backtracking, success );"

// Common debug event triggers used by region overrides below

//enterSubRule() ::= <<
//try
//{
// dbg.EnterSubRule( <decisionNumber> );<\n>
//>>

//exitSubRule() ::= <<
//}
//finally
//{
// dbg.ExitSubRule( <decisionNumber> );
//}<\n>
//>>

//enterDecision() ::= <<
//try
```

```
//{
// dbg.EnterDecision( <decisionNumber> );<\n>
//>>

//exitDecision() ::= <<
//}
//finally
//{
// dbg.ExitDecision( <decisionNumber> );
//}<\n>
//>>

//enterAlt(n) ::= "dbg.EnterAlt( <n> );<\n>"

//
 Region overrides that tell various constructs to add debugging triggers

//@block.predecision() ::= "<enterSubRule()><enterDecision()>"

//@block.postdecision() ::= "<exitDecision()>"

//@block.postbranch() ::= "<exitSubRule()>"

//@ruleBlock.predecision() ::= "<enterDecision()>"

//@ruleBlock.postdecision() ::= "<exitDecision()>"

//@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

//@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

//@positiveClosureBlock.predecision() ::= "<enterDecision()>"

//@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

//@positiveClosureBlock.earlyExitException() ::=
// "dbg.RecognitionException( eee<decisionNumber> );<\n>"

//@closureBlock.preloop() ::= "<enterSubRule()>"

//@closureBlock.postloop() ::= "<exitSubRule()>"

//@closureBlock.predecision() ::= "<enterDecision()>"
```

```
//@closureBlock.postdecision() ::= "<exitDecision()>"

//@altSwitchCase.prealt()
 ::= "<enterAlt(n=i)>"

//@element.prematch() ::=
// "dbg.Location( <it.line>, <it.pos> );"

//@matchSet.mismatchedSetException() ::=
// "dbg.RecognitionException( mse );"

//@dfaState.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//@dfaStateSwitch.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//dfaDecision(decisionNumber,description) ::= <<
//try
//{
// isCyclicDecision = true;
// <super.dfaDecision(...)>
//}
//catch ( NoViableAltException nvae )
//{
// dbg.RecognitionException( nvae );
// throw nvae;
//}
//>>

//@cyclicDFA.errorMethod() ::= <<
//public override void Error( NoViableAltException nvae )
//{
// ((DebugParser)recognizer).dbg.RecognitionException( nvae );
//}
//>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
EvalPredicate(<pred>, "<description>")
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp2/Dbg.stg
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```
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined
 into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = default(<ASTLabelType>);
<ASTLabelType> _last = default(<ASTLabelType>);
```

```
<endif>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(rewriteMode)>
retval.Tree = (<ASTLabelType>)_first_0;
if (adaptor.GetParent(retval.Tree)!=null && adaptor.IsNil(adaptor.GetParent(retval.Tree)))
 retval.Tree = (<ASTLabelType>)adaptor.GetParent(retval.Tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last
 = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = default(<ASTLabelType>);
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(root.el.rule)>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>.Tree;
<else>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down) {
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
```

```
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<enclosingTreeLevel>,
 root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text;
 format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
```

```
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text;
 format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if
 (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.DupTree(<label>);
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text;
 format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
```

```
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text;
 format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
```

```
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<treeLevel>, <label>.Tree);
<else> <! rewrite mode !>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>.Tree;
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope)
 ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
>>

/**
 x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRuleRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now; override to
*  change NextToken to NextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,args)
```

```
 ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif>stream_<token>.NextNode())
<else>
stream_<token>.NextNode()
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/ASTTreeParser.stg
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*/
/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

group gnu;

location(file, line, column) ::= "<file>:<line>:"

message(id, text) ::= "<text> (<id>)"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"

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*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.StringTemplate;
using Antlr.StringTemplate.Language;
<if(!backtracking)>
using Hashtable = System.Collections.Hashtable;
<endif>

>>

/** Add this
 to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
private StringTemplate _st;
public StringTemplate Template { get { return _st; } set { _st = value; } }
public override string ToString() { return (Template==null) ? string.Empty : Template.ToString(); }
>>

@genericParser.members() ::= <<
<@super.members()>
protected StringTemplateGroup templateLib = new StringTemplateGroup("<name>Templates",
typeof(AngleBracketTemplateLexer) );

public StringTemplateGroup TemplateLib
{
 get { return this.templateLib; }
 set { this.templateLib = value; }
}

/// \<summary> Allows convenient multi-value initialization:
///  "new STAttrMap().Add(...).Add(...)"
/// \</summary>
protected class STAttrMap : Hashtable
{
 public STAttrMap Add(string attrName, object value)
 {
   base.Add(attrName, value);
   return this;
```

```
 }
 public STAttrMap Add(string attrName, int value)
 {
   base.Add(attrName, value);
   return this;
 }
}
>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope)
 ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Template",...)>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> )
{
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.TokenStream).Replace(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start),
 retval.Template);
<else>
((TokenRewriteStream)input).Replace(
 ((IToken)retval.Start).TokenIndex,
 input.LT(-1).TokenIndex,
 retval.Template);
<endif>
>>

rewriteTemplateAlt() ::= <<
// <it.description>
<if(it.pred)>
```

```
if (<it.pred>) {
  retval.Template = <it.alt>;
}<\n>
<else>
{
  retval.Template = <it.alt>;
}<\n>
<endif>
>>

rewriteEmptyTemplate(alts)
 ::= <<
null;
>>

/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <<
templateLib.GetInstanceOf("<name>"<if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>

/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <<
templateLib.GetInstanceOf(<expr><if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <<
new StringTemplate(templateLib, "<template>"<if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/**
```

```
 An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).SetAttribute("<attrName>",<expr>);
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(templateLib,<stringExpr>)
>>
```

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*/
```

```
/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
```
```

```
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/

finishedBacktracking(block) ::= <<
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
  <block>
<else>
<block>
<endif>
>>

/**
 Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_first_0 = None
_last = None<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<finishedBacktracking({
<if(rewriteMode)>
retval.tree = _first_0
if self._adaptor.getParent(retval.tree) is not None and self._adaptor.isNil(self._adaptor.getParent(retval.tree)):
  retval.tree = self._adaptor.getParent(retval.tree)
<endif>
})>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = self.input.LT(1)
_save_last_<treeLevel> = _last
_first_<treeLevel> = None
<if(!rewriteMode)>
root_<treeLevel> = self._adaptor.nil()<\n>
<endif>
```

```
<root:element()>
<if(rewriteMode)>
<finishedBacktracking({
<if(root.el.rule)>
if _first_<enclosingTreeLevel>
 is None:
   _first_<enclosingTreeLevel> = <root.el.label>.tree<\n>
<else>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label><\n>
<endif>
})>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)<\n>
<endif>
<if(!rewriteMode)>
self._adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>)<\n>
<endif>
_last = _save_last_<treeLevel>

>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
```

```
<if(terminalOptions.node)>
<label>_tree
 = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label><\n>
})>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={})
 ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
```

```
<super.wildcard(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<label>_tree = self._adaptor.dupTree(<label>)
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>
})>
<endif>
>>

// SET AST
matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<endif>
}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={})
 ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
```

```
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
}, ...)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<finishedBacktracking({
<if(!rewriteMode)>
self._adaptor.addChild(root_<treeLevel>, <label>.tree)
<else> <! rewrite mode !>
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>.tree<\n>
<endif>
})>
>>

/** x+=rule auto construct
 */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
root_<treeLevel> = self._adaptor.becomeRoot(<label>.tree, root_<treeLevel>)
})>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>
```

```
/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope)
 ::= <<
_last = self.input.LT(1)
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,scope,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
})>
<endif>
>>

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```

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*/
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The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

group antlr;

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"

wantsSingleLineMessage() ::= "false"

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*/

/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid.
 There is no huge explosion of combinations.
*/

@rule.setErrorReturnValue() ::= <<
retval.Tree = (<ASTLabelType>)adaptor.ErrorNode(input, retval.Start, input.LT(-1), re);
<! System.out.WriteLine("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <%
<super.tokenRef(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)><\n>if (state.backtracking == 0) {<endif>
<\n><label>_tree = <createNodeFromToken(...)>;
<\n>adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)><\n>}<endif>
<endif>
%>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <%
<super.tokenRef(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)><\n>if (<actions.(actionScope).synpredgate>) {<endif>
<\n><label>_tree =
 <createNodeFromToken(...)>;
<\n>root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)><\n>}<endif>
<endif>
%>
```

```
/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending
 on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={<if(!ruleDescriptor.isSynPred)><if(backtracking)>if
(<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <createNodeFromToken(...)>);<endif>},
...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts:
```

(A|B|...|C)

```
matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);
<endif>
<super.matchSet(postmatchCode={<if(!ruleDescriptor.isSynPred)><if(backtracking)>if
(<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<createNodeFromToken(...)>, root_0);<endif>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <%
<super.ruleRef(...)>
<if(!ruleDescriptor.isSynPred)>
<\n><if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <label>.Tree);
<endif>
%>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_0);
>>

/** x+=rule when
 output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
```

>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
<endif>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(token=[],...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={})
 ::= <<
<super.wildcard(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
<endif>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalO
ptions.text)>,<terminalOptions.text; format="string"><endif>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
adaptor.SetTokenBoundaries(retval.Tree, retval.Start, retval.Stop);
<if(backtracking)>}<endif>
>>

Found

in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/ASTParser.stg
No license file was found, but licenses were detected in source scan.

/*
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** The API version of the runtime that recognizers generated by this runtime
* need.
*/
apiVersion() ::= "1"

/** The overall file structure of a recognizer; stores methods for rules
* and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
        bitsets, buildTemplate, buildAST, rewriteMode, profile,
        backtracking, synpreds, memoize,
 numRules,
        fileName, ANTLRVersion, generatedTimestamp, trace,

```
        scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
import sys
from antlr3 import *
<if(TREE_PARSER)>
from antlr3.tree import *<\n>
<endif>
<@end>

<actions.(actionScope).header>

<! <docComment> !>

# for convenience in actions
HIDDEN = BaseRecognizer.HIDDEN

# token types
<tokens:{it | <it.name>=<it.type>}; separator="\n">

# token names
tokenNamesMap = {
  0: "\<invalid>", 1: "\<EOR>", 2: "\<DOWN>", 3: "\<UP>",
  <tokens:{it | <it.type>: "<it.name>"}; wrap, separator=", ">
}
Token.registerTokenNamesMap(tokenNamesMap)

<recognizer>

<if(actions.(actionScope).main)>
<actions.(actionScope).main>
<else>
def main(argv, stdin=sys.stdin, stdout=sys.stdout, stderr=sys.stderr):
<if(LEXER)>
  from antlr3.main import LexerMain
  main = LexerMain(<recognizer.name>)<\n>
<endif>
<if(PARSER)>
  from antlr3.main import ParserMain
  main = ParserMain("<recognizer.grammar.name>Lexer",
 <recognizer.name>)<\n>
<endif>
<if(TREE_PARSER)>
  from antlr3.main import WalkerMain
  main = WalkerMain(<recognizer.name>)<\n>
<endif>
```

```
  main.stdin = stdin
  main.stdout = stdout
  main.stderr = stderr
  main.execute(argv)<\n>
<endif>

<actions.(actionScope).footer>

if __name__ == '__main__':
  main(sys.argv)

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode,
    labelType="CommonToken", superClass="Lexer") ::= <<
<if(grammar.directDelegates)>
# path hack to allow absolute import of related grammars.
from os.path import dirname
__path__ = [dirname(__file__)]
del dirname

<grammar.directDelegates:
{g|from .<g.recognizerName> import <g.recognizerName>}; separator="\n">
<endif>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
  <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>

  grammarFileName = "<fileName>"
  api_version = <apiVersion()>

  def __init__(self<grammar.delegators:{g|,
 <g:delegateName()>}>, input=None, state=None):
      if state is None:
          state = RecognizerSharedState()
      super().__init__(input, state)

<if(memoize)>
<if(grammar.grammarIsRoot)>
      self._state.ruleMemo = {}
<endif>
<endif>

      <grammar.directDelegates:
       {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
      <grammar.directDelegates:
       {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
```

```
separator="\n"}; separator="\n">
      <grammar.delegators:
       {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
      <last(grammar.delegators):
       {g|self.gParent = <g:delegateName()>}; separator="\n">
      self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

      <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">


 <actions.lexer.init>


  <actions.lexer.members>


<if(filterMode)>
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>


>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
def nextToken(self):
  while True:
      if self.input.LA(1) == EOF:
         return self.makeEOFToken()

      self._state.token = None
      self._state.channel = DEFAULT_CHANNEL
      self._state.tokenStartCharIndex = self.input.index()
      self._state.tokenStartCharPositionInLine = self.input.charPositionInLine
      self._state.tokenStartLine = self.input.line
      self._state._text
 = None
      try:
```

```
        m = self.input.mark()
        try:
            # means we won't throw slow exception
            self._state.backtracking = 1
            try:
                self.mTokens()
            finally:
                self._state.backtracking = 0

        except BacktrackingFailed:
            # mTokens backtracks with synpred at backtracking==2
            # and we set the synpredgate to allow actions at level 1.
            self.input.rewind(m)
            self.input.consume() # advance one char and try again

        else:
            self.emit()
            return self._state.token

    except RecognitionException as re:
        # shouldn't happen in backtracking mode, but...
        self.reportError(re)
        self.recover(re)


def memoize(self, input, ruleIndex, ruleStartIndex, success):
  if self._state.backtracking > 1:
     # is Lexer always superclass?

 super().memoize(input, ruleIndex, ruleStartIndex, success)


def alreadyParsedRule(self, input, ruleIndex):
  if self._state.backtracking > 1:
     return super().alreadyParsedRule(input, ruleIndex)
  return False


>>

actionGate() ::= "self._state.backtracking == 0"

filteringActionGate() ::= "self._state.backtracking == 1"

/** How to generate a parser */

genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
          bitsets, inputStreamType, superClass, labelType, members,
```

```
            rewriteElementType, filterMode, init, ASTLabelType="Object") ::= <<
# token names
tokenNames = [
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
  <tokenNames; wrap, separator=", ">
]

<scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScopeClass(scope=it)><endif>}>

<if(grammar.directDelegates)>
# path hack to allow absolute import of related grammars.
from os.path import dirname
__path__ = [dirname(__file__)]
del dirname

<grammar.directDelegates:
{g|from
 .<g.recognizerName> import <g.recognizerName>}; separator="\n">
<endif>

<rules:{it|<ruleAttributeScopeClass(scope=it.ruleDescriptor.ruleScope)>}>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
  grammarFileName = "<fileName>"
  api_version = <apiVersion()>
  tokenNames = tokenNames

  def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input, state=None, *args, **kwargs):
      if state is None:
          state = RecognizerSharedState()

      <@args()>
      super().__init__(input, state, *args, **kwargs)

<if(memoize)>
<if(grammar.grammarIsRoot)>
      self._state.ruleMemo = {}
<endif>
<endif>

      <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

      <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeStack(scope=it)><endif>}>
      <rules:{it | <ruleAttributeScopeStack(scope=it.ruleDescriptor.ruleScope)>}>

      <init>

      <grammar.delegators:
```

```
      {g|self.<g:delegateName()> = <g:delegateName()>};
 separator="\n">
      <grammar.directDelegates:
      {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
      <grammar.directDelegates:
      {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
      <last(grammar.delegators):
      {g|self.gParent = self.<g:delegateName()>}; separator="\n">
      self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

      <@init><@end>


  <@members><@end>

  <members>

  <rules; separator="\n\n">

  <! generate rule/method definitions for imported rules so they
    appear to be defined in this recognizer. !>
  <grammar.delegatedRules:{ruleDescriptor| <delegateRule(ruleDescriptor)> }; separator="\n">

  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>
 = frozenset([<it.tokenTypes:{it | <it>};separator=", ">])<\n>}>

>>

delegateRule(ruleDescriptor) ::= <<
def <ruleDescriptor.name>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<\ >   <if(ruleDescriptor.hasReturnValue)>return
<endif>self.<ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)
><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>)


>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="Object", superClass="Parser", labelType="Token",
    members={<actions.parser.members>},
    init={<actions.parser.init>}
    ) ::= <<
```

```
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TokenStream", superClass,
            labelType, members, "Token",
            false, init, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream
 is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>},
         init={<actions.treeparser.init>}
         ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
            bitsets, "TreeNodeStream", superClass,
            labelType, members, "Node",
            filterMode, init, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule,
 they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start "<ruleName>"
def <ruleName>_fragment(self, <ruleDescriptor.parameterScope:parameterScope()>):
  <ruleLabelDefs()>
<if(trace)>
  self.traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
  try:
      <block>

  finally:
      self.traceOut("<ruleName>_fragment", <ruleDescriptor.index>)

<else>
  <block>
<endif>
# $ANTLR end "<ruleName>"
```

```
>>

synpred(name) ::= <<
def <name>(self):
  self._state.backtracking += 1
  <@start()>
  start = self.input.mark()
  try:
     self.<name>_fragment()
  except BacktrackingFailed:
     success = False
  else:
     success = True
  self.input.rewind(start)
  <@stop()>
  self._state.backtracking -= 1
  return success


>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if self._state.backtracking > 0 and self.alreadyParsedRule(self.input,
 <ruleDescriptor.index>):
  # for cached failed rules, alreadyParsedRule will raise an exception
  success = True
  return <ruleReturnValue()>

<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if self._state.backtracking > 0:
  raise BacktrackingFailed

<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
```

```
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start "<ruleName>"
# <fileName>:<description>
<ruleDescriptor.actions.decorate>
def <ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
  self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>

 <@body><ruleBody()><@end>
  <@postamble()>
  return <ruleReturnValue()>

# $ANTLR end "<ruleName>"
>>

ruleBody() ::= <<
<if(memoize)>
<if(backtracking)>
success = False<\n>
<endif>
<endif>
try:
  try:
    <ruleMemoization(name=ruleName)>
    <block>
    <ruleCleanUp()>
    <(ruleDescriptor.actions.after):execAction()>

<if(memoize)>
<if(backtracking)>
    success = True<\n>
<endif>
<endif>
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
```

```
<else>
  except RecognitionException as re:
      self.reportError(re)
      self.recover(self.input, re)
      <@setErrorReturnValue()>

<endif>
<else>
  finally:
      pass

<endif>
<endif>
finally:
<if(trace)>
  self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  pass
>>

catch(decl,action) ::= <<
except <e.decl>:
   <e.action>

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval = self.<ruleDescriptor.name>_return()
retval.start = self.input.LT(1)<\n>
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> = <if(a.initValue)><a.initValue><else>None<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = self.input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.append(<it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.append(<it.name>_scope())}; separator="\n">
>>
```

```
ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.pop()}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it | <it.label.text> = None}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,
  ruleDescriptor.wildcardTreeListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{it | <it.label.text> = None}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it | <it.label.text> = None}; separator="\n"
>
<ruleDescriptor.charLabels:{it | <it.label.text> = None}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | list_<it.label.text> = None}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop
```

```
 = self.input.LT(-1)<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if self._state.backtracking > 0:
   self.memoize(self.input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex, success)

<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start "<ruleName>"
def m<ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
   self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
<if(memoize)>
<if(backtracking)>
   success = False<\n>
<endif>
<endif>
   try:
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      <block><\n>
<else>
      _type = <ruleName>
      _channel = DEFAULT_CHANNEL

      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
       <ruleDescriptor.actions.init>
      <block>
      <ruleCleanUp()>
      self._state.type = _type
      self._state.channel = _channel
```

```
      <(ruleDescriptor.actions.after):execAction()>
<endif>
<if(memoize)>
<if(backtracking)>
      success = True<\n>
<endif>
<endif>

  finally:
<if(trace)>
      self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
      <ruleScopeCleanUp()>
      <memoize()>
      pass

# $ANTLR end "<ruleName>"



>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
def mTokens(self):
  <block><\n>



>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@body><blockBody()><@end>
>>

blockBody() ::= <<
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<@prebranch()>
<alts:{a
```

```
| <altSwitchCase(i, a)>}; separator="\nel">
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n)
 ::= <<
# <fileName>:<description>
cnt<decisionNumber> = 0
<decls>
<@preloop()>
<@loopBody>
<positiveClosureBlockLoop()>
<@end>
<@postloop()>
>>

positiveClosureBlockLoop() ::= <<
while True: #loop<decisionNumber>
```

```
  alt<decisionNumber> = <maxAlt>
  <@predecision()>
  <@decisionBody><decision><@end>
  <@postdecision()>
  <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
  else:
     if cnt<decisionNumber> >= 1:
        break #loop<decisionNumber>

     <ruleBacktrackFailure()>
     eee = EarlyExitException(<decisionNumber>, self.input)
     <@earlyExitException()>
     raise eee

  cnt<decisionNumber> += 1
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
<@loopBody>
<closureBlockLoop()>
<@end>
<@postloop()>
>>

closureBlockLoop()
 ::= <<
while True: #loop<decisionNumber>
  alt<decisionNumber> = <maxAlt>
  <@predecision()>
  <@decisionBody><decision><@end>
  <@postdecision()>
  <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
  else:
     break #loop<decisionNumber>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
```

```
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
if alt<decisionNumber> == <altNum>:
  <@prealt()>
  <alt>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt, treeLevel,rew) ::= <<
#
 <fileName>:<description>
pass <! so empty alternatives are a valid block !>
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label> = <endif>self.match(self.input, <token>,
self.FOLLOW_<token>_in_<ruleName><elementIndex>)
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
```

```
>>

listLabel(label, elem) ::= <<
if list_<label> is None:
  list_<label> = []
list_<label>.append(<elem>)<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.match(<char>)
>>

/**
 match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchRange(<a>, <b>)
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
if <s>:
  self.input.consume()
  <postmatchCode>
<if(!LEXER)>
  self._state.errorRecovery = False<\n>
<endif>

else:
  <ruleBacktrackFailure()>
  mse = MismatchedSetException(None, self.input)
  <@mismatchedSetException()>
<if(LEXER)>
  self.recover(mse)
  raise mse
<else>
  raise mse
  <! use following code to make it recover inline; remove throw mse;
  self.recoverFromMismatchedSet(
```

```
      self.input, mse, self.FOLLOW_set_in_<ruleName><elementIndex>
      )
  !>
<endif>
<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/**
 Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
<label>Start = self.getCharIndex()
self.match(<string>)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(input=self.input, type=INVALID_TOKEN_TYPE, channel=DEFAULT_CHANNEL,
start=<label>Start, stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.match(<string>)
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
self.matchAny()
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label,label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
```

```
self.matchAny()
>>

wildcardCharListLabel(label, elementIndex) ::=
 <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
self._state.following.append(self.FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label> = <endif>self.<if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=",
">)<\n>
self._state.following.pop()
>>

/** ids+=rule */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope)
 ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(
  input=self.input,
  type=INVALID_TOKEN_TYPE,
  channel=DEFAULT_CHANNEL,
  start=<label>Start<elementIndex>,
  stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
```

```
<else>
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
<label>StartLine<elementIndex>
 = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
self.match(EOF)
<label> = <labelType>(input=self.input, type=EOF, channel=DEFAULT_CHANNEL,
start=<label>Start<elementIndex>, stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.match(EOF)
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                 ::= "<recRuleArg()>"
recRuleArg()                    ::= "_p"
recRuleAltPredicate(ruleName, opPrec) ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()        ::= "root_0 = $<ruleName>_primary.tree"
recRuleSetReturnAction(src, name)   ::= "$<name> = $<src>.<name>"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
  self.match(self.input,
 DOWN, None)
  <children:element()>
  self.match(self.input, UP, None)

<else>
```

```
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if not (<evalPredicate(pred, description)>):
  <ruleBacktrackFailure()>
  raise FailedPredicateException(self.input, "<ruleName>", "<description>")

>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
  <@noViableAltException()>
  raise nvae<\n>
<endif>
>>

/**
 Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
```

```
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>
 = <eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else:
  alt<decisionNumber> = <eotPredictsAlt>
<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if (<labelExpr>) <if(predicates)>and (<predicates>)<endif>:
  <targetState>
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
<!
 FIXME: this is one of the few occasion, where I miss a switch statement
 in Python. ATM this is implemented as a list of if .. elif ..
 This
 may be replaced by faster a dictionary lookup, when I find a solution
 for the cases when an edge is not a plain dfaAcceptState.
!>
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
```

```
  nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
  <@noViableAltException()>
  raise nvae<\n>
<endif>

>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
<if(eotPredictsAlt)>
else:
  alt<decisionNumber> = <eotPredictsAlt>
<endif>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
if LA<decisionNumber> in {<labels; separator=", ">}:
  <targetState>
>>

// C y c l
 i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = self.dfa<decisionNumber>.predict(self.input)
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
# lookup tables for DFA #<dfa.decisionNumber>
```

```
DFA<dfa.decisionNumber>_eot = DFA.unpack(
  "<dfa.javaCompressedEOT; wrap="\"\n    \"">"
  )

DFA<dfa.decisionNumber>_eof = DFA.unpack(
  "<dfa.javaCompressedEOF; wrap="\"\n    \"">"
   )

DFA<dfa.decisionNumber>_min = DFA.unpack(
  "<dfa.javaCompressedMin; wrap="\"\n    \"">"
  )

DFA<dfa.decisionNumber>_max = DFA.unpack(
  "<dfa.javaCompressedMax; wrap="\"\n    \"">"
  )

DFA<dfa.decisionNumber>_accept = DFA.unpack(
  "<dfa.javaCompressedAccept; wrap="\"\n    \"">"
  )

DFA<dfa.decisionNumber>_special = DFA.unpack(
  "<dfa.javaCompressedSpecial; wrap="\"\n    \"">"
  )


DFA<dfa.decisionNumber>_transition = [
  <dfa.javaCompressedTransition:{s|DFA.unpack("<s; wrap="\"\n\"">")}; separator=",\n">
]

# class definition for DFA #<dfa.decisionNumber>

class DFA<dfa.decisionNumber>(DFA):
  pass

  <@errorMethod()>

<if(dfa.specialStateSTs)>
  def specialStateTransition(self_, s, input):
      # convince pylint that my self_ magic is ok ;)
      # pylint: disable-msg=E0213

      # pretend we are a member of the recognizer
      # thus semantic predicates can be evaluated
      self = self_.recognizer

      _s = s

      <dfa.specialStateSTs:{state
```

```
| if s == <i0>: <! compressed special state numbers 0..n-1 !>
  <state>}; separator="\nel">

<if(backtracking)>
      if self._state.backtracking > 0:
         raise BacktrackingFailed

<endif>
      nvae = NoViableAltException(self_.getDescription(), <dfa.decisionNumber>, _s, input)
      self_.error(nvae)
      raise nvae<\n>
<endif>

>>

cyclicDFAInit(dfa) ::= <<
self.dfa<dfa.decisionNumber> = self.DFA<dfa.decisionNumber>(
  self, <dfa.decisionNumber>,
  eot = self.DFA<dfa.decisionNumber>_eot,
  eof = self.DFA<dfa.decisionNumber>_eof,
  min = self.DFA<dfa.decisionNumber>_min,
  max = self.DFA<dfa.decisionNumber>_max,
  accept = self.DFA<dfa.decisionNumber>_accept,
  special = self.DFA<dfa.decisionNumber>_special,
  transition = self.DFA<dfa.decisionNumber>_transition
  )<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState)
 ::= <<
LA<decisionNumber>_<stateNumber> = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
index<decisionNumber>_<stateNumber> = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nel">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if s >= 0:
  return s
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
```

```
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if (<labelExpr>)<if(predicates)> and (<predicates>)<endif>:
   s = <targetStateNumber><\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
se:
   s = <targetStateNumber><\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands)
 ::= "(<operands; separator=\" or \">)"

notPredicate(pred) ::= "not (<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "self.<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "self.input.LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(<lower> \<= LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(<lower> \<=
self.input.LA(<k>) \<= <upper>)"

lookaheadSetTest(values,k,valuesAsInt) ::= <%
LA<decisionNumber>_<stateNumber> in {<values; separator=", ">}
%>

isolatedLookaheadSetTest(values,k,valuesAsInt) ::= <%
```

```
self.input.LA(<k>) in {<values; separator=", ">}
%>

lookaheadVarName(k)
 ::= "LA<decisionNumber>_<stateNumber>"
isolatedLookaheadVarName(k) ::= "self.input.LA(<k>)"

setTest(ranges) ::= "<ranges; separator=\" or \">"

// A T T R I B U T E S

globalAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
  def __init__(self):
    <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

globalAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

ruleAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
  def __init__(self):
    <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

ruleAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>
```

```
delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Define a rule label including
 default value */
ruleLabelDef(label) ::= <<
<label.label.text> = None
>>

returnStructName(r) ::= "<r.name>_return"

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
class <ruleDescriptor:returnStructName()>(<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope):
  def __init__(self):
      super().__init__()

      <if(scope)><scope.attributes:{it | self.<it.decl> = None}; separator="\n"><endif>
      <@ruleReturnInit()>


  <@ruleReturnMembers()>

<endif>
>>

parameterScope(scope) ::= <<
<if(scope)><scope.attributes:{it | <it.decl>}; separator=", "><endif>
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
self.<scope>_stack[-<negIndex>].<attr.name>
<else>
<if(index)>
self.<scope>_stack[<index>].<attr.name>
<else>
self.<scope>_stack[-1].<attr.name>
<endif>
```

```
<endif>
%>

/*
 not applying patch because of bug in action parser!

<if(negIndex)>
((len(self.<scope>_stack) - <negIndex> - 1) >= 0 and [self.<scope>_stack[-<negIndex>].<attr.name>] or [None])[0]
<else>
<if(index)>
((<index> \< len(self.<scope>_stack)) and [self.<scope>_stack[<index>].<attr.name>] or [None])[0]
<else>
((len(self.<scope>_stack) > 0) and [self.<scope>_stack[-1].<attr.name>] or [None])[0]
<endif>
<endif>

*/

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[-<negIndex>].<attr.name> = <expr>
<else>
<if(index)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[<index>].<attr.name> = <expr>
<else>
self.<scope>_stack[-1].<attr.name> = <expr>
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "self.<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
((<scope> is not None) and [<scope>.<attr.name>] or [None])[0]
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
```

```
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> = <expr>
<else>
<attr.name> = <expr>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach; and they are evaluated early;
// they cannot
 see TREE_PARSER or PARSER attributes for example. :(

tokenLabelPropertyRef_text(scope,attr) ::= "<scope>.text"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.type"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.line"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.charPositionInLine"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.channel"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.index"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "<scope>.start"
ruleLabelPropertyRef_stop(scope,attr) ::= "<scope>.stop"
ruleLabelPropertyRef_tree(scope,attr) ::= "<scope>.tree"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
((<scope> is not None) and [self.input.getTokenStream().toString(
  self.input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
  self.input.getTreeAdaptor().getTokenStopIndex(<scope>.start)
  )] or [None])[0]
<else>
((<scope> is not None) and [self.input.toString(<scope>.start,<scope>.stop)]
 or [None])[0]
<endif>
%>
```

```
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> is not None) and [<scope>.st] or [None])[0]"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "((<scope> is not None) and [<scope>.type] or [0])[0]"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "((<scope> is not None) and [<scope>.line] or [0])[0]"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "((<scope> is not None) and [<scope>.charPositionInLine] or
[0])[0]"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "((<scope> is not None) and [<scope>.channel] or [0])[0]"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "((<scope> is not None) and [<scope>.index] or [0])[0]"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "((<scope> is not None) and [<scope>.text] or [None])[0]"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "((<scope> is not None) and [int(<scope>.text)] or [0])[0]"

// Somebody may ref $template
 or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop" //mmm... or input.LT(-1)??
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= "self.input.toString(retval.start, self.input.LT(-1))"
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "self._state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "self._state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "self._state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(self.getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed
 in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<else>
```

```
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<endif>
<else>
#action start
<action>
#action end
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"


// M I S C (properties, etc...)

codeFileExtension() ::= ".py"

true_value() ::= "True"
false_value() ::= "False"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python3/Python3.stg
No license file was found, but licenses were detected in source scan.


```
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* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

@outputFile.imports() ::= <<
<@super.imports()>

<if(!TREE_PARSER)>
<! tree parser would already have imported !>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

parserCtorBody() ::=
 <%
<super.parserCtorBody()><\n>
TreeAdaptor =
<if(actions.(actionScope).treeAdaptorInitializer)>
 <actions.(actionScope).treeAdaptorInitializer>
<else>
 new <actions.(actionScope).treeAdaptorType; null="CommonTreeAdaptor">()
<end>
;
%>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
private <treeAdaptorType()> adaptor;

public <treeAdaptorType()> TreeAdaptor
{
 get
 {
  return adaptor;
```

```
 }

 set
 {
  this.adaptor = value;
  <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
}
>>

treeAdaptorType() ::= <<
<actions.(actionScope).treeAdaptorType; null="ITreeAdaptor">
>>

ruleReturnBaseType() ::= <%
Ast<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<ASTLabelType>, <labelType>>
%>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = default(<ASTLabelType>);<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|<ASTLabelType>
  <it.label.text>_tree = default(<ASTLabelType>);}; separator="\n">
<ruleDescriptor.tokenListLabels:{it|<ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);};
separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
```

```
root_0 = (<ASTLabelType>)adaptor.Nil();
<endif>
<endif>
<endif>
>>

// T
 r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/**
 rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule.name>.Add(<label>.Tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>
```

```
/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule>.Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep,
 // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::= <<
<\n>{
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
<endif>
<prevRuleRootRef()>.Tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.Nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER&&rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
if
 (<prevRuleRootRef()>.Tree != null)
 input.ReplaceChildren(adaptor.GetParent(retval.Start), adaptor.GetChildIndex(retval.Start),
adaptor.GetChildIndex(_last), retval.Tree);
<endif>
```

```
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER||!rewriteMode)>
<prevRuleRootRef()>.Tree = root_0;
<endif>
<if(backtracking)>
}
<endif>
}

>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
  separator="\n"
>
<referencedWildcardLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new
 RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
  :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.Tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
  separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
```

```
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if (<referencedElementsDeep:{el | stream_<el>.HasNext}; separator="||">)
{
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.Reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,
 // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if (!(<referencedElements:{el | stream_<el>.HasNext}; separator="||">))
{
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
```

```
 <a.alt>
}
<else>
{
 <a.alt>
}
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType>
 root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <%
<@pregen()>
DebugLocation(<e.line>, <e.pos>);<\n>
<e.el>
%>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
```

```
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(),
 root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);<\n>
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting
 in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<rule>.NextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<rule>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.AddChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
```

```
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label)
 ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.NextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create
 new node from old !>
adaptor.Create(<token>, <args; separator=", ">)
<else>
stream_<token>.NextNode()
<endif>
<endif>
```

%>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp2/AST.stg
No license file was found, but licenses were detected in source scan.

/*
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*/

/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label
* is combined into tokenRef, ruleRef, ...
*/

finishedBacktracking(block) ::= <<

```
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
>>

/**
 Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_first_0 = None
_last = None<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<finishedBacktracking({
<if(rewriteMode)>
retval.tree = _first_0
if self._adaptor.getParent(retval.tree) is not None and self._adaptor.isNil(self._adaptor.getParent(retval.tree)):
   retval.tree = self._adaptor.getParent(retval.tree)
<endif>
})>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = self.input.LT(1)
_save_last_<treeLevel> = _last
_first_<treeLevel> = None
<if(!rewriteMode)>
root_<treeLevel> = self._adaptor.nil()<\n>
<endif>
<root:element()>
<if(rewriteMode)>
<finishedBacktracking({
<if(root.el.rule)>
if _first_<enclosingTreeLevel>
 is None:
   _first_<enclosingTreeLevel> = <root.el.label>.tree<\n>
<else>
```

```
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label><\n>
<endif>
})>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)<\n>
<endif>
<if(!rewriteMode)>
self._adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>)<\n>
<endif>
_last = _save_last_<treeLevel>

>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree
 = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
```

```
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
  _first_<treeLevel> = <label><\n>
})>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={})
 ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.wildcard(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<label>_tree = self._adaptor.dupTree(<label>)
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
```

```
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>
})>
<endif>
>>

// SET AST
matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<endif>
}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={})
 ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
}, ...)>
>>
```

```
// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<finishedBacktracking({
<if(!rewriteMode)>
self._adaptor.addChild(root_<treeLevel>, <label>.tree)
<else> <! rewrite mode !>
if _first_<treeLevel> is None:
  _first_<treeLevel> = <label>.tree<\n>
<endif>
})>
>>

/** x+=rule auto construct
 */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
root_<treeLevel> = self._adaptor.becomeRoot(<label>.tree, root_<treeLevel>)
})>
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
```

```
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope)
 ::= <<
_last = self.input.LT(1)
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,scope,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
})>
<endif>
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python/ASTTreeParser.stg
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```
/*
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* All rights reserved.
*
* Conversion to C#:
```

```
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* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

@outputFile.imports() ::= <<
<@super.imports()>

<if(!TREE_PARSER)>
<! tree parser would already have imported !>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
<treeAdaptorType()>
 treeAdaptor = default(<treeAdaptorType()>);
CreateTreeAdaptor(ref treeAdaptor);
TreeAdaptor = treeAdaptor<if(!actions.(actionScope).treeAdaptorType)> ?? new CommonTreeAdaptor()<endif>;
```

```
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
// Implement this function in your helper file to use a custom tree adaptor
partial void CreateTreeAdaptor(ref <treeAdaptorType()> adaptor);

private <treeAdaptorType()> adaptor;

public <treeAdaptorType()> TreeAdaptor
{
 get
 {
  return adaptor;
 }

 set
 {
  this.adaptor = value;
  <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
}
>>

treeAdaptorType() ::= <<
<actions.(actionScope).treeAdaptorType; null="ITreeAdaptor">
>>

ruleReturnBaseType() ::= <%
Ast<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<ASTLabelType>, <labelType>>
%>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType>
 root_0 = default(<ASTLabelType>);<\n>
>>

ruleLabelDefs(ruleDescriptor, labelType, ASTLabelType, rewriteElementType) ::= <%
<super.ruleLabelDefs(...)>
<if(!ruleDescriptor.isSynPred)>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|<\n><ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}>
<ruleDescriptor.tokenListLabels:{it|<\n><ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it|<\n>RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}>
```

```
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it|<\n>RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");}>
<endif>
%>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same
 alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST && outerAlt && !rewriteMode && !ruleDescriptor.isSynPred)>
root_0 = (<ASTLabelType>)adaptor.Nil();
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);
>>

/**
 Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
```

```
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule.name>.Add(<label>.Tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule>.Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope)
 ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::= <<
<\n>{
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
<endif>
<prevRuleRootRef()>.Tree = root_0;
<rewriteCodeLabels()>
```

```
root_0 = (<ASTLabelType>)adaptor.Nil();
<alts:rewriteAlt();
 separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER&&rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
if (<prevRuleRootRef()>.Tree != null)
 input.ReplaceChildren(adaptor.GetParent(retval.Start), adaptor.GetChildIndex(retval.Start),
adaptor.GetChildIndex(_last), retval.Tree);
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER||!rewriteMode)>
<prevRuleRootRef()>.Tree = root_0;
<endif>
<if(backtracking)>
}
<endif>
}

>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
 separator="\n"
>
<referencedTokenListLabels
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
 separator="\n"
>
<referencedWildcardLabels
 :{it|RewriteRuleSubtreeStream
 stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.Tree:null);};
 separator="\n"
>
<referencedRuleListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
```

```
 separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if (<referencedElementsDeep:{el | stream_<el>.HasNext}; separator="||">)
{
 <alt>
}
<referencedElementsDeep:{el
 | stream_<el>.Reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if (!(<referencedElements:{el | stream_<el>.HasNext}; separator="||">))
{
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
```

```
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
 <a.alt>
}
<else>
{
 <a.alt>
}
<endif>
>>

/** For empty rewrites:
 "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <%
<@pregen()>
DebugLocation(<e.line>, <e.pos>);<\n>
<e.el>
%>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
```

```
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/**
 Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);<\n>
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What
 is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<rule>.NextTree());<\n>
>>
```

```
rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<rule>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.AddChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label)
 ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={})
```

::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.NextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.Create(<token>, <args; separator=", ">)
<else>
stream_<token>.NextNode()
<endif>
<endif>
%>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/AST.stg
No license file was found, but licenses were detected in source scan.

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*/

```
/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/

@rule.setErrorReturnValue()
 ::= <<
retval.tree = (<ASTLabelType>)(ADAPTOR->errorNode(ADAPTOR, INPUT, retval.start, LT(-1), EXCEPTION));
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
ADAPTOR->addChild(ADAPTOR, root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_0));
<if(backtracking)>}<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions)
 ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>
```

```
/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus
 ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )
<endif>ADAPTOR->addChild(ADAPTOR, root_0, <createNodeFromToken(...)>);},...)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,terminalOptions,postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(label)>
<label>=(<labelType>)LT(1);<\n>
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_0 =
(<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <createNodeFromToken(...)>,
```

root_0));},...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>ADAPTOR->addChild(ADAPTOR, root_0,
<label>.tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 = (<ASTLabelType>)(ADAPTOR-
>becomeRoot(ADAPTOR, <label>.tree, root_0));
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelAST(...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelAST(...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope)
 ::= <<
<ruleRefRuleRoot(...)>
<listLabelAST(...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
ADAPTOR->addChild(ADAPTOR, root_0, <label>_tree);

```
<if(backtracking)>}<endif>
>>

wildcardBang(token,label,elementIndex,terminalOptions) ::= "<super.wildcard(...)>"

wildcardRuleRoot(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
root_0 = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_0));
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(<label>) <! new MethodNode(IDLabel) !>
<else>
(<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>))
<endif>
>>

ruleCleanUp()
 ::= <<
<super.ruleCleanUp()>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> )
{<\n>
<endif>
<if(!ruleDescriptor.isSynPred)>
 retval.stop = LT(-1);<\n>
<endif>
 retval.tree = (<ASTLabelType>)(ADAPTOR->rulePostProcessing(ADAPTOR, root_0));
 ADAPTOR->setTokenBoundaries(ADAPTOR, retval.tree, retval.start, retval.stop);
   <ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
   <ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
<if(backtracking)>
}<\n>
<endif>
>>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/C/ASTParser.stg
No license file was found, but licenses were detected in source scan.

/*
[The "BSD license"]
```

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http://www.temporal-wave.com
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template overrides to add debugging to normal C output;
* If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/
@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
const char *
ruleNames[] =
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)> <! grammar imports other grammar(s) !>
static ANTLR3_UINT32
 ruleLevel = 0;
static ANTLR3_UINT32 getRuleLevel()
{
 return ruleLevel;
}
static void incRuleLevel()

```
{
 ruleLevel++;
}
static void decRuleLevel()
{
 ruleLevel--;
}
<else> <! imported grammar !>
static ANTLR3_UINT32
getRuleLevel()
{
 return <grammar.delegators:{g| <g:delegateName()>}>->getRuleLevel();
}
static void incRuleLevel()
{
 <grammar.delegators:{g| <g:delegateName()>}>->incRuleLevel();
}
static void
decRuleLevel()
{
 <grammar.delegators:{g| <g:delegateName()>}>.decRuleLevel();
}
<endif>
<if(profile)>
// Profiling not yet implemented for C target
//
<endif>
<if(grammar.grammarIsRoot)>
<ctorForPredefinedListener()>
<else>
<ctorForDelegateGrammar()>
<endif>

static ANTLR3_BOOLEAN
evalPredicate(p<name> ctx, ANTLR3_BOOLEAN result, const char * predicate)
{
  DBG->semanticPredicate(DBG, result, predicate);
  return result;
}<\n>
>>

@genericParser.debugStuff() ::= <<
<if(grammar.grammarIsRoot)>
<createListenerAndHandshake()>
<endif>
>>

ctorForProfilingRootGrammar() ::=
```

```
 <<
>>

/** Basically we don't want to set any dbg listeners as root will have it. */
ctorForDelegateGrammar() ::= <<

>>

ctorForPredefinedListener() ::= <<

>>

createListenerAndHandshake() ::= <<
{
 // DEBUG MODE code
 //
 pANTLR3_DEBUG_EVENT_LISTENER  proxy;
 proxy = antlr3DebugListenerNew();
 proxy->grammarFileName = INPUT->tokenSource->strFactory->newStr8(INPUT->tokenSource->strFactory,
(pANTLR3_UINT8)ctx->getGrammarFileName());

<if(TREE_PARSER)>
 proxy->adaptor = ADAPTOR;
<endif>
 PARSER->setDebugListener(PARSER, proxy);

 // Try to connect to the debugger (waits forever for a connection)
 //
 proxy->handshake(proxy);

 // End DEBUG MODE code
 //
}
>>


@rule.preamble() ::= <<
if ( getRuleLevel()==0 )
{
 DBG->commence(DBG);
}
DBG->enterRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
incRuleLevel();
DBG->location(DBG, <ruleDescriptor.tree.line>, <ruleDescriptor.tree.column>);<\n>
>>

@rule.postamble() ::= <<
DBG->location(DBG, <ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.column>);<\n>
```

```
DBG->exitRule(DBG,
 getGrammarFileName(), (const char *)"<ruleName>");
decRuleLevel();
if ( getRuleLevel()==0 )
{
 DBG->terminate(DBG);
}
<\n>
>>

@checkRuleBacktrackFailure.debugClean() ::= <<
DBG->exitRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
decRuleLevel();
>>

@synpred.start() ::= "DBG->beginBacktrack(DBG, BACKTRACKING);"

@synpred.stop() ::= "DBG->endBacktrack(DBG, BACKTRACKING, success);"

// Common debug event triggers used by region overrides below

enterSubRule() ::=
  "DBG->enterSubRule(DBG, <decisionNumber>);<\n>"

exitSubRule() ::=
  "DBG->exitSubRule(DBG, <decisionNumber>);<\n>"

enterDecision() ::=
  "DBG->enterDecision(DBG, <decisionNumber>);<\n>"

exitDecision() ::=
  "DBG->exitDecision(DBG, <decisionNumber>);<\n>"

enterAlt(n) ::= "DBG->enterAlt(DBG, <n>);<\n>"

// Region overrides that tell various constructs to add debugging triggers

@block.predecision() ::= "<enterSubRule()><enterDecision()>"

@block.postdecision()
 ::= "<exitDecision()>"

@block.postbranch() ::= "<exitSubRule()>"

@ruleBlock.predecision() ::= "<enterDecision()>"

@ruleBlock.postdecision() ::= "<exitDecision()>"
```

```
@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

@positiveClosureBlock.predecision() ::= "<enterDecision()>"

@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

@positiveClosureBlock.earlyExitException() ::=
  "DBG->recognitionException(DBG, EXCEPTION);<\n>"

@closureBlock.preloop() ::= "<enterSubRule()>"

@closureBlock.postloop() ::= "<exitSubRule()>"

@closureBlock.predecision() ::= "<enterDecision()>"

@closureBlock.postdecision() ::= "<exitDecision()>"

@altSwitchCase.prealt() ::= "<enterAlt(altNum)>"

@element.prematch() ::=
  "DBG->location(DBG, <e.line>, <e.pos>);" // e is arg of element

@matchSet.mismatchedSetException() ::=
   "DBG->recognitionException(DBG, EXCEPTION);"

@newNVException.noViableAltException() ::= "DBG->recognitionException(DBG, EXCEPTION);"

dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(ctx, RECOGNIZER, ISTREAM,
&cdfa<decisionNumber>);
if  (HASEXCEPTION())
{
 DBG->recognitionException(DBG, EXCEPTION);
  goto rule<ruleDescriptor.name>Ex;
}
<checkRuleBacktrackFailure()>
>>

@cyclicDFA.errorMethod() ::= <<
//static void
//dfaError(p<name> ctx)
//{
```

```
//    DBG->recognitionException(DBG, EXCEPTION);
//}
>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
evalPredicate(ctx, <pred>, (const char *)"<description>")
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/C/Dbg.stg
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```
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```
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```
*/

javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
```

```
 "short":"0",
 "char":"0",
 default:"null" // anything other than an atomic type
]

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
 "True":"true",
 "False":"false",
 "true":"true",
 "false":"false",
 default:"false"
]

/**
 The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
import org.antlr.runtime.*;
<if(TREE_PARSER)>
import org.antlr.runtime.tree.*;
<endif>
import java.util.Stack;
import java.util.List;
import java.util.ArrayList;
<if(backtracking)>
import java.util.Map;
import java.util.HashMap;
<endif>
<@end>

<docComment>
@SuppressWarnings("all")
<recognizer>
```

```
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
    superClass="Lexer")
 ::= <<
public class <grammar.recognizerName> extends <@superClassName><superClass><@end> {
 <tokens:{it | public static final int <it.name>=<it.type>;}; separator="\n">
 <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
 <actions.lexer.members>

 // delegates
 <grammar.delegates:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 // delegators
 <grammar.delegators:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>
 public <superClass>[] getDelegates() {
  return new <superClass>[] {<grammar.delegates: {g|<g:delegateName()>}; separator = ", ">};
 }

 public <grammar.recognizerName>() {} <! needed by subclasses !>
 public <grammar.recognizerName>(CharStream input<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>) {
  this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>);
 }
 public <grammar.recognizerName>(CharStream
 input, RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
  super(input,state);
<if(memoize)>
<if(grammar.grammarIsRoot)>
  state.ruleMemo = new HashMap[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
   <grammar.directDelegates:
    {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
   <grammar.delegators:
    {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
   <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
 @Override public String getGrammarFileName() { return "<fileName>"; }

<if(filterMode)>
 <filteringNextToken()>
<endif>
 <rules; separator="\n\n">
```

```
 <synpreds:{p | <lexerSynpred(p)>}>

 <cyclicDFAs:{dfa | protected DFA<dfa.decisionNumber> dfa<dfa.decisionNumber> = new
DFA<dfa.decisionNumber>(this);}; separator="\n">
 <cyclicDFAs:cyclicDFA(); separator="\n\n"><! dump tables for all DFA !>

}
>>

/** A override of
 Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
@Override
public Token nextToken() {
 while (true) {
  if ( input.LA(1)==CharStream.EOF ) {
   Token eof = new CommonToken(input,Token.EOF,
         Token.DEFAULT_CHANNEL,
         input.index(),input.index());
   eof.setLine(getLine());
   eof.setCharPositionInLine(getCharPositionInLine());
   return eof;
  }
 state.token = null;
 state.channel = Token.DEFAULT_CHANNEL;
 state.tokenStartCharIndex = input.index();
 state.tokenStartCharPositionInLine = input.getCharPositionInLine();
 state.tokenStartLine = input.getLine();
 state.text = null;
 try {
  int m = input.mark();
  state.backtracking=1; <! means we won't throw slow exception !>
  state.failed=false;
  mTokens();
  state.backtracking=0;
  <!
 mTokens backtracks with synpred at backtracking==2
    and we set the synpredgate to allow actions at level 1. !>
  if ( state.failed ) {
   input.rewind(m);
   input.consume(); <! advance one char and try again !>
  }
  else {
```

```
   emit();
   return state.token;
  }
 }
 catch (RecognitionException re) {
  // shouldn't happen in backtracking mode, but...
  reportError(re);
  recover(re);
 }
}
}

@Override
public void memoize(IntStream input,
 int ruleIndex,
 int ruleStartIndex)
{
if ( state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

@Override
public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
if ( state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "state.backtracking==0"

filteringActionGate() ::= "state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules,
 numRules,
            bitsets, inputStreamType, superClass,
            labelType, members, rewriteElementType,
            filterMode, ASTLabelType="Object") ::= <<
public class <grammar.recognizerName> extends <@superClassName><superClass><@end> {
<if(grammar.grammarIsRoot)>
 public static final String[] tokenNames = new String[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ", wrap="\n\t\t">
 };
<endif>
 <tokens:{it |public static final int <it.name>=<it.type>;}; separator="\n">

 // delegates
 <grammar.delegates: {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 public <superClass>[] getDelegates() {
```

```
 return new <superClass>[] {<grammar.delegates: {g|<g:delegateName()>}; separator = ", ">};
 }

 // delegators
 <grammar.delegators:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

 <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<@members>
 <!
 WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
 public <grammar.recognizerName>(<inputStreamType> input<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>) {
  this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>);
 }
 public <grammar.recognizerName>(<inputStreamType> input, RecognizerSharedState
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
  super(input, state);
  <parserCtorBody()>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
  <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
<@end>

 @Override public String[] getTokenNames() { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; }
 @Override public String getGrammarFileName()
 { return "<fileName>"; }

 <members>

 <rules; separator="\n\n">

<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 // Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 public <returnType(ruleDescriptor)> <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>)
throws <ruleDescriptor.throwsSpec; separator=", "> { <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)><ru
leDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>); \}}; separator="\n">
```

```
 <synpreds:{p | <synpred(p)>}>

 <cyclicDFAs:{dfa | protected DFA<dfa.decisionNumber> dfa<dfa.decisionNumber> = new
DFA<dfa.decisionNumber>(this);}; separator="\n">
 <cyclicDFAs:cyclicDFA(); separator="\n\n"><! dump tables for all DFA !>

 <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
      words64=it.bits)>};
 separator="\n">
}
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new HashMap[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
 {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
     ASTLabelType="Object", superClass="Parser", labelType="Token",
     members={<actions.parser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
           bitsets, "TokenStream", superClass,
           labelType, members, "Token",
           false, ASTLabelType)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
         numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
          members={<actions.treeparser.members>}
         ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
           bitsets, "TreeNodeStream", superClass,
           labelType, members, "Node",
           filterMode, ASTLabelType)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
```

```
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
public final void <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>) throws
<ruleDescriptor.throwsSpec:{x|<x>};
 separator=", "> {
 <ruleLabelDefs()>
<if(trace)>
 traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try {
  <block>
 }
 finally {
  traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
 }
<else>
 <block>
<endif>
}
// $ANTLR end <ruleName>
>>

synpred(name) ::= <<
public final boolean <name>() {
 state.backtracking++;
 <@start()>
 int start = input.mark();
 try {
  <name>_fragment(); // can never throw exception
 } catch (RecognitionException re) {
  System.err.println("impossible: "+re);
 }
 boolean success = !state.failed;
 input.rewind(start);
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>
```

```
ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) {
<returnStatement(({<ruleReturnValue()>}))> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if
 (state.failed) <returnStatement(({<ruleReturnValue()>}))><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true;
<returnStatement(({<ruleReturnValue()>}))>}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
// <fileName>:<description>
<if(isPredefinedRewriteRule.(ruleName) && filterMode && buildAST)>
@Override
<endif>
public final <returnType(ruleDescriptor)> <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>) throws
<ruleDescriptor.throwsSpec:{x|<x>}; separator=", "> {
 <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 <ruleLabelDefs()>
 <ruleDescriptor.actions.init>
 <@preamble()>
 try
 {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
```

```
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re) {
  reportError(re);
  recover(input,re);
  <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
 finally {
  // do for sure before leaving
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
 }
 <@postamble()>
 <returnStatement(({<ruleReturnValue()>}), false)>
}
// $ANTLR end "<ruleName>"
>>

returnStatement(returnValue, force=true) ::= <%
<if(!isEmptyString.(returnValue))>
 return <returnValue>;
<elseif(force)>
 return;
<endif>
%>

catch(decl,action) ::= <<
catch (<e.decl>) {
 <e.action>
}
>>

ruleDeclarations()
 ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new <returnType(ruleDescriptor)>();
retval.start = input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
```

```
<a.type> <a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.index();
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.push(new <it>_scope());}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.push(new <it.name>_scope());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.pop();}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it |<labelType> <it.label.text>=null;};
 separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it |List\<Object> list_<it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|RuleReturnScope <ll.label.text> = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
 :{it |<labelType> <it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
 :{it |List\<Object> list_<it.label.text>=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
```

```
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop
 = input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
public final void m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>) throws RecognitionException
{
 <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 try {
<if(nakedBlock)>
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
<else>
  int _type = <ruleName>;
  int _channel = DEFAULT_TOKEN_CHANNEL;
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
```

```
 <block>
 <ruleCleanUp()>
 state.type = _type;
 state.channel
= _channel;
 <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally {
  // do for sure before leaving
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeCleanUp()>
  <memoize()>
 }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
@Override
public void mTokens() throws RecognitionException {
 <block>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description)
```

```
 ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
loop<decisionNumber>:
while (true) {
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch
 (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
 default :
  if ( cnt<decisionNumber> >= 1 ) break loop<decisionNumber>;
  <ruleBacktrackFailure()>
```

```
 EarlyExitException eee = new EarlyExitException(<decisionNumber>, input);
 <@earlyExitException()>
 throw eee;
 }
 cnt<decisionNumber>++;
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
loop<decisionNumber>:
while (true) {
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
 default :
  break loop<decisionNumber>;
 }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum> :
 <@prealt()>
```

```
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::=
 <<
<if(label)><label>=(<labelType>)<endif>match(input,<token>,FOLLOW_<token>_in_<ruleName><elementIndex
>); <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new ArrayList\<Object>();
list_<label>.add(<elem>);
>>

/** match a character */
charRef(char,label) ::= <<
```

```
<if(label)>
<label> = input.LA(1);
<endif>
match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=<castToLabelType("input.LT(1)")>;
<endif>
<endif>
if ( <s>
 ) {
 input.consume();
 <postmatchCode>
<if(!LEXER)>
 state.errorRecovery=false;
<endif>
 <if(backtracking)>state.failed=false;<endif>
}
else {
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 <@mismatchedSetException()>
<if(LEXER)>
 recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
 !>
<endif>
}
>>
```

```
matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
int <label>Start = getCharIndex();
match(<string>); <checkRuleBacktrackFailure()>
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
 <label>Start, getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
match(<string>); <checkRuleBacktrackFailure()>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=<castToLabelType("input.LT(1)")>;
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label, label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>
```

```
/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule
 name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);
state._fsp--;
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
 <checkRuleBacktrackFailure()>
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>
```

```
/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
match(EOF); <checkRuleBacktrackFailure()>
<labelType> <label> = new <labelType>(input, EOF, Token.DEFAULT_CHANNEL, <label>Start<elementIndex>,
getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
match(EOF);
 <checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                 ::= "int <recRuleArg()>"
recRuleArg()                    ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()        ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
 match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
 <children:element()>
 match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input,
 Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
```

```
if ( !(<evalPredicate(pred,description)>) ) {
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
<if((!isTrue.(last(edges).labelExpr)) && (!last(edges).predicates))>
else {
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 <(nvaExceptionWrapperMap.(k))({NoViableAltException nvae =
 new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);
<@noViableAltException()>
throw nvae;})>
<endif>
}
<endif>
>>

nvaExceptionWrapperMap ::= [
 "1":"wrapNvaExceptionForK1",
 "2":"wrapNvaExceptionForK2",
 default:"wrapNvaExceptionForKN"
]

wrapNvaExceptionForK1(exceptionCode)
 ::= <<
<exceptionCode>
>>

wrapNvaExceptionForK2(exceptionCode) ::= <<
int nvaeMark = input.mark();
try {
 input.consume();
 <exceptionCode>
} finally {
 input.rewind(nvaeMark);
}
>>

wrapNvaExceptionForKN(exceptionCode) ::= <<
```

```
int nvaeMark = input.mark();
try {
 for (int nvaeConsume = 0; nvaeConsume \< <k> - 1; nvaeConsume++) {
  input.consume();
 }
 <exceptionCode>
} finally {
 input.rewind(nvaeMark);
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
>>

/** A DFA
 state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
 alt<decisionNumber>=<eotPredictsAlt>;
}
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
```

```
*/
dfaEdge(labelExpr,
 targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 <(nvaExceptionWrapperMap.(k))({NoViableAltException nvae =
 new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);
<@noViableAltException()>
throw nvae;})>
<endif>
}
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
 <edges; separator="\n">
}
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>)
 ) {
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;
<endif>
}
>>

dfaEdgeSwitch(labels, targetState) ::= <<
```

```
<labels:{it |case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input);
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa)
 ::= <<
static final String DFA<dfa.decisionNumber>_eotS =
 "<dfa.javaCompressedEOT; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_eofS =
 "<dfa.javaCompressedEOF; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_minS =
 "<dfa.javaCompressedMin; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_maxS =
 "<dfa.javaCompressedMax; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_acceptS =
 "<dfa.javaCompressedAccept; wrap="\"+\n\t\"">";
static final String DFA<dfa.decisionNumber>_specialS =
 "<dfa.javaCompressedSpecial; wrap="\"+\n\t\"">}>";
static final String[] DFA<dfa.decisionNumber>_transitionS = {
  <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
};

static final short[] DFA<dfa.decisionNumber>_eot =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eotS);
static final short[] DFA<dfa.decisionNumber>_eof =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eofS);
static final char[] DFA<dfa.decisionNumber>_min
```

```
 = DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
static final char[] DFA<dfa.decisionNumber>_max =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
static final short[] DFA<dfa.decisionNumber>_accept =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
static final short[] DFA<dfa.decisionNumber>_special =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_specialS);
static final short[][] DFA<dfa.decisionNumber>_transition;

static {
 int numStates = DFA<dfa.decisionNumber>_transitionS.length;
 DFA<dfa.decisionNumber>_transition = new short[numStates][];
 for (int i=0; i\<numStates; i++) {
  DFA<dfa.decisionNumber>_transition[i] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
 }
}

protected class DFA<dfa.decisionNumber> extends DFA {

 public DFA<dfa.decisionNumber>(BaseRecognizer recognizer) {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof
 = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
  this.accept = DFA<dfa.decisionNumber>_accept;
  this.special = DFA<dfa.decisionNumber>_special;
  this.transition = DFA<dfa.decisionNumber>_transition;
 }
 @Override
 public String getDescription() {
  return "<dfa.description>";
 }
 <@errorMethod()>
<if(dfa.specialStateSTs)>
 @Override
 public int specialStateTransition(int s, IntStream _input) throws NoViableAltException {
  <if(LEXER)>
  IntStream input = _input;
  <endif>
  <if(PARSER)>
  TokenStream input = (TokenStream)_input;
  <endif>
  <if(TREE_PARSER)>
  TreeNodeStream input = (TreeNodeStream)_input;
  <endif>
```

```
 int _s = s;
 switch ( s ) {
 <dfa.specialStateSTs:{state |
 case <i0> : <! compressed special state numbers 0..n-1 !>
  <state>}; separator="\n">
 }
<if(backtracking)>
 if (state.backtracking>0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae =
  new NoViableAltException(getDescription(),
 <dfa.decisionNumber>, _s, input);
 error(nvae);
 throw nvae;
 }
<endif>
}
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(1);
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
int index<decisionNumber>_<stateNumber> = input.index();
input.rewind();
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}
>>

/** An edge pointing
 at end-of-token; essentially matches any char;
*  always jump to the target.
*/
```

```
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,{})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt)
 ::= "(input.LA(<k>) >= <lower> && input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
 <scope.attributes:{it |<it.decl>;}; separator="\n">
}
protected Stack\<<scope.name>_scope> <scope.name>_stack = new Stack\<<scope.name>_scope>();
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope)>
```

```
<if(scope.attributes)>
protected static class <scope.name>_scope {
 <scope.attributes:{it |<it.decl>;}; separator="\n">
}
protected Stack\<<scope.name>_scope> <scope.name>_stack = new Stack\<<scope.name>_scope>();
<endif>
<endif>
>>

returnStructName(r) ::= "<r.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
%>

/** Generate
 the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<returnScopeBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
```

```
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public
 static class <ruleDescriptor:returnStructName()> extends <returnScopeBaseType()> {
 <if(scope)><scope.attributes:{it |public <it.decl>;}; separator="\n"><endif>
 <@ruleReturnMembers()>
};
<endif>
>>

returnScopeBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope
%>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>;"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1).<attr.name>
<else>
<if(index)>
<scope>_stack.elementAt(<index>).<attr.name>
<else>
<scope>_stack.peek().<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1).<attr.name> =<expr>;
<else>
<if(index)>
<scope>_stack.elementAt(<index>).<attr.name> =<expr>;
<else>
```

```
<scope>_stack.peek().<attr.name>
 =<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>;
<else>
<attr.name> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/**
 ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.getText():null)"
```

```
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.getType():0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.getLine():0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.getCharPositionInLine():0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.getChannel():0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.getTokenIndex():0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?Integer.valueOf(<scope>.getText()):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?(<castToLabelType({<scope>.start})>):null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?(<castToLabelType({<scope>.stop})>):null)"
ruleLabelPropertyRef_tree(scope,attr)
 ::= "(<scope>!=null?((<ASTLabelType>)<scope>.getTree()):null)"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))):null)
<else>
(<scope>!=null?input.toString(<scope>.start,<scope>.stop):null)
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?((StringTemplate)<scope>.getTemplate()):null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
 "(<scope>!=null?<scope>.getType():0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
 "(<scope>!=null?<scope>.getLine():0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
 "(<scope>!=null?<scope>.getCharPositionInLine():-1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
 "(<scope>!=null?<scope>.getChannel():0)"
lexerRuleLabelPropertyRef_index(scope,attr)
 ::=
 "(<scope>!=null?<scope>.getTokenIndex():0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
 "(<scope>!=null?<scope>.getText():null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
 "(<scope>!=null?Integer.valueOf(<scope>.getText()):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(<castToLabelType(\"retval.start\")>)"
rulePropertyRef_stop(scope,attr) ::= "(<castToLabelType(\"retval.stop\")>)"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <%
```

```
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr)
 ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "Integer.valueOf(<scope>.getText())"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
%>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name,
 words64) ::= <<
public static final BitSet <name> = new BitSet(new long[]{<words64:{it |<it>L};separator=",">});
>>

codeFileExtension() ::= ".java"
```

```
true_value() ::= "true"
false_value() ::= "false"

isEmptyString ::= [
 "" : true,
 default : false
]

isTrue ::= [
 "true" : true,
 default : false
]

isDefaultLabelType ::= [
 "Token" : true,
 default : false
]

isPredefinedRewriteRule ::= [
 "topdown" : true,
 "bottomup" : true,
 default : false
]

castToLabelType(value) ::= <%
<if(!isDefaultLabelType.(labelType))>
(<labelType>)
<endif>
<value>
%>
```

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/Java/Java.stg
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*/

/** Templates for building ASTs during normal parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* The situation is not too bad as rewrite (->) usage makes ^ and !
* invalid. There is no huge explosion of combinations.
*/
@rule.setErrorReturnValue() ::= <<
/* ASTParser rule.setErrorReturnValue */
retval.tree
 = (<ASTLabelType> *)[treeAdaptor errorNode:input From:retval.start To:[input LT:-1] Exception:re];
<! System.out.println("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token, label, elementIndex, terminalOptions) ::= <<
/* ASTParser tokenRef */
<super.tokenRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = <createNodeFromToken(...)>;
[treeAdaptor addChild:<label>_tree toTree:root_0];
<if(backtracking)>}<endif>
>>

/* ID! and output=AST (same as plain tokenRef) */

```
/* ASTParser tokenRefBang */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_0];
<if(backtracking)>}<endif>
>>

/**
 ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser tokenRefBangAndListLabel */
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser tokenRefAndListLabel */
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
/* ASTParser tokenRefRuleRootAndListLabel */
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template
 name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.
```

```
matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <%
/* ASTParser matchSet */
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
  [treeAdaptor addChild:<createNodeFromToken(...)> toTree:root_0 ];}, ...)>
%>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
/* ASTParser matchRuleBlockSet */
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,terminalOptions, postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug)
 ::= <<
/* ASTParser matchSetRuleRoot */
<if(label)>
<label>=(<labelType> *)[input LT:1]; /* matchSetRuleRoot *//<\n>
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createNodeFromToken(...)> old:root_0];}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRef */
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
[treeAdaptor addChild:[<label> getTree] toTree:root_0];
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefRuleRoot */
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:[<label>
 getTree] old:root_0];
>>
```

```
/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefAndListLabel */
<ruleRef(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefBangAndListLabel */
<ruleRefBang(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefRuleRootAndListLabel */
<ruleRefRuleRoot(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser wildcard */
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
  [treeAdaptor addChild:[[treeAdaptor create:<label>] retain] toTree:root_0];
<if(backtracking)>}<endif>
>>

wildcardBang(token,label,elementIndex,terminalOptions)
 ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser wildcardRuleRoot */
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
  <label>_tree = [[treeAdaptor create:<label>] retain]
  root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_0];
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
/* ASTParser createNodeFromToken */
<if(terminalOptions.node)>
[<terminalOptions.node> new<terminalOptions.node>:<label>] <! new MethodNode(IDLabel) !>
<else>
```

```
(<ASTLabelType> *)[[treeAdaptor create:<label>] retain]
<endif>
>>

// straight from java cleanup ///
ruleCleanUp() ::= <<
/* ASTParser ruleCleanUp */
<super.ruleCleanUp()>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
  retval.tree = (<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0];
  [treeAdaptor setTokenBoundaries:retval.tree
 From:retval.start To:retval.stopToken];
<if(backtracking)>}<endif>
>>
```

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/ObjC/ASTParser.stg
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*/
/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.

The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

group antlr;

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"

Found
 in path(s):
* /antlr-3-5-3-jar/org/antlr/tool/templates/messages/formats/vs2005.stg
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*/
/** Template overrides to add debugging to normal Java output;
*  If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.Runtime.Debug;
using IOException = System.IO.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
public static readonly
 string[] ruleNames =
 new string[]
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)><! grammar imports other grammar(s) !>
int ruleLevel = 0;
public virtual int RuleLevel { get { return ruleLevel; } }
public virtual void IncRuleLevel() { ruleLevel++; }
public virtual void DecRuleLevel() { ruleLevel--; }
<if(profile)>
<ctorForProfilingRootGrammar()>
<else>
<ctorForRootGrammar()>
<endif>
<ctorForPredefinedListener()>
<else><! imported grammar !>
public int RuleLevel { get { return <grammar.delegators:{g| <g:delegateName()>}>.RuleLevel; } }
public void IncRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.IncRuleLevel(); }
public void DecRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.DecRuleLevel(); }
<ctorForDelegateGrammar()>
<endif>
<if(profile)>
public override bool AlreadyParsedRule( IIntStream input, int ruleIndex )
{
 int stopIndex = GetRuleMemoization(ruleIndex, input.Index);
 ((Profiler)dbg).ExamineRuleMemoization(input,
 ruleIndex, stopIndex, <grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 return base.AlreadyParsedRule(input, ruleIndex);
}<\n>
public override void Memoize( IIntStream input, int ruleIndex, int ruleStartIndex )
```

```
{
 ((Profiler)dbg).Memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 base.Memoize(input, ruleIndex, ruleStartIndex);
}<\n>
<endif>
protected virtual bool EvalPredicate( bool result, string predicate )
{
 dbg.SemanticPredicate( result, predicate );
 return result;
}<\n>
>>

ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, DebugEventSocketProxy.DefaultDebuggerPort, new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier;
 null="public"> <name>( <inputStreamType> input, int port, RecognizerSharedState state )
 : base( input, state )
{
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, new Profiler(null), new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state )
 : base( input, dbg, state )
{
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
```

```
 <@finally()>
}
<\n>
>>

/**
 Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : base( input, dbg, state )
{
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
}<\n>
>>

ctorForPredefinedListener() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg
)
 <@superClassRef>: base( input, dbg, new RecognizerSharedState() )<@end>
{
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|,
 <g:delegateName()>}>);}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>

createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, input.TreeAdaptor );<\n>
<else>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, null );<\n>
<endif>
DebugListener = proxy;
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
```

```
{
 ReportError( ioe );
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

/*
* Much of the following rules were merged into CSharp3.stg.
*/

@rule.preamble() ::= <<
if (RuleLevel == 0)
 DebugListener.Commence();
IncRuleLevel();
>>
//@rule.preamble() ::= <<
//try
//{
// dbg.EnterRule( GrammarFileName, "<ruleName>" );
// if ( RuleLevel == 0 )
// {
//  dbg.Commence();
// }
// IncRuleLevel();
// dbg.Location( <ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine> );<\n>
//>>

@rule.postamble() ::= <<
DecRuleLevel();
if (RuleLevel == 0)
 DebugListener.Terminate();
>>
//@rule.postamble()
 ::= <<
//dbg.Location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
//}
//finally
//{
// dbg.ExitRule( GrammarFileName, "<ruleName>" );
// DecRuleLevel();
// if ( RuleLevel == 0 )
// {
//  dbg.Terminate();
// }
//}<\n>
//>>
```

```
//@insertSynpreds.start() ::= "dbg.BeginBacktrack( state.backtracking );"
//@insertSynpreds.stop() ::= "dbg.EndBacktrack( state.backtracking, success );"

// Common debug event triggers used by region overrides below

//enterSubRule() ::= <<
//try
//{
// dbg.EnterSubRule( <decisionNumber> );<\n>
//>>

//exitSubRule() ::= <<
//}
//finally
//{
// dbg.ExitSubRule( <decisionNumber> );
//}<\n>
//>>

//enterDecision() ::= <<
//try
//{
// dbg.EnterDecision( <decisionNumber> );<\n>
//>>

//exitDecision() ::= <<
//}
//finally
//{
// dbg.ExitDecision( <decisionNumber> );
//}<\n>
//>>

//enterAlt(n) ::= "dbg.EnterAlt( <n> );<\n>"

// Region overrides that tell various constructs to add debugging
 triggers

//@block.predecision() ::= "<enterSubRule()><enterDecision()>"

//@block.postdecision() ::= "<exitDecision()>"

//@block.postbranch() ::= "<exitSubRule()>"

//@ruleBlock.predecision() ::= "<enterDecision()>"

//@ruleBlock.postdecision() ::= "<exitDecision()>"
```

```
//@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

//@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

//@positiveClosureBlock.predecision() ::= "<enterDecision()>"

//@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

//@positiveClosureBlock.earlyExitException() ::=
// "dbg.RecognitionException( eee<decisionNumber> );<\n>"

//@closureBlock.preloop() ::= "<enterSubRule()>"

//@closureBlock.postloop() ::= "<exitSubRule()>"

//@closureBlock.predecision() ::= "<enterDecision()>"

//@closureBlock.postdecision() ::= "<exitDecision()>"

//@altSwitchCase.prealt() ::= "<enterAlt(n=i)>"

//@element.prematch()
 ::=
// "dbg.Location( <it.line>, <it.pos> );"

//@matchSet.mismatchedSetException() ::=
// "dbg.RecognitionException( mse );"

//@dfaState.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//@dfaStateSwitch.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//dfaDecision(decisionNumber,description) ::= <<
//try
//{
// isCyclicDecision = true;
// <super.dfaDecision(...)>
//}
//catch ( NoViableAltException nvae )
//{
// dbg.RecognitionException( nvae );
// throw nvae;
//}
//>>
```

```
//@cyclicDFA.errorMethod() ::= <<
//public override void Error( NoViableAltException nvae )
//{
// ((DebugParser)recognizer).dbg.RecognitionException( nvae );
//}
//>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
EvalPredicate(<pred>, "<description>")
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/Dbg.stg
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```
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*/
```

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/

parserMembers() ::= <<
 protected DebugTreeAdaptor adaptor;

 public ITreeAdaptor TreeAdaptor
 {
  get
  {
   return adaptor;
  }
  set
  {
<if(grammar.grammarIsRoot)>
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
   this.adaptor
 = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif><\n>
   <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
  }
 }<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port,
<if(TREE_PARSER)>input.TreeAdaptor<else>adaptor<endif> );
DebugListener = proxy;
<inputStreamType> = new Debug<inputStreamType>( input, proxy );
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@ctorForRootGrammar.finally() ::= <<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
```

```
proxy.TreeAdaptor = adap;
>>

@ctorForProfilingRootGrammar.finally() ::=<<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
>>

@ctorForPredefinedListener.superClassRef() ::= ": base( input, dbg )"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)><! don't create new
 adaptor for delegates !>
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;<\n>
<endif>
>>

//@rewriteElement.pregen() ::= "dbg.Location( <e.line>, <e.pos> );"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp2/ASTDbg.stg
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*/

/*
* This code generating template and the associated Cpp runtime was produced by:
* Gokulakannan Somasundaram ( heavy lifting from C Run-time by Jim Idle )
*/
cTypeInitMap ::= [
 "int"     : "0",             // Integers     start out being 0
 "long"    : "0",             // Longs        start out being 0
 "float"   : "0.0",           // Floats       start out being 0
 "double"  : "0.0",           // Doubles      start out being 0
 "bool"    : "false",
   // Booleans     start out being Antlr C for false
 "byte"    : "0",             // Bytes        start out being 0
 "short"   : "0",             // Shorts       start out being 0
 "char"    : "0"              // Chars        start out being 0
]

leadIn(type) ::=
<<
/** \file
*  This <type> file was generated by $ANTLR version <ANTLRVersion>
*
*     -  From the grammar source file : <fileName>
*     -                          On : <generatedTimestamp>
<if(LEXER)>
*     -                for the lexer : <name>Lexer
<endif>
<if(PARSER)>
*     -               for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -          for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* C++ language generator and runtime by Gokulakannan Somasundaram ( heavy lifting from C Run-time by Jim
Idle )
*
*
>>

/** The overall file structure of a recognizer; stores methods for rules
```

```
*  and cyclic DFAs plus support code.
 */
outputFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
        ) ::=
<<
<leadIn("C++ source")>
*/
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<if(actions.(actionScope).header)>

/* ============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ============================================================================
*/
<endif>

/* -----------------------------------------
* Include the ANTLR3 generated header file.
*/
#include    "<name>.hpp"
<if(trace)>
#include \<iostream>
<endif>
<if(recognizer.grammar.delegators)>
// Include delegator definition header files
//
<recognizer.grammar.delegators: {g|#include "<g.recognizerName>.hpp" }; separator="\n">
<endif>

<actions.(actionScope).postinclude>
/* ----------------------------------------- */

<docComment>

<if(literals)>

<beginNamespace(actions)>
```

```
/**
 String literals used by <name> that we must do things like MATCHS() with.
*  C will normally just lay down 8 bit characters, and you can use L"xxx" to
*  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
*  we perform this little trick of defining the literals as arrays of UINT32
*  and passing in the address of these.
*/
<literals:{it | static ANTLR_UCHAR lit_<i>[]  = <it>;}; separator="\n">

<endNamespace(actions)>

<endif>

/* ============================================================================= */

/* =============================================================================
* Start of recognizer
*/

<recognizer>

/* End of code
* =============================================================================
*/

>>
headerFileExtension() ::= ".hpp"

beginNamespace(actions) ::= <%
 <if(actions.(actionScope).namespace)>
 namespace <actions.(actionScope).namespace> {
 <endif>
%>

endNamespace(actions) ::=
 <%
 <if(actions.(actionScope).namespace)>
 }
 <endif>
%>


headerFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
```

```
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
    ) ::=
<<
<leadIn("C++ header")>
<if(PARSER)>
* The parser <mainName()> has the callable functions (rules) shown below,
<endif>
<if(LEXER)>
* The lexer <mainName()> has the callable functions (rules) shown below,
<endif>
<if(TREE_PARSER)>
* The tree parser <mainName()> has the callable functions
 (rules) shown below,
<endif>
* which will invoke the code for the associated rule in the source grammar
* assuming that the input stream is pointing to a token/text stream that could begin
* this rule.
*
* For instance if you call the first (topmost) rule in a parser grammar, you will
* get the results of a full parse, but calling a rule half way through the grammar will
* allow you to pass part of a full token stream to the parser, such as for syntax checking
* in editors and so on.
*
*/
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//
```

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#ifndef _<name>_H
#define _<name>_H
<actions.(actionScope).preincludes>
/* =============================================================================
* Standard antlr3 C++ runtime definitions
*/
#include \<antlr3.hpp>

/* End of standard antlr 3 runtime definitions
* =============================================================================
*/

<actions.(actionScope).includes>

<if(recognizer.grammar.delegates)>
// Include delegate definition header files
//
<recognizer.grammar.delegates: {g|#include "<g.recognizerName>.hpp"}; separator="\n">

<endif>
```

```
<actions.(actionScope).header>

#ifdef WIN32
// Disable: Unreferenced parameter,       - Rules with parameters that are not used
//          constant conditional,       - ANTLR realizes that a prediction is always true (synpred usually)
//          initialized but unused variable     - tree rewrite variables declared but not needed
//          Unreferenced local variable      - lexer rule declares but does not always
 use _type
//          potentially unitialized variable used   - retval always returned from a rule
//   unreferenced local function has been removed - susually getTokenNames or freeScope, they can go without
warnigns
//
// These are only really displayed at warning level /W4 but that is the code ideal I am aiming at
// and the codegen must generate some of these warnings by necessity, apart from 4100, which is
// usually generated when a parser rule is given a parameter that it does not use. Mostly though
// this is a matter of orthogonality hence I disable that one.
//
#pragma warning( disable : 4100 )
#pragma warning( disable : 4101 )
#pragma warning( disable : 4127 )
#pragma warning( disable : 4189 )
#pragma warning( disable : 4505 )
#pragma warning( disable : 4701 )
#endif
<if(backtracking)>

/* ========================
* BACKTRACKING IS ENABLED
* ========================
*/
<endif>

<beginNamespace(actions)>

<if(recognizer.grammar.delegators)>
// Include delegator definition
 classes
//
<recognizer.grammar.delegators: {g|class <g.recognizerName>; }; separator="\n">
<endif>

<actions.(actionScope).traits>
typedef <name>Traits <name>ImplTraits;

<rules:{r | <if(r.ruleDescriptor.isSynPred)> struct <r.ruleDescriptor.name> {\}; <endif>}; separator="\n">

class <name>Tokens
{
```

```
public:
 /** Symbolic definitions of all the tokens that the <grammarType()> will work with.
  *
  * Antlr will define EOF, but we can't use that as it it is too common in
  * in C header files and that would be confusing. There is no way to filter this out at the moment
  * so we just undef it here for now. That isn't the value we get back from C recognizers
  * anyway. We are looking for ANTLR_TOKEN_EOF.
  */
 enum Tokens
 {
  EOF_TOKEN = <name>ImplTraits::CommonTokenType::TOKEN_EOF
  <tokens:{it | , <it.name> = <it.type> }; separator="\n">
 };

};

/** Context tracking structure for <mainName()>
*/
class <name> : public <componentBaseType()>, public <name>Tokens
{
public:
 typedef
 <name>ImplTraits ImplTraits;
 typedef <name> ComponentType;
 typedef ComponentType::StreamType StreamType;
 typedef <componentBaseType()> BaseType;
 typedef ImplTraits::RecognizerSharedStateType\<StreamType> RecognizerSharedStateType;
 typedef StreamType InputType;
<if(recognizer.filterMode)>
 static const bool IsFiltered = true;
<else>
 static const bool IsFiltered = false;
<endif>

 <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDecl(it)><endif>}>
 <rules:{r | <if(r.ruleDescriptor.ruleScope)><ruleAttributeScopeDecl(scope=r.ruleDescriptor.ruleScope)><endif>}>

private:
<if(recognizer.grammar.delegates)>
 <recognizer.grammar.delegates:
      {g|<g.recognizerName>*  m_<g:delegateName()>;}; separator="\n">
<endif>
<if(recognizer.grammar.delegators)>
 <recognizer.grammar.delegators:
      {g|<g.recognizerName>*  m_<g:delegateName()>;}; separator="\n">
<endif>
<scopes:{it | <if(it.isDynamicGlobalScope)>
   <globalAttributeScopeDef(it)>
```

```
<endif>}; separator="\n\n">
<rules:
 {r |<if(r.ruleDescriptor.ruleScope)>
   <ruleAttributeScopeDef(scope=r.ruleDescriptor.ruleScope)>
<endif>}>
   <@members>
   <@end>

public:
   <name>(InputType* instream<recognizer.grammar.delegators:{g|, <g.recognizerName>*
<g:delegateName()>}>);
   <name>(InputType* instream, RecognizerSharedStateType* state<recognizer.grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>);

   void init(InputType* instream <recognizer.grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>
);

   <actions.(actionScope).context>

<if(LEXER)>
<if(recognizer.filterMode)>
   void  memoize(ANTLR_MARKER  ruleIndex, ANTLR_MARKER  ruleParseStart);
   bool  alreadyParsedRule(ANTLR_MARKER ruleIndex);
   <filteringNextToken()>
<endif>
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)><headerReturnType(ruleDescriptor=r.ruleDescriptor)>
m<r.ruleDescriptor.name>( <r.ruleDescriptor.parameterScope:parameterScope()>);<endif>}; separator="\n">
   <rules:{r | <if(r.ruleDescriptor.isSynPred)>
  <headerReturnType(ruleDescriptor=r.ruleDescriptor)> msynpred( antlr3::ClassForwarder\<
<r.ruleDescriptor.name> > <r.ruleDescriptor.parameterScope:parameterScope()>);
   void m<r.ruleDescriptor.name>_fragment (<r.ruleDescriptor.parameterScope:parameterScope()>);<endif>};
separator="\n">
<endif>
<if(!LEXER)>
   <rules:{r | <headerReturnScope(ruleDescriptor=r.ruleDescriptor)>}>
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)> <headerReturnType(ruleDescriptor=r.ruleDescriptor)>
<r.ruleDescriptor.name> (<r.ruleDescriptor.parameterScope:parameterScope()>); <endif>}; separator="\n">
   <rules:{r | <if(r.ruleDescriptor.isSynPred)>  <headerReturnType(ruleDescriptor=r.ruleDescriptor)> msynpred(
antlr3::ClassForwarder\< <r.ruleDescriptor.name> > <r.ruleDescriptor.parameterScope:parameterScope()>);
   void m<r.ruleDescriptor.name>_fragment (<r.ruleDescriptor.parameterScope:parameterScope()>);<endif>};
separator="\n">
<! generate rule/method definitions for imported rules
 so they
  appear to be defined in this recognizer. !>
   // Delegated rules
<recognizer.grammar.delegatedRules:{ruleDescriptor|
   <headerReturnType(ruleDescriptor)>
<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">
```

```
<endif>

  const char *    getGrammarFileName();
  void            reset();
  ~<name>();

};

// Function protoypes for the constructor functions that external translation units
// such as delegators and delegates may wish to call.
//
<if(!recognizer.grammar.grammarIsRoot)>
extern ANTLR_UINT8*   <recognizer.grammar.composite.rootGrammar.recognizerName>TokenNames[];
<endif>


/* End of token definitions for <name>
* =============================================================================
*/

<endNamespace(actions)>

#endif

/* END - Note:Keep extra line feed to satisfy UNIX systems */

>>

grammarType() ::= <%
<if(PARSER)>
parser
<endif>
<if(LEXER)>
lexer
<endif>
<if(TREE_PARSER)>
tree parser
<endif>
%>

componentType()
 ::= <<
<if(PARSER)>
<name>ImplTraits::ParserType
<endif>
<if(LEXER)>
<name>ImplTraits::LexerType
<endif>
```

```
<if(TREE_PARSER)>
<name>ImplTraits::TreeParserType
<endif>
>>

componentBaseType() ::= <%
<if(PARSER)>
<name>ImplTraits::BaseParserType
<endif>
<if(LEXER)>
<name>ImplTraits::BaseLexerType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::BaseTreeParserType
<endif>
%>

streamType() ::= <<
<if(PARSER)>
<name>ImplTraits::ParserType::StreamType
<endif>
<if(LEXER)>
<name>ImplTraits::LexerType::StreamType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::TreeParserType::StreamType
<endif>
>>


mainName() ::= <%
<if(PARSER)>
<name>
<endif>
<if(LEXER)>
<name>
<endif>
<if(TREE_PARSER)>
<name>
<endif>
%>

headerReturnScope(ruleDescriptor) ::= "<returnScope(scope=ruleDescriptor.returnScope)>"

headerReturnType(ruleDescriptor) ::= <%
<if(LEXER)>
<if(!ruleDescriptor.isSynPred)>
void
```

```
<else>
<returnType()>
<endif>
<else>
<returnType()>
<endif>
%>

// Produce the lexer output
//
lexer(  grammar,
 name,
       tokens,
      scopes,
      rules,
      numRules,
      filterMode,
      superClass,
      labelType="ImplTraits::CommonTokenType*") ::= <<

using namespace antlr3;

<beginNamespace(actions)>

<if(filterMode)>

/* Override the normal MEMOIZE and HAVEALREADYPARSED macros as this is a filtering
* lexer. In filter mode, the memoizing and backtracking are gated at BACKTRACKING > 1 rather
* than just BACKTRACKING. In some cases this might generate code akin to:
*   if (BACKTRACKING) if (BACKTRACKING > 1) memoize.
*/
void <name>::memoize(ANTLR_MARKER  ruleIndex, ANTLR_MARKER  ruleParseStart)
{
 BaseType* base = this;
 if ( this->get_backtracking()>1 )
  base->memoize( ruleIndex, ruleParseStart );

}

bool <name>::alreadyParsedRule(ANTLR_MARKER ruleIndex)
{
 BaseType* base = this;
 if ( this->get_backtracking() > 1 )
  return base->haveParsedRule(ruleIndex);
 return false;
}

<endif>
```

```
/* ============================================================================
* Lexer
 matching rules end.
* ============================================================================
*/

<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<actions.lexer.members>

<name>::~<name>()
{
<if(memoize)>
 RuleMemoType* rulememo = this->getRuleMemo();
 if(rulememo != NULL)
 {
  delete rulememo;
  this->setRuleMemo(NULL);
 }
<endif>
<if(grammar.directDelegates)>
 // Free the lexers that we delegated to
 // functions to. NULL the state so we only free it once.
 //
 <grammar.directDelegates:
       {g| m_<g:delegateName()>->set_lexstate(NULL);
       delete m_<g:delegateName()>; }; separator="\n">
<endif>
}

void
<name>::reset()
{
   this->get_rec()->reset();
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
const char* <name>::getGrammarFileName()
{
 return fileName;
}
```

```
/** \brief Create a new lexer called
 <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
<name>::<name>(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
:<name>ImplTraits::BaseLexerType(ANTLR_SIZE_HINT, instream, NULL)
{
 // See if we can create a new lexer with the standard constructor
 //
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \param[state] state Previously created shared recognizer stat
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
<name>::<name>(StreamType* instream, RecognizerSharedStateType* state<grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>)
:<name>ImplTraits::BaseLexerType(ANTLR_SIZE_HINT, instream, state)
{
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}
 >);
}

void <name>::init(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>} >)
{
   /* -------------------------------------------------------------------
    * Memory for basic structure is allocated, now to fill in
    * in base ANTLR3 structures. We initialize the function pointers
    * for the standard ANTLR3 lexer function set, but upon return
    * from here, the programmer may set the pointers to provide custom
    * implementations of each function.
    *
    * We don't use the macros defined in <name>.h here so you can get a sense
    * of what goes where.
    */

<if(memoize)>
<if(grammar.grammarIsRoot)>
   // Create a LIST for recording rule memos.
```

```
  //
  this->setRuleMemo( new IntTrie(15) ); /* 16 bit depth is enough for 32768 rules! */
<endif>
<endif>

<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
      {g|m_<g:delegateName()>
 = new <g.recognizerName>(instream, this->get_lexstate(), this<grammar.delegators:{g|, <g:delegateName()>}>);};
separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to lexers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
      {g| m_<g:delegateName()> = <g:delegateName()>;}; separator="\n">
<endif>
}

<if(cyclicDFAs)>

/* ========================================================================
* DFA tables for the lexer
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* ========================================================================
* End of DFA tables for the lexer
*/
<endif>

/* ========================================================================
* Functions to match the lexer grammar defined tokens from the input stream
*/

<rules; separator="\n\n">

/* ========================================================================
* Lexer matching rules end.
* ========================================================================
 */
<if(synpreds)>

/* ========================================================================
* Lexer syntactic predicates
```

```
*/
<synpreds:{p | <lexerSynpred(predname=p)>}>
/* =============================================================================
* Lexer syntactic predicates end.
* =============================================================================
*/
<endif>

/* End of Lexer code
* ================================================
* ================================================
*/

<endNamespace(actions)>

>>


filteringNextToken() ::= <<
<name>ImplTraits::CommonTokenType*
<name>ImplTraits::TokenSourceType::nextToken()
{
  LexerType*   lexer;
  typename LexerType::RecognizerSharedStateType* state;

  lexer   = this->get_super();
  state = lexer->get_lexstate();

  /* Get rid of any previous token (token factory takes care of
   * any deallocation when this token is finally used up.

 */
  state->set_token_present( false );
  state->set_error( false );     /* Start out without an exception */
  state->set_failedflag(false);

  /* Record the start of the token in our input stream.
   */
  state->set_tokenStartCharIndex( lexer->index();
  state->set_tokenStartCharPositionInLine( lexer->getCharPositionInLine() );
  state->set_tokenStartLine( lexer->getLine() );
  state->set_text("");

  /* Now call the matching rules and see if we can generate a new token
   */
  for (;;)
  {
 if (lexer->LA(1) == ANTLR_CHARSTREAM_EOF)
```

```
 {
  /* Reached the end of the stream, nothing more to do.
   */
  CommonTokenType&    teof = m_eofToken;

  teof.set_startIndex(lexer->getCharIndex());
  teof.set_stopIndex(lexer->getCharIndex());
  teof.setLine(lexer->getLine());
  return  &teof;
  }

 state->set_token_present(false);
 state->set_error(false);     /* Start out without an exception */

 {
  ANTLR_MARKER   m;

  m = this->get_istream()->mark();
  state->set_backtracking(1);    /*
No exceptions */
  state->set_failedflag(false);

  /* Call the generated lexer, see if it can get a new token together.
   */
  lexer->mTokens();
     state->set_backtracking(0);

    <! mTokens backtracks with synpred at BACKTRACKING==2
    and we set the synpredgate to allow actions at level 1. !>

  if(state->get_failed())
  {
   lexer->rewind(m);
   lexer->consume(); <! advance one char and try again !>
  }
  else
  {
   lexer->emit();     /* Assemble the token and emit it to the stream */
   TokenType& tok = state->get_token();
   return &tok;
  }
 }
   }
}
>>

actionGate() ::= "this->get_backtracking()==0"
```

```
filteringActionGate() ::= "this->get_backtracking()==1"

/** How to generate a parser */
genericParser(  grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass,
              labelType, members, rewriteElementType,
              filterMode, ASTLabelType="ImplTraits::TreeType*")
 ::= <<

using namespace antlr3;
<if(grammar.grammarIsRoot)>
/** \brief Table of all token names in symbolic order, mainly used for
*         error reporting.
*/
ANTLR_UINT8* <name>TokenNames[<length(tokenNames)>+4]
   = {
      (ANTLR_UINT8*) "\<invalid>",       /* String to print to indicate an invalid token */
      (ANTLR_UINT8*) "\<EOR>",
      (ANTLR_UINT8*) "\<DOWN>",
      (ANTLR_UINT8*) "\<UP>",
      <tokenNames:{it |(ANTLR_UINT8*) <it>}; separator=",\n">
     };
<endif>

  <@members>

  <@end>

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
const char* <name>::getGrammarFileName()
{
 return fileName;
}
/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
<name>::<name>(
 StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
<constructorInitializerType("NULL")>
{
```

```
 // See if we can create a new parser with the standard constructor
 //
 this->init(instream<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
<name>::<name>( StreamType* instream, RecognizerSharedStateType* state<grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>)
<constructorInitializerType("state")>
{
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}>);
}

void <name>::init(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
{
  <actions.parser.apifuncs>
<if(memoize)>
<if(grammar.grammarIsRoot)>
  /* Create a LIST for recording rule memos.
   */
   typedef RecognizerSharedStateType::RuleMemoType
 RuleMemoType;
   this->setRuleMemo( new RuleMemoType(15) ); /* 16 bit depth is enough for 32768 rules! */<\n>
<endif>
<endif>
<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
      {g|m_<g:delegateName()> = new <g.recognizerName>(instream, this->get_psrstate(),
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <endif>
     <if(grammar.delegators)>
    // Install the pointers back to lexers that will delegate us to perform certain functions
    // for them.
    //
     <grammar.delegators: {g| m_<g:delegateName()> = <g:delegateName()>;}; separator="\n">
 <endif>
 /* Install the token table
 */
 this->get_psrstate()->set_tokenNames( <grammar.composite.rootGrammar.recognizerName>TokenNames );
```

```
 <@debugStuff()>

}

void
<name>::reset()
{
  this->get_rec()->reset();
}

/** Free the parser resources
*/
<name>::~<name>()
{
  <@cleanup>
  <@end>
<if(grammar.directDelegates)>
 //
 Free the parsers that we delegated to
 // functions to.NULL the state so we only free it once.
 //
 <grammar.directDelegates:
      {g| m_<g:delegateName()>->set_psrstate( NULL );
      delete m_<g:delegateName()>;}; separator="\n">
<endif>
<if(memoize)>
<if(grammar.grammarIsRoot)>
 if(this->getRuleMemo() != NULL)
 {
  delete this->getRuleMemo();
  this->setRuleMemo(NULL);
 }
<endif>
<endif>
}

/** Return token names used by this <grammarType()>
*
* The returned pointer is used as an index into the token names table (using the token
* number as the index).
*
* \return Pointer to first char * in the table.
*/
static ANTLR_UINT8** getTokenNames()
{
      return <grammar.composite.rootGrammar.recognizerName>TokenNames;
}
```

```
  <members>

/* Declare the bitsets
*/
<bitsets:{it | <bitsetDeclare(bitsetname={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
                words64=it.bits, traits={<name>ImplTraits} )>}>


<if(cyclicDFAs)>

/* ========================================================================
 * DFA tables for the parser
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* ========================================================================
* End of DFA tables for the parser
*/
<endif>

/* ============================================
* Parsing rules
*/
<rules; separator="\n\n">
<if(grammar.delegatedRules)>
 // Delegated methods that appear to be a part of this
 // parser
 //
<grammar.delegatedRules:{ruleDescriptor|
  <returnType()> <name>::<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>)
  {
     <if(ruleDescriptor.hasReturnValue)>return <endif>m_<ruleDescriptor.grammar:delegateName()>-
><ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.nam
e>}; separator=", "><endif>);
  \}}; separator="\n">

<endif>
/* End of parsing rules
* ============================================
*/

/* ============================================
 * Syntactic predicates
*/
<synpreds:{p | <synpred(predname=p)>}>
/* End of syntactic predicates
* ============================================
*/
```

```
>>

constructorInitializerType(rec_state) ::=<<
<if(PARSER)>
  :ImplTraits::BaseParserType(ANTLR_SIZE_HINT, instream, <rec_state>)
<endif>
<if(TREE_PARSER)>
  :ImplTraits::BaseTreeParserType(ANTLR_SIZE_HINT, instream, <rec_state>)
<endif>
>>

parser( grammar,
 name,
 scopes,
 tokens,
 tokenNames,
 rules,
 numRules,
 bitsets,
 ASTLabelType,
 superClass="Parser",
 labelType="const ImplTraits::CommonTokenType*",
 members={<actions.parser.members>}
 ) ::= <<
<beginNamespace(actions)>
<genericParser(inputStreamType="CommonTokenStreamType*", rewriteElementType="Token", filterMode=false,
...)>
<endNamespace(actions)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser( grammar,
  name,
  scopes,
  tokens,
  tokenNames,
  globalAction,
  rules,
  numRules,
  bitsets,
  filterMode,
  labelType={<ASTLabelType>},
  ASTLabelType="ImplTraits::TreeType*",
  superClass="TreeParser",
  members={<actions.treeparser.members>}
  )
```

```
 ::= <<
<beginNamespace(actions)>
<genericParser(inputStreamType="CommonTreeNodeStream*", rewriteElementType="Node", ...)>
<endNamespace(actions)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
void <name>::m<ruleName>_fragment( <ruleDescriptor.parameterScope:parameterScope()> )
{
 <ruleLabelDefs()>
 <ruleLabelInitializations()>
<if(trace)>
    ANTLR_PRINTF("enter <ruleName> %d failed = %d, backtracking = %d\\n", this->LT(1),failed,this-
>get_backtracking() );
   <block>
   ANTLR_PRINTF("exit <ruleName> %d, failed = %d, backtracking = %d\\n", this->LT(1),failed,this-
>get_backtracking());

<else>
   <block>
<endif>

goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
}
// $ANTLR end <ruleName>
>>

synpred(predname) ::= <<

bool <name>::msynpred( antlr3::ClassForwarder\< <predname> >  )
{
   ANTLR_MARKER   start;
   bool  success;

   this->inc_backtracking();
   <@start()>
   start = this->mark();
   this->m<predname>_fragment();     // can never throw exception
```

```
  success = !( this->get_failedflag() );
  this->rewind(start);
  <@stop()>
  this->dec_backtracking();
  this->set_failedflag(false);
  return success;
}<\n>
>>

lexerSynpred(predname) ::= <<
<synpred(predname)>
>>

ruleMemoization(rname) ::= <<
<if(memoize)>
if ( (this->get_backtracking()>0)
 && (this->haveParsedRule(<ruleDescriptor.index>)) )
{
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
 retval.start = 0;<\n>
<endif>
<endif>
  <(ruleDescriptor.actions.after):execAfter()>
  <finalCode(finalBlock=finally)>
<if(!ruleDescriptor.isSynPred)>
  <scopeClean()><\n>
<endif>
  return <ruleReturnValue()>;
}
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
if  (this->hasException())
{
  goto rule<ruleDescriptor.name>Ex;
}
<if(backtracking)>
if (this->hasFailed())
{
  <scopeClean()>
  <@debugClean()>
  return <ruleReturnValue()>;
}
<endif>
>>
```

```
/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if (this->get_backtracking()>0)
{
  this->set_failedflag( true );
  <scopeClean()>
  return <ruleReturnValue()>;
}
<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required
 for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
/**
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
<returnType()>
<name>::<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
  <if(trace)>ANTLR_PRINTF("enter <ruleName> %s failed=%d, backtracking=%d\n", this->LT(1), this-
>get_backtracking() );<endif>
  <ruleDeclarations()>
  <ruleDescriptor.actions.declarations>
  <ruleLabelDefs()>
  <ruleInitializations()>
  <ruleDescriptor.actions.init>
  <ruleMemoization(rname=ruleName)>
  <ruleLabelInitializations()>

  <if(actions.(actionScope).rulecatch)>
   try {
  <else>
  <if(exceptions)>
     try {
  <endif>
  <endif>
  <@preamble()>
  {
     <block>
  }
  <ruleCleanUp()>
```

```
<if(exceptions)>
  <(ruleDescriptor.actions.after):execAfter()>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
  <if(!emptyRule)>
   if (this->hasException())
       {
          this->preporterror();
          this->precover();
          <@setErrorReturnValue()>
       }
       <if(ruleDescriptor.actions.after)>
       else
       {
          <(ruleDescriptor.actions.after):execAfter()>
       }<\n>
       <endif>
 <if(actions.(actionScope).rulecatch)>
     } <actions.(actionScope).rulecatch>
       <endif>
  <endif>
<endif>

  <if(trace)>ANTLR_PRINTF("exit <ruleName> %d failed=%s backtracking=%s\n", this->LT(1), failed, this-
>get_backtracking() );<endif>
  <memoize()>
<if(finally)>
  <finalCode(finalBlock=finally)>
<endif>
  <scopeClean()>
  <@postamble()>
  return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
  <finalBlock>
}

>>

catch(decl,action) ::= <<
/* catch(decl,action)
*/
}catch (<e.decl>) {
  <e.action>
```

```
}
>>

ruleDeclarations() ::= <<

<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval(this);<\n>
<else>
<if(PARSER)>
  <name>ImplTraits::RuleReturnValueType
 _antlr_rule_exit(this);
<endif>
<if(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name>;
}>
<endif>
<endif>
<if(memoize)>
ANTLR_MARKER <ruleDescriptor.name>_StartIndex;
<endif>
>>

ruleInitializations() ::= <<
/* Initialize rule variables
*/
<if(ruleDescriptor.returnScope)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.returnScope.attributes:{ a | <if(a.initValue)>retval.<a.name> = <a.initValue>;<endif> }>
<else>
<ruleDescriptor.returnScope.attributes:{ a | <if(a.initValue)><a.name> = <a.initValue>;<endif> }>
<endif>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = this->index();<\n>
<endif>
<ruleDescriptor.useScopes:{it | m_<it>_stack.push(<it>Scope()); }; separator="\n">
<ruleDescriptor.ruleScope:{it | m_<it.name>_stack.push(<it.name>Scope()); }; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it |<labelType> <it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |ImplTraits::TokenPtrsListType list_<it.label.text>;}; separator="\n"
>
```

```
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
>>

ruleLabelInitializations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
retval.call_start_placeholder();
<endif>
<endif>
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<labelType> <it.label.text> = NULL;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |ANTLR_UINT32 <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | ImplTraits::IntTrieType<CommonTokenType>* list_<it.label.text>;}; separator="\n"
>
>>

lexerRuleLabelInit() ::= <<
<[ruleDescriptor.tokenListLabels,
  ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |list_<it.label.text> = new ImplTraits::IntTrieType<CommonTokenType>(31);}; separator="\n"
>
>>

lexerRuleLabelFree() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | delete list_<it.label.text>;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
```

```
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( this->get_backtracking() > 0 ) { this->memoize(<ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

ruleCleanUp() ::= <<

// This is where rules clean up and exit
//
goto
 rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
<if(!ruleDescriptor.isSynPred)>
retval.call_stop_placeholder();<\n>
<endif>
<endif>
<endif>
>>

scopeClean() ::= <<
<ruleDescriptor.useScopes:{it | m_<it>_stack.pop(); }; separator="\n">
<ruleDescriptor.ruleScope:{it | m_<it.name>_stack.pop(); }; separator="\n">

>>
/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules, which do not produce tokens.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
//   Comes from: <block.description>
/** \brief Lexer rule generated by ANTLR3
*
* $ANTLR start <ruleName>
*
```

```
* Looks to match the characters the constitute the token <ruleName>
* from the attached input stream.
*
*
* \remark
*  - lexer->error == true if an exception was thrown.
*/
void <name>::m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
  ANTLR_UINT32 _type;
   <ruleDeclarations()>
  <ruleDescriptor.actions.declarations>
  <lexerRuleLabelDefs()>
  <if(trace)>
  std::cout \<\< "enter <ruleName> '" \<\< (char)this->LA(1)
        \<\< "' line=" \<\< this->getLine() \<\< ":" \<\< this->getCharPositionInLine()
        \<\< " failed=" \<\< this->get_failedflag() \<\< " backtracking=" \<\< this->get_backtracking() \<\<
std::endl;
  <endif>

<if(nakedBlock)>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  <ruleDescriptor.actions.init>

  <block><\n>
<else>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  _type     = <ruleName>;

  <ruleDescriptor.actions.init>

  <block>
 this->get_lexstate()->set_type(_type);
<endif>
  <if(trace)>
  std::cout \<\< "exit <ruleName> '" \<\< (char)this->LA(1)
        \<\< "' line=" \<\< this->getLine() \<\< ":" \<\< this->getCharPositionInLine()
        \<\< " failed=" \<\< this->get_failedflag() \<\< " backtracking="
 \<\< this->get_backtracking() \<\< std::endl;
  <endif>
  <ruleCleanUp()>
  <lexerRuleLabelFree()>
  <(ruleDescriptor.actions.after):execAfter()>
  <memoize>
}
// $ANTLR end <ruleName>
```

```
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
/** This is the entry point in to the lexer from an object that
*  wants to generate the next token, such as a pCOMMON_TOKEN_STREAM
*/
void
<name>::mTokens()
{
  <block><\n>

  goto ruleTokensEx; /* Prevent compiler warnings */
ruleTokensEx: ;
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<

// <fileName>:<description>
{
  int alt<decisionNumber>=<maxAlt>;
  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  <@prebranch()>
  switch (alt<decisionNumber>)

  {
 <alts:{a | <altSwitchCase(i,a)>}>
  }
  <@postbranch()>
}
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
{
  //  <fileName>:<description>

  ANTLR_UINT32 alt<decisionNumber>;
```

```
  alt<decisionNumber>=<maxAlt>;

  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
 <alts:{a | <altSwitchCase(i,a)>}>
  }
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n)
 ::= <<
// <fileName>:<description>
{
  int cnt<decisionNumber>=0;
  <decls>
  <@preloop()>

  for (;;)
  {
     int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
```

```
    <alts:{a | <altSwitchCase(i,a)>}>
    default:

 if ( cnt<decisionNumber> >= 1 )
 {
    goto loop<decisionNumber>;
 }
 <ruleBacktrackFailure()>
 <earlyExitEx()>
 <@earlyExitException()>
 goto rule<ruleDescriptor.name>Ex;
}
 cnt<decisionNumber>++;
  }
  loop<decisionNumber>: ; /* Jump to here if this rule does not match */
  <@postloop()>
}
>>

earlyExitEx() ::= <<
/* mismatchedSetEx()
*/
new ANTLR_Exception\< <name>ImplTraits, EARLY_EXIT_EXCEPTION, StreamType>( this->get_rec(), "" );
<\n>
>>
positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description)
 ::= <<

// <fileName>:<description>
<decls>

<@preloop()>
for (;;)
{
  int alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
 <alts:{a | <altSwitchCase(i,a)>}>
 default:
    goto loop<decisionNumber>; /* break out of the loop */
    break;
  }
```

```
}
loop<decisionNumber>: ; /* Jump out to here if this rule does not match */
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by antlr before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
  <@prealt()>
  <alt>
  break;<\n>
>>

/**
 An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
  <@declarations()>
  <@initializations()>
  <elements:element()>
  <rew>
  <@cleanup()>
}
>>

// E L E M E N T S
/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
```

```
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> = <endif> this->matchToken(<token>, &FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
list_<label>.push_back(<elem>);
>>


/** match a character */
charRef(char,label)
 ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchc(<char>);
<checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchRange(<a>, <b>);
<checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= this->LA(1);<\n>
<else>
<label>=(<labelType>) this->LT(1);<\n>
<endif>
<endif>
if ( <s> )
```

```
{
  this->consume();
  <postmatchCode>
<if(!LEXER)>
  this->set_perror_recovery(false);
<endif>
  <if(backtracking)> this->set_failedflag(false); <\n><endif>
}
else
{
  <ruleBacktrackFailure()>
  <mismatchedSetEx()>
  <@mismatchedSetException()>
<if(LEXER)>
  this->recover();
<else>
<! use following code to make it recover inline;
  this->recoverFromMismatchedSet(&FOLLOW_set_in_<ruleName><elementIndex>);
!>
<endif>
  goto rule<ruleDescriptor.name>Ex;
}<\n>
>>

mismatchedSetEx()
 ::= <<
new ANTLR_Exception\< <name>ImplTraits, MISMATCHED_SET_EXCEPTION, StreamType>( this->get_rec(),
"" );
<if(PARSER)>
this->get_exception()->set_expectingSet(NULL);
<! use following code to make it recover inline;
this->get_exception()->set_expectingSet( &FOLLOW_set_in_<ruleName><elementIndex> );
!>
<endif>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
ANTLR_MARKER <label>Start = this->getCharIndex();
ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
```

```
ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
this->matchs(<string>);
<checkRuleBacktrackFailure()>
<label> = new CommonTokenType;
<label>->set_type( CommonTokenType::TOKEN_INVALID );
<label>->set_startIndex( <label>Start);
<label>->set_stopIndex(
 this->getCharIndex()-1);
<label>->set_input( this->get_input() );
<label>->set_line( <label>StartLine<elementIndex> );
<label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
<else>
this->matchs(<string>);
<checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=(<labelType>)this->LT(1);<\n>
<endif>
this->matchAnyToken();
<checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchAny();
<checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values. The 'rule' argument was the
*  target rule name, but now is type
```

```
 Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
this->followPush(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)>m_<scope:delegateName()>-><endif><rule.name>(<if(args)><args;
separator=", "><endif>);<\n>
this->followPop();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
/* <description> */
<if(label)>
{
  ANTLR_MARKER <label>Start<elementIndex> = this->getCharIndex();
  ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
  ANTLR_UINT32 <label>StartCharPos<elementIndex>
 = this->getCharPositionInLine();
  <if(scope)>m_<scope:delegateName()>-><endif>m<rule.name>(<if(scope)>m_<scope:delegateName()><endif>
<if(args)>, <endif><args; separator=", ">);
  <checkRuleBacktrackFailure()>
  <label> = new CommonTokenType();
  <label>->set_type( CommonTokenType::TOKEN_INVALID);
  <label>->set_startIndex( <label>Start<elementIndex> );
  <label>->set_stopIndex( this->getCharIndex()-1 );
  <label>->set_input( this->get_input() );
  <label>->set_line( <label>StartLine<elementIndex> );
  <label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
}
<else>
<if(scope)>m_<scope:delegateName()>-><endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>
```

```
/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
{
  ANTLR_UINT32 <label>Start<elementIndex>;
   ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
  ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
  <labelType> <label>;
  <label>Start<elementIndex> = this->getCharIndex();
  this->matchc(ANTLR_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <label> = new CommonTokenType();
  <label>->set_type( CommonTokenType::TOKEN_EOF );
  <label>->set_startIndex(<label>Start<elementIndex>);
  <label>->set_stopIndex(this->getCharIndex()-1);
  <label>->set_input( this->get_input() );
  <label>->set_line( <label>StartLine<elementIndex> );
  <label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
}
<else>
  this->matchc(ANTLR_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <endif>
>>

// used for left-recursive rules
recRuleDefArg()                   ::= "int <recRuleArg()>"
recRuleArg()                      ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()
            ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( this->LA(1)== CommonTokenType::TOKEN_DOWN ) {
  this->matchToken(CommonTokenType::TOKEN_DOWN, NULL);
  <checkRuleBacktrackFailure()>
  <children:element()>
```

```
  this->matchToken(CommonTokenType::TOKEN_UP, NULL);
  <checkRuleBacktrackFailure()>
}
<else>
this->matchToken(CommonTokenType::TOKEN_DOWN, NULL);
<checkRuleBacktrackFailure()>
<children:element()>
this->matchToken(CommonTokenType::TOKEN_UP, NULL);
<checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if
 ( !(<evalPredicate(...)>) )
{
  <ruleBacktrackFailure()>
  <newFPE(...)>
}
>>

newFPE() ::= <<
 ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, FAILED_PREDICATE_EXCEPTION,
StreamType>( this->get_rec(), "<description>" );
  ex->set_ruleName( "<ruleName>" );
  <\n>
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<

{
  int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
  <edges; separator="\nelse ">
  else
  {
<if(eotPredictsAlt)>
    alt<decisionNumber>=<eotPredictsAlt>;
<else>
    <ruleBacktrackFailure()>

    <newNVException()>
    goto rule<ruleDescriptor.name>Ex;
```

```
<endif>
  }
}
>>

newNVException() ::= <<
ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, NO_VIABLE_ALT_EXCEPTION,
StreamType>( this->get_rec(), "<description>" );
ex->set_decisionNum( <decisionNumber> );
ex->set_state( <stateNumber> );
<@noViableAltException()>
<\n>
>>

/** Same as a normal
 DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
  <edges; separator="\nelse ">
}
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/

dfaLoopbackStateDecls()::= <<
ANTLR_UINT32   LA<decisionNumber>_<stateNumber>;
>>
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
 /* dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
   */
  int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
  <edges; separator="\nelse "><\n>
  <if(eotPredictsAlt)>
  <if(!edges)>
 alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
 <else>
  else
```

```
  {
 alt<decisionNumber>=<eotPredictsAlt>;
  }<\n>
  <endif>
  <endif>
}
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
 ::= <<
switch ( this->LA(<k>) )
{
<edges; separator="\n">

default:
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  <newNVException()>
  goto rule<ruleDescriptor.name>Ex;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
  <edges; separator="\n">
```

```
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber>=<eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
  <targetState>
 }
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The
 <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(this, this->get_rec(), this->get_istream(),
cdfa<decisionNumber> );
<checkRuleBacktrackFailure()>
>>

/* Dump DFA tables as static initialized arrays of shorts(16 bits)/characters(8 bits)
* which are then used to statically initialize the dfa structure, which means that there
* is no runtime initialization whatsoever, other than anything the C compiler might
* need to generate. In general the C compiler will lay out memory such that there is no
* runtime code required.
*/
cyclicDFA(dfa) ::= <<
/** Static dfa state tables for Cyclic dfa:
*    <dfa.description>
*/
static const ANTLR_INT32 dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
  {
```

```
 <dfa.eot; wrap="\n", separator=", ", null="-1">
  };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
  {
 <dfa.eof; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
  {
 <dfa.min; wrap="\n", separator=", ", null="-1">
  };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
  {
 <dfa.max; wrap="\n", separator=", ", null="-1">
  };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
  {
 <dfa.accept; wrap="\n", separator=", ", null="-1">
  };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
  {
 <dfa.special; wrap="\n", separator=", ", null="-1">
  };

/** Used when there is no transition table entry for a particular state */
static const ANTLR_INT32* dfa<dfa.decisionNumber>_T_empty  =   NULL;

<dfa.edgeTransitionClassMap.keys:{ table |
static const ANTLR_INT32 dfa<dfa.decisionNumber>_T<i0>[] =
  {
 <table; separator=", ", wrap="\n", null="-1">
  \};<\n>}; null = "">

/* Transition tables are a table of sub tables, with some tables
* reused for efficiency.
 */
static const ANTLR_INT32 * const dfa<dfa.decisionNumber>_transitions[] =
{
  <dfa.transitionEdgeTables:{xref|dfa<dfa.decisionNumber>_T<xref>}; separator=", ", wrap="\n", null="NULL">
};

<@errorMethod()>

/* Declare tracking structure for Cyclic DFA <dfa.decisionNumber>
*/
class <name>CyclicDFA<dfa.decisionNumber> : public CyclicDFA\< <name>ImplTraits, <name> >, public
<name>Tokens
{
public:
```

```
 typedef CyclicDFA\< <name>ImplTraits, <name> >  BaseType;
 typedef BaseType::ContextType CtxType;

private:
<if(dfa.specialStateSTs)>
 //to maintain C-Target compatibility, we need to make some of ctx functions look like member funcs
 CtxType* m_ctx;
<endif>

public:
 <name>CyclicDFA<dfa.decisionNumber>( ANTLR_INT32 decisionNumber
    , const ANTLR_UCHAR* description
    , const ANTLR_INT32* const eot
    , const ANTLR_INT32* const eof
    , const ANTLR_INT32* const min
    , const ANTLR_INT32* const max
    , const ANTLR_INT32* const accept
    , const ANTLR_INT32* const special
    ,
 const ANTLR_INT32* const *const transition)
    :BaseType( decisionNumber, description, eot, eof, min, max, accept,
       special, transition )
 {
 <if(dfa.specialStateSTs)>
  m_ctx = NULL;
 <endif>
 }

  <if(dfa.specialStateSTs)>
  ANTLR_UINT32 LA(ANTLR_INT32 i)
  {
     return m_ctx->LA(i);
  }

  <if(PARSER)>
  const CtxType::CommonTokenType*  LT(ANTLR_INT32 k)
  {
     return m_ctx->LT(k);
  }
  <endif>
  <if(synpreds)>
  template\<typename PredType>
  bool msynpred( PredType pred )
  {
     return m_ctx->msynpred(pred);
  }
  <endif>
```

```
 ANTLR_INT32  specialStateTransition(CtxType * ctx, RecognizerType* recognizer, IntStreamType* is,
ANTLR_INT32 s)
 {
    ANTLR_INT32    _s;

    m_ctx = ctx;
    _s     = s;
    switch  (s)
    {
    <dfa.specialStateSTs:{state |
    case <i0>:

 <state>}; separator="\n">
    }
 <if(backtracking)>
    if ( ctx->get_backtracking() > 0)
    {
  ctx->set_failedflag( true );
 return -1;

   }
 <endif>
    ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, NO_VIABLE_ALT_EXCEPTION,
StreamType>( recognizer, "<dfa.description>" );
    ex->set_decisionNum( <dfa.decisionNumber> );
    ex->set_state(_s);
    <@noViableAltException()>
    return -1;
 }
 <endif>
};

static <name>CyclicDFA<dfa.decisionNumber>  cdfa<dfa.decisionNumber>(
    <dfa.decisionNumber>,      /* Decision number of this dfa     */
    /* Which decision this represents:   */
    (const ANTLR_UCHAR*)"<dfa.description>",
    dfa<dfa.decisionNumber>_eot,     /* EOT table       */
    dfa<dfa.decisionNumber>_eof,     /* EOF table       */
    dfa<dfa.decisionNumber>_min,     /* Minimum tokens for each state    */
    dfa<dfa.decisionNumber>_max,     /* Maximum tokens for each state    */
    dfa<dfa.decisionNumber>_accept, /* Accept table       */
    dfa<dfa.decisionNumber>_special, /* Special transition states     */
    dfa<dfa.decisionNumber>_transitions /* Table of transition
 tables     */

 );
```

```
/* End of Cyclic DFA <dfa.decisionNumber>
* ---------------------
*/
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
  ANTLR_UINT32 LA<decisionNumber>_<stateNumber>;<\n>
  ANTLR_MARKER index<decisionNumber>_<stateNumber>;<\n>

  LA<decisionNumber>_<stateNumber> = ctx->LA(1);<\n>
  <if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
  index<decisionNumber>_<stateNumber> = ctx->index();<\n>
  ctx->rewindLast();<\n>
  <endif>
  s = -1;
  <edges; separator="\nelse ">
 <if(semPredState)> <! return input cursor to state before we rewound !>
 ctx->seek(index<decisionNumber>_<stateNumber>);<\n>
 <endif>
  if ( s>=0 )
  {
 return s;
  }
}
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr,
 targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif> )
{
  s = <targetStateNumber>;
}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>
```

```
// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "( (<left>) && (<right>) )"

orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\"||\">)"

notPredicate(pred) ::= "!( <evalPredicate(pred,{})> )"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "this->msynpred( antlr3::ClassForwarder\<<pred>>() )"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "this->LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt)
 ::= <%
((LA<decisionNumber>_<stateNumber> >= <lower>) && (LA<decisionNumber>_<stateNumber> \<= <upper>))
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "((this->LA(<k>) >=
<lower>) && (this->LA(<k>) \<= <upper>))"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

makeScopeSet() ::= <<
/* makeScopeSet()
*/
/** Definition of the <scope.name> scope variable tracking
*  structure. An instance of this structure is created by calling
*  <name>_<scope.name>Push().
*/
struct  <scopeStruct(sname=scope.name,...)>
{
  /* =============================================================================
   * Programmer defined variables...
   */
  <scope.attributes:{it |<it.decl>;}; separator="\n">

  /* End of programmer defined variables
```

```
   * ========================================================================
   */
};

>>

globalAttributeScopeDecl(scope)
 ::= <<
<if(scope.attributes)>
/* globalAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

ruleAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

globalAttributeScopeDef(scope) ::=
<<
/* globalAttributeScopeDef(scope)
*/
<if(scope.attributes)>

StackType\< <scopeStruct(sname=scope.name)> > <scopeStack(sname=scope.name)>;

<endif>
>>

ruleAttributeScopeDef(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDef(scope)
*/
StackType\< <scopeStruct(sname=scope.name)> >  <scopeStack(sname=scope.name,...)>;

<endif>
>>

scopeStruct(sname) ::= <<
<sname>Scope
>>

scopeStack(sname) ::= <<
```

```
m_<sname>_stack
>>

returnStructName(r) ::= "<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>::<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
bool
<endif>
%>

/**
 Generate the C type associated with a single or multiple return
*  value(s).
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "0".
*/
initValue(typeName) ::= <<
= <cTypeInitMap.(typeName)>
>>
```

```
/** Define a rule label  */
ruleLabelDef(label) ::= <<
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text>;
>>
/**  Rule label default value */
ruleLabelInitVal(label) ::= <<
>>

ASTLabelType() ::=
"<if(recognizer.ASTLabelType)><recognizer.ASTLabelType><else>ImplTraits::TreeType*<endif>"

/** Define a return struct for a rule if the
 code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
struct <ruleDescriptor:returnStructName()> : public <name>ImplTraits::RuleReturnValueType
{
public:
  typedef <name>ImplTraits::RuleReturnValueType BaseType;
  <ruleDescriptor:returnStructName()>()
     : BaseType()
     <if(scope)>, <scope.attributes:{it | <it.name>() }; separator=","><endif>
     { init(); }
  <ruleDescriptor:returnStructName()>( BaseParserType* parser )
     : BaseType(parser)
     <if(scope)>, <scope.attributes:{it | <it.name>() }; separator=","><endif>
     { init(); }
  <ruleDescriptor:returnStructName()>( const <ruleDescriptor:returnStructName()>& other )
     : BaseType(other)
  <if(scope)>, <scope.attributes:{it | <it.name>(other.<it.name>) }; separator=", "><endif>
  { copy(other);
 }
  ~<ruleDescriptor:returnStructName()>()
  {
     <@ruleReturnMembersDelete()>
  }

  <ruleDescriptor:returnStructName()>&
  operator=( const <ruleDescriptor:returnStructName()>& other )
  {
     BaseType::operator=( other );
     <if(scope)><scope.attributes:{it | <it.name> = other.<it.name>; }; separator="\n"><endif>
     copy(other);
```

```
    return *this;
   }
   <@ruleReturnMembers()>
   void init() { <@ruleReturnMembersInit()> }
   void copy( const <ruleDescriptor:returnStructName()>& other) { <@ruleReturnMembersCopy()> }
<else>
struct <ruleDescriptor:returnStructName()>
{
public:
   <name>ImplTraits::<recognizer.ASTLabelType>       start;
   <name>ImplTraits::<recognizer.ASTLabelType>       stop;
   <ruleDescriptor:returnStructName()>( const <ruleDescriptor:returnStructName()>& other )
   <if(scope.attributes)>
   <scope.attributes:{it | <it.name>(other.<it.name>) }; separator=",">
   <endif>
   {
     start = other.start;
     stop
  = other.stop;
   }

   <ruleDescriptor:returnStructName()>&
   operator=( const <ruleDescriptor:returnStructName()>& other )
   {
     start = other.start;
     stop  = other.stop;

    <scope.attributes:{it | <it.name> = other.<it.name>; }; separator="\n">
    return *this;
   }
<endif>
   <if(scope)><scope.attributes:{it |<it.type> <it.name>;}; separator="\n"><endif>
};

<endif>
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name>=<expr>;"

/** Note that the scopeAttributeRef does not have access to the
* grammar name directly
*/
```

```
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
 m_<scope>_stack.at( m_<scope>_stack.size()-<negIndex>-1).<attr.name>
<else>
<if(index)>
 m_<scope>_stack.at(<index>).<attr.name>
<else>
 m_<scope>_stack.peek().<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex)
 ::= <%
<if(negIndex)>
 m_<scope>_stack.at( m_<scope>_stack.size()-<negIndex>-1).<attr.name> = <expr>;
<else>
<if(index)>
 m_<scope>_stack.at(<index>).<attr.name> = <expr>;
<else>
 m_<scope>_stack.peek().<attr.name> =<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<scope>.<attr.name>
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
>>
```

```
returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>=<expr>;
<else>
<attr.name>=<expr>;
<endif>
>>

/**
 How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach
//
tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText())"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>->get_type())"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>->get_line())"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>->get_charPositionInLine())"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>->get_channel())"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>->get_tokenIndex())"
tokenLabelPropertyRef_tree(scope,attr) ::= "(<scope>->get_tree())"
tokenLabelPropertyRef_int(scope,attr) ::= "(<name>ImplTraits::ConvertToInt32(<scope>->getText()))"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::=
 "(<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(this->get_strstream()->toStringSS(<scope>.start, <scope>.start))
<else>
(this->get_strstream()->toStringTT(<scope>.start, <scope>.stop))
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>->get_type())"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>->get_line())"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>->get_charPositionInLine())"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>->get_channel())"
```

```
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>->get_tokenIndex())"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText())"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop"
rulePropertyRef_tree(scope,attr)
 ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
this->get_input()->toStringSS( this->get_adaptor()->getTokenStartIndex(retval.start), this->get_adaptor()-
>getTokenStopIndex(retval.start))
<else>
this->get_strstream()->toStringTT(retval.start, this->LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "this->getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "this->get_state()->get_tokenStartLine()"
lexerRulePropertyRef_pos(scope,attr) ::= "this->get_state()->get_tokenStartCharPositionInLine()"
lexerRulePropertyRef_channel(scope,attr) ::= "this->get_state()->get_channel()"
lexerRulePropertyRef_start(scope,attr) ::= "this->get_state()->get_tokenStartCharIndex()"
lexerRulePropertyRef_stop(scope,attr) ::= "(this->getCharIndex()-1)"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_int(scope,attr)
 ::= "(<name>ImplTraits::ConvertToInt32(<scope>->getText()))"


// setting $st and $tree is allowed in local rule. everything else is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree=<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st=<expr>;"


/** How to deal with an @after for C targets. Because we cannot rely on
*  any garbage collection, after code is executed even in backtracking
*  mode. Must be documented clearly.
*/
execAfter(action) ::= <<
{
  <action>
}
>>

/** How to execute an action (when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
```

```
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> )
{
  <action>
}
<else>
if ( BACKTRACKING == 0 )
{
  <action>
}
<endif>
<else>
{
  <action>
}
<endif>
>>

// M I S C (properties, etc...)

bitsetDeclare(bitsetname, words64, traits) ::= <<

/** Bitset defining follow set for error recovery in rule state: <name>  */
static ANTLR_BITWORD
 <bitsetname>_bits[] = { <words64:{it |ANTLR_UINT64_LIT(<it>)}; separator=", "> };
static  <traits>::BitsetListType <bitsetname>( <bitsetname>_bits, <length(words64)> );
>>

codeFileExtension() ::= ".cpp"

true_value() ::= "true"
false_value() ::= "false"
```

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* /antlr-3-5-3-jar/org/antlr/codegen/templates/Python/AST.stg
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```
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
 */
group ASTTreeParser;

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_First[0] := nil;
_Last := nil;<\n>
>>

ruleDeclarationVars() ::= <<
<super.ruleDeclarationVars()>
_First, _Save_Last: array [0..63] of I<ASTLabelType>;
_Last: I<ASTLabelType>;
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if (State.Backtracking = 0) then
begin<endif>
<if(rewriteMode)>
RetVal.Tree := _First[0] as I<ASTLabelType>;
if (Adaptor.GetParent(RetVal.Tree) \<\> nil) and (Adaptor.IsNil(Adaptor.GetParent(RetVal.Tree))) then
 RetVal.Tree := Adaptor.GetParent(RetVal.Tree) as I<ASTLabelType>;
<endif>
<if(backtracking)>end;<endif>
>>
```

```
/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_Last := Input.LT(1)
 as I<ASTLabelType>;
begin
 _Save_Last[<treeLevel>] := _Last;
 _First[<treeLevel>] := nil;
<if(!rewriteMode)>
 Root[<treeLevel>] := Adaptor.GetNilNode as I<ASTLabelType>;<\n>
<endif>
 <root:element()>
<if(rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
<if(root.el.rule)>
 if (_First[<enclosingTreeLevel>] = nil) then _First[<enclosingTreeLevel>] := <root.el.label>.Tree;
<else>
 if (_First[<enclosingTreeLevel>] = nil) then _First[<enclosingTreeLevel>] := <root.el.label>;
<endif>
<endif>
 <actionsAfterRoot:element()>
<if(nullableChildList)>
 if (Input.LA(1) = TToken.DOWN) then
 begin
   Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
   <children:element()>
   Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
 end;
<else>
 Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
 Adaptor.AddChild(Root[<enclosingTreeLevel>],
 Root[<treeLevel>]);
<endif>
 _Last := _Save_Last[<treeLevel>];
end;<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
```

```
*/
tokenRefBang(token,label,elementIndex) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
 <label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
 Adaptor.AddChild(Root[<treeLevel>], <label>_tree);
<if(backtracking)>
end;
<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
if (_First[<treeLevel>] = nil) then _First[<treeLevel>] := <label>;
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions)
 ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
```

```
<else>
 <label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
 Root[<treeLevel>] := Adaptor.BecomeRoot(<label>_tree, Root[<treeLevel>]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_Llast := Input.LT(1) as I<ASTLabelType>;
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if
 (State.Backtracking = 0) then begin <endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
<label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
Adaptor.AddChild(Root[<treeLevel>], <label>_tree);
<if(backtracking)>end;<endif>
<endif>
}
)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(..., postmatchCode={
```

```
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then begin <endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
<label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
Root[<treeLevel>] := Adaptor.BecomeRoot(<label>_tree,
 Root[<treeLevel>]) as I<ASTLabelType>;
<if(backtracking)>end;<endif>
<endif>
}
)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
<if(!rewriteMode)>
Adaptor.AddChild(Root[<treeLevel>], <label>.Tree);
<else> <! rewrite mode !>
if (_First[<treeLevel>] = nil) then _First[<treeLevel>] := <label>.Tree;
<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[<treeLevel>] :=
Adaptor.BecomeRoot(<label>.Tree, Root[<treeLevel>]) as I<ASTLabelType>;
<endif>
>>

/**
 ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
*  change nextToken
 to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create((Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode)
<else>
(Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
RetVal.Tree := Adaptor.RulePostProcessing(Root[0]) as I<ASTLabelType>;
```

<if(backtracking)>
end;
<endif>
<endif>
>>

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Delphi/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

/*
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* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

csharpVisibilityMap ::= [
 "private":"private",
 "protected":"protected",
 "public":"public",
 "fragment":"private",

```
 default:"private"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,PARSER,TREE_PARSER, actionScope, actions,
   docComment, recognizer,
   name,
 tokens, tokenNames, rules, cyclicDFAs,
   bitsets, buildTemplate, buildAST, rewriteMode, profile,
   backtracking, synpreds, memoize, numRules,
   fileName, ANTLRVersion, generatedTimestamp, trace,
   scopes, superClass, literals) ::=
<<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

// The variable 'variable' is assigned but its value is never used.
#pragma warning disable 219
// Unreachable code detected.
#pragma warning disable 162
// Missing XML comment for publicly visible type or member 'Type_or_Member'
#pragma warning disable 1591
// CLS compliance checking will not
 be performed on 'type' because it is not visible from outside this assembly.
#pragma warning disable 3019

<actions.(actionScope).header>

<@imports>
using System.Collections.Generic;
using Antlr.Runtime;
using Antlr.Runtime.Misc;
<if(TREE_PARSER)>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
<@end>
```

```
<if(actions.(actionScope).namespace)>
namespace <actions.(actionScope).namespace>
{
<endif>
<docComment>
<recognizer>
<if(actions.(actionScope).namespace)>

} // namespace <actions.(actionScope).namespace>
<endif>
>>

lexerInputStreamType() ::= <<
<actions.(actionScope).inputStreamType; null="ICharStream">
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Lexer
<endif>},
  rewriteElementType={}, ASTLabelType={}) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar,
 actions=actions)> partial class <grammar.recognizerName> : <@superClassName><superClass><@end>
{
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">
 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.lexer.members>

 // delegates
 <grammar.delegates:
  {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 // delegators
 <grammar.delegators:
  {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>()<! needed by subclasses !>
 {
  OnCreated();
 }

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
  : this(input, new RecognizerSharedState()<grammar.delegators:{g|,
 <g:delegateName()>}>)
 {
 }
```

```
 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
  : base(input, state)
 {
<if(memoize)>
<if(grammar.grammarIsRoot)>
  state.ruleMemo = new System.Collections.Generic.Dictionary\<int, int>[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, this.state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this);}; separator="\n">
  <grammar.delegators:
   {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>

  OnCreated();
 }
 public override string GrammarFileName { get { return "<fileName>"; } }

<if(grammar.hasDelegates)>
 public override <lexerInputStreamType()> CharStream
 {
  get
  {
   return base.CharStream;
  }
  set
  {
   base.CharStream
 = value;
   <grammar.directDelegates:
    {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
   <grammar.delegators:
    {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
   <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
 }

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
<endif>
```

```
<endif>
<if(filterMode)>
 <filteringNextToken()>
<endif>


 partial void OnCreated();
 partial void EnterRule(string ruleName, int ruleIndex);
 partial void LeaveRule(string ruleName, int ruleIndex);

 <rules; separator="\n">

 <insertLexerSynpreds(synpreds)>

 #region DFA
 <cyclicDFAs:{dfa | DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber>
 = new DFA<dfa.decisionNumber>(this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif>);}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override IToken NextToken()
{
 while (true)
 {
  if (input.LA(1) == CharStreamConstants.EndOfFile)
  {
   IToken eof = new CommonToken((ICharStream)input, CharStreamConstants.EndOfFile, TokenChannels.Default,
input.Index, input.Index);
   eof.Line = Line;
```

```
  eof.CharPositionInLine = CharPositionInLine;
  return eof;
  }
  state.token = null;
  state.channel = TokenChannels.Default;
  state.tokenStartCharIndex
 = input.Index;
  state.tokenStartCharPositionInLine = input.CharPositionInLine;
  state.tokenStartLine = input.Line;
  state.text = null;
  try
  {
   int m = input.Mark();
   state.backtracking=1;<! means we won't throw slow exception !>
   state.failed=false;
   mTokens();
   state.backtracking=0;
   <! mTokens backtracks with synpred at backtracking==2
      and we set the synpredgate to allow actions at level 1. !>
   if (state.failed)
   {
    input.Rewind(m);
    input.Consume();<! advance one char and try again !>
   }
   else
   {
    Emit();
    return state.token;
   }
  }
  catch (RecognitionException re)
  {
   // shouldn't happen in backtracking mode, but...
   ReportError(re);
   Recover(re);
  }
 }
}

public override void Memoize(IIntStream input, int ruleIndex, int ruleStartIndex)
{
 if (state.backtracking > 1)
  base.Memoize(input, ruleIndex, ruleStartIndex);
}

public override bool AlreadyParsedRule(IIntStream input, int ruleIndex)
{
 if (state.backtracking > 1)
```

```
 return
 base.AlreadyParsedRule(input, ruleIndex);

 return false;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
              bitsets, inputStreamType, superClass,
              labelType, members, rewriteElementType,
              filterMode, ASTLabelType="object") ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
<if(grammar.grammarIsRoot)>
 internal static readonly string[] tokenNames = new string[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
 };
<endif>
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">

<if(grammar.delegates)>
 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName>
 <g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
<endif>

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
```

```
<if(TREE_PARSER)>
 public override void SetTreeNodeStream(ITreeNodeStream input)
 {
  base.SetTreeNodeStream(input);
  <grammar.delegates:{g|<g:delegateName()>.SetTreeNodeStream(input);}; separator="\n">
 }
<endif>
<endif>

 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <@members()>

 public override string[] TokenNames { get { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; } }
 public override string GrammarFileName { get { return "<fileName>"; } }

 <members>

 partial void
 OnCreated();
 partial void EnterRule(string ruleName, int ruleIndex);
 partial void LeaveRule(string ruleName, int ruleIndex);

 #region Rules
 <rules; separator="\n">
 #endregion Rules

<if(grammar.delegatedRules)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 #region Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 <ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)>
<ruleDescriptor.name; format="id">(<ruleDescriptor.parameterScope:parameterScope()>)<!throws
RecognitionException !>{ <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name;
format="id">(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.name;
format="id">}; separator=", "><endif>); \}}; separator="\n">
 #endregion Delegated rules
<endif>

 <insertSynpreds(synpreds)>

<if(cyclicDFAs)>
 #region DFA
 <cyclicDFAs:{dfa | private
 DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">
```

```
 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>( this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif> );}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion DFA
<endif>

<if(bitsets)>
 #region Follow sets
 private static class Follow
 {
  <bitsets:{it|<bitset(name={_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}; separator="\n">
 }
 #endregion Follow sets
<endif>
}
>>

@genericParser.members() ::= <<
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
{
}
<actions.(actionScope).ctorModifier; null="public">
 <grammar.recognizerName>(<inputStreamType> input, RecognizerSharedState state<grammar.delegators:{g|,
<g.recognizerName> <g:delegateName()>}>)
 : base(input, state)
{
<if(grammar.directDelegates)>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
<endif>
<if(grammar.indirectDelegates)>
 <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
<endif>
<if(grammar.delegators)>
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
<endif>
 <parserCtorBody()>
 OnCreated();
```

```
}
>>

// imported grammars are 'public' (can't be internal because their return scope classes must be accessible)
parserModifier(grammar, actions) ::= <<
<if(grammar.grammarIsRoot)><actions.(actionScope).modifier; null="public"><else>public<endif>
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo
 = new System.Collections.Generic.Dictionary\<int, int>[<length(grammar.allImportedRules)>+1];<\n><! index
from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Parser
<endif>}, labelType="IToken",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="IToken", filterMode=false, ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Tree.<
if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif><endif>},
        members={<actions.treeparser.members>}) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
*  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
```

```
partial void EnterRule_<ruleName>_fragment();
partial void LeaveRule_<ruleName>_fragment();

// $ANTLR start <ruleName>
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs(...)>
 EnterRule_<ruleName>_fragment();
 EnterRule("<ruleName>_fragment",
 <ruleDescriptor.index>);
 TraceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try
 {
  <block>
 }
 finally
 {
  TraceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule_<ruleName>_fragment();
 }
}
// $ANTLR end <ruleName>
>>

insertLexerSynpreds(synpreds) ::= <<
<insertSynpreds(synpreds)>
>>

insertSynpreds(synpreds) ::= <<
<if(synpreds)>
#region Synpreds
private bool EvaluatePredicate(System.Action fragment)
{
 bool success = false;
 state.backtracking++;
 <@start()>
 try { DebugBeginBacktrack(state.backtracking);
 int start = input.Mark();
 try
 {
  fragment();
 }
 catch ( RecognitionException re )
 {
  System.Console.Error.WriteLine("impossible: "+re);
```

```
 }
 success = !state.failed;
 input.Rewind(start);
 } finally { DebugEndBacktrack(state.backtracking, success); }
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return
 success;
}
#endregion Synpreds
<endif>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if (state.backtracking > 0 && AlreadyParsedRule(input, <ruleDescriptor.index>)) { <returnFromRule()> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnFromRule()><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; <returnFromRule()>}<endif>
>>

ruleWrapperMap ::= [
 "bottomup":{<ruleWrapperBottomup()>},
 "topdown":{<ruleWrapperTopdown()>},
 default:""
]

ruleWrapperBottomup() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Bottomup() { <if(buildAST)>return
<endif>bottomup(); }
<endif>
>>

ruleWrapperTopdown() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif>
 Topdown() { <if(buildAST)>return <endif>topdown(); }
<endif>
```

```
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(ruleDescriptor.returnScope)>
partial void EnterRule_<ruleName>();
partial void LeaveRule_<ruleName>();
<ruleWrapperMap.(ruleName)>
// $ANTLR start "<ruleName>"
// <fileName>:<description>
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)> <ruleName;
format="id">(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 <ruleLabelDefs(...)>
 <ruleDescriptor.actions.init>
 try { DebugEnterRule(GrammarFileName, "<ruleName>");
 DebugLocation(<ruleDescriptor.tree.line>,
 <ruleDescriptor.EORNode.charPositionInLine>);
 <@preamble()>
 try
 {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re)
 {
  ReportError(re);
  Recover(input,re);
  <@setErrorReturnValue()>
 }
```

```
<endif>
<endif>
<endif>
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
 }
 DebugLocation(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 } finally { DebugExitRule(GrammarFileName, "<ruleName>"); }
 <@postamble()>
 <returnFromRule()><\n>
}
// $ANTLR end "<ruleName>"
>>

// imported grammars need to have internal
 rules
ruleModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>internal<endif>
>>

// imported grammars need to have public return scopes
returnScopeModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>public<endif>
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
 <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new
<returnType(ruleDescriptor)>(<if(ruleDescriptor.returnScope.attributes)>this<endif>);
retval.Start = (<labelType>)input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name; format="id"> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
```

```
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.Index;
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_stack.Push(new
 <it>_scope(this));<it>_scopeInit(<it>_stack.Peek());}; separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_stack.Push(new
<it.name>_scope(this));<it.name>_scopeInit(<it.name>_stack.Peek());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_scopeAfter(<it>_stack.Peek());<it>_stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_scopeAfter(<it.name>_stack.Peek());<it.name>_stack.Pop();};
separator="\n">
>>

ruleLabelDefs(ruleDescriptor, labelType, ASTLabelType, rewriteElementType) ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wil
dcardTreeListLabels]
 :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<ruleDescriptor.tokenListLabels
 :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<[ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|List\<<ASTLabelType>\> list_<it.label.text>
 = null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:ruleLabelDef(); separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
 :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<[ruleDescriptor.charListLabels,
 ruleDescriptor.charLabels]
 :{it|int <it.label.text> = 0;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
```

```
 :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.charListLabels:{it|List\<int> list_<it.label.text> = null;}; separator="\n"
>
>>

returnFromRule() ::= <%
return
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<! This comment is a hack to make sure the following
  single space appears in the output. !> <ruleDescriptor.singleValueReturnName>
<else>
<!!>
 retval
<endif>
<endif>
<endif>
;
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.Stop = (<labelType>)input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) { Memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<

partial void EnterRule_<ruleName>();
partial void LeaveRule_<ruleName>();

// $ANTLR start "<ruleName>"
[GrammarRule("<ruleName>")]
```

```
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 try
 {
<if(nakedBlock)>
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
<else>
  int
 _type = <ruleName>;
  int _channel = DefaultTokenChannel;
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
  <ruleCleanUp()>
  state.type = _type;
  state.channel = _channel;
  <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally
 {
  TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
  <ruleScopeCleanUp()>
  <memoize()>
 }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<

public override void mTokens()
{
```

```
 <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
//
 <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterSubRule(<decisionNumber>);
try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
} finally { DebugExitSubRule(<decisionNumber>); }
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description)
 ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
```

```
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  if (cnt<decisionNumber> >= 1)
   goto loop<decisionNumber>;

  <ruleBacktrackFailure()>
  EarlyExitException
 eee<decisionNumber> = new EarlyExitException( <decisionNumber>, input );
  DebugRecognitionException(eee<decisionNumber>);
  <@earlyExitException()>
  throw eee<decisionNumber>;
 }
 cnt<decisionNumber>++;
}
loop<decisionNumber>:
```

```
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch ( alt<decisionNumber> )
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  goto loop<decisionNumber>;
 }
}

loop<decisionNumber>:
 ;

}
 finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block
```

```
/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
 <@prealt()>
 DebugEnterAlt(<altNum>);
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel,
 treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(it) ::= <%
<@prematch()>
DebugLocation(<it.line>, <it.pos>);<\n>
<it.el><\n>
%>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>Match(input,<token>,Follow._<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
```

```
>>

listLabel(label,elem) ::= <<
#error The listLabel template should not be used with this target.<\n>
>>

listLabelElem(label,elem,elemType) ::= <<
if (list_<label>==null) list_<label>=new List\<<elemType; null={<labelType>}>\>();
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/**
 match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<matchSetLabel()>
<endif>
if (<s>)
{
 input.Consume();
 <postmatchCode>
 <if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
}
else
{
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 DebugRecognitionException(mse);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(mse);
 throw mse;
```

```
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,Follow._set_in_<ruleName><elementIndex>);
 !>
<endif>
}<\n>
>>

matchSetUnchecked(s,label,elementIndex,postmatchCode=false) ::= <%
<if(label)>
<matchSetLabel()><\n>
<endif>
input.Consume();<\n>
<if(postmatchCode)>
<postmatchCode><\n>
<endif>
<if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
%>

matchSetLabel()
 ::= <%
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=(<labelType>)input.LT(1);
<endif>
%>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <%
<if(label)>
int <label>Start = CharIndex;<\n>
Match(<string>); <checkRuleBacktrackFailure()><\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(<string>); <checkRuleBacktrackFailure()><\n>
```

```
<endif>
%>

wildcard(token,label,elementIndex,terminalOptions={})
 ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(Follow._<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name;
 format="id">(<args; separator=", ">);
PopFollow();
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem=label,elemType={<ASTLabelType>},...)>
>>
```

```
/** A lexer rule reference.
*
*  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()><\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line
 = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
%>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
Match(EOF); <checkRuleBacktrackFailure()><\n>
<labelType> <label> = new <labelType>(input, EOF, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
%>

// used for left-recursive
```

```
 rules
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                       ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()           ::= "root_0=$<ruleName>_primary.tree;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down)
{
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description)
 ::= <<
if (!(<evalPredicate(...)>))
{
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
else
{
<if(eotPredictsAlt)>
 alt<decisionNumber> = <eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
```

```
 NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
 DebugRecognitionException(nvae);
 <@noViableAltException()>
 throw nvae;
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
 ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt>;<! if no edges, don't gen ELSE !>
<else>
else
{
 alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter
 to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
```

```
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<else>
 {
  <ruleBacktrackFailure()>
  NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
  DebugRecognitionException(nvae);
  <@noViableAltException()>
  throw nvae;
 }
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges;
 separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
```

```
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it|case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
try
{
 alt<decisionNumber> = dfa<decisionNumber>.Predict(input);
}
catch (NoViableAltException nvae)
{
 DebugRecognitionException(nvae);
 throw;
}
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated
 strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
private class DFA<dfa.decisionNumber> : DFA
{
 private const string DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n\t\t\"">";
```

```
 private const string DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n\t\t\"">}>";
 private static readonly string[] DFA<dfa.decisionNumber>_transitionS
 =
  {
   <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
  };

 private static readonly short[] DFA<dfa.decisionNumber>_eot =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eotS);
 private static readonly short[] DFA<dfa.decisionNumber>_eof =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eofS);
 private static readonly char[] DFA<dfa.decisionNumber>_min =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
 private static readonly char[] DFA<dfa.decisionNumber>_max =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
 private static readonly short[] DFA<dfa.decisionNumber>_accept =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
 private static readonly short[] DFA<dfa.decisionNumber>_special =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_specialS);
 private static readonly short[][] DFA<dfa.decisionNumber>_transition;

 static DFA<dfa.decisionNumber>()
 {
  int numStates = DFA<dfa.decisionNumber>_transitionS.Length;
  DFA<dfa.decisionNumber>_transition
 = new short[numStates][];
  for ( int i=0; i \< numStates; i++ )
  {
   DFA<dfa.decisionNumber>_transition[i] =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
  }
 }

 public DFA<dfa.decisionNumber>( BaseRecognizer recognizer<if(dfa.specialStateSTs)>,
SpecialStateTransitionHandler specialStateTransition<endif> )
<if(dfa.specialStateSTs)>
  : base(specialStateTransition)
<endif>
 {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
```

```
 this.eot = DFA<dfa.decisionNumber>_eot;
 this.eof = DFA<dfa.decisionNumber>_eof;
 this.min = DFA<dfa.decisionNumber>_min;
 this.max = DFA<dfa.decisionNumber>_max;
 this.accept = DFA<dfa.decisionNumber>_accept;
 this.special = DFA<dfa.decisionNumber>_special;
 this.transition = DFA<dfa.decisionNumber>_transition;
 }

 public override string Description { get { return "<dfa.description>"; } }

 public override void Error(NoViableAltException nvae)
 {
  DebugRecognitionException(nvae);
 }
}<\n>
<if(dfa.specialStateSTs)>
private
 int SpecialStateTransition<dfa.decisionNumber>(DFA dfa, int s, IIntStream _input)<! throws
NoViableAltException!>
{
 <if(LEXER)>
 IIntStream input = _input;
 <endif>
 <if(PARSER)>
 ITokenStream input = (ITokenStream)_input;
 <endif>
 <if(TREE_PARSER)>
 ITreeNodeStream input = (ITreeNodeStream)_input;
 <endif>
 int _s = s;
 s = -1;
 <! pull these outside the switch cases to save space on locals !>
 int LA<dfa.decisionNumber>_1 = input.LA(1);
 int index<dfa.decisionNumber>_1 = input.Index;
 switch (_s)
 {
 <dfa.specialStateSTs:{state |case <i0>:<! compressed special state numbers 0..n-1 !>
 <state>}; separator="\n">

 default:
  break;
 }

 if (s >= 0)
  return s;

<if(backtracking)>
```

```
 if (state.backtracking > 0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae = new NoViableAltException(dfa.Description, <dfa.decisionNumber>, _s, input);
 dfa.Error(nvae);
 throw nvae;
}
<endif>
>>

/** A state in a cyclic
 DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
<if(semPredState)>
 <! get next lookahead symbol to test edges, then rewind !>
 input.Rewind();
<endif>
 <edges; separator="\nelse ">
<if(semPredState)>
 <! return input cursor to state before we rewound !>
 input.Seek(index<decisionNumber>_1);
<endif>
 break;
}
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands)
```

```
 ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "EvaluatePredicate(<pred>_fragment)"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<k>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<k><ge()><lower> && LA<decisionNumber>_<k><le()><upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::=
"(input.LA(<k>)<ge()><lower> && input.LA(<k>)<le()><upper>)"

le() ::= "\<="
ge() ::= ">="

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

attributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected sealed partial class
 <scope.name>_scope
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">

 public <scope.name>_scope(<grammar.recognizerName> grammar) { OnCreated(grammar); }
 partial void OnCreated(<grammar.recognizerName> grammar);
}
<if(scope.actions.scopeinit)>
protected void <scope.name>_scopeInit( <scope.name>_scope scope )
{
 <scope.actions.scopeinit>
}
<else>
```

```
partial void <scope.name>_scopeInit( <scope.name>_scope scope );
<endif>
<if(scope.actions.scopeafter)>
protected void <scope.name>_scopeAfter( <scope.name>_scope scope )
{
 <scope.actions.scopeafter>
}
<else>
partial void <scope.name>_scopeAfter( <scope.name>_scope scope );
<endif>
protected readonly ListStack\<<scope.name>_scope> <scope.name>_stack = new
ListStack\<<scope.name>_scope>();
<endif>
<endif>
>>

globalAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

ruleAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

returnStructName(it) ::= "<it.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.returnScope.attributes
 && ruleDescriptor.hasMultipleReturnValues)>
 <ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
 <ruleDescriptor.singleValueReturnType>
<else>
 void
<endif>
%>

/** Generate the C# type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
 <referencedRule.singleValueReturnType>
<else>
```

```
 void
<endif>
%>

delegateName(it) ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
default(<typeName>)
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(label.referencedRule)> <label.label.text>
 = <initValue(ruleLabelType(label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
*  subgroups to stick in members.
*/
returnScope(scope) ::= <<
<if(scope.attributes && ruleDescriptor.hasMultipleReturnValues)>
<returnScopeModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> sealed partial class
<ruleDescriptor:returnStructName()> : <ruleReturnBaseType()><@ruleReturnInterfaces()>
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
 <@ruleReturnMembers()>
}
<endif>
>>

ruleReturnBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<labelType>>
%>

@returnScope.ruleReturnMembers() ::= <<
public <ruleDescriptor:returnStructName()>(<grammar.recognizerName> grammar) {OnCreated(grammar);}
partial void OnCreated(<grammar.recognizerName> grammar);
>>

parameterScope(scope) ::= <<
<scope.attributes:{it|<it.decl>}; separator=", ">
>>
```

```
parameterAttributeRef(attr)
 ::= <<
<attr.name; format="id">
>>

parameterSetAttributeRef(attr,expr) ::= <<
<attr.name; format="id"> =<expr>;
>>

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id">
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id">
<else>
<scope>_stack.Peek().<attr.name; format="id">
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id"> = <expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id"> = <expr>;
<else>
<scope>_stack.Peek().<attr.name; format="id"> = <expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.Count>0 && $function::name.Equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/**
 reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name; format="id">:<initValue(attr.type)>)
<else>
<scope>
<endif>
```

```
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id">
<else>
<attr.name; format="id">
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id"> =<expr>;
<else>
<attr.name; format="id"> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.Text:default(string))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.Type:0)"
tokenLabelPropertyRef_line(scope,attr)
 ::= "(<scope>!=null?<scope>.Line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.CharPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.Channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.TokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int.Parse(<scope>.Text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Start):default(<labelType>))"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Stop):default(<labelType>))"
ruleLabelPropertyRef_tree(scope,attr) ::=
"(<scope>!=null?((<ASTLabelType>)<scope>.Tree):default(<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(<scope>.Start),
 input.TreeAdaptor.GetTokenStopIndex(<scope>.Start))):default(string))
<else>
(<scope>!=null?input.ToString(<scope>.Start,<scope>.Stop):default(string))
```

```
<endif>
%>

ruleLabelPropertyRef_st(scope,attr)
 ::= "(<scope>!=null?<scope>.Template:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(<scope>!=null?<scope>.Type:0)"

lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(<scope>!=null?<scope>.Line:0)"

lexerRuleLabelPropertyRef_pos(scope,attr) ::=
   "(<scope>!=null?<scope>.CharPositionInLine:-1)"

lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(<scope>!=null?<scope>.Channel:0)"

lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(<scope>!=null?<scope>.TokenIndex:0)"

lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(<scope>!=null?<scope>.Text:default(string))"

lexerRuleLabelPropertyRef_int(scope,attr) ::=
   "(<scope>!=null?int.Parse(<scope>.Text):0)"

// Somebody may ref
 $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.Start"
rulePropertyRef_stop(scope,attr) ::= "retval.Stop"
rulePropertyRef_tree(scope,attr) ::= "retval.Tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start))
<else>
input.ToString(retval.Start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.Template"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
```

```
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr)
 ::= "int.Parse(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.Tree = <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.Template =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)<\n>
{<\n>
<@indentedAction()><\n>
}
<else>
<action>
<endif>
%>

@execAction.indentedAction() ::= <<
 <action>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static readonly BitSet <name> = new BitSet(new ulong[]{<words64:{it|<it>UL};separator=",">});
>>

codeFileExtension() ::= ".cs"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/CSharp3/CSharp3.stg
No license file was found, but licenses were detected in source scan.

```
/*
[The "BSD license"]
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

@outputFile.imports() ::= <<
<@super.imports()>
<if(!TREE_PARSER)><! tree parser would already have imported !>
import org.antlr.runtime.tree.*;<\n>
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
protected var adaptor:TreeAdaptor = new CommonTreeAdaptor();<\n>
override public function set treeAdaptor(adaptor:TreeAdaptor):void {
  this.adaptor = adaptor;
```

```
 <grammar.directDelegates:{g|<g:delegateName()>.treeAdaptor = this.adaptor;}>
}
override public function get treeAdaptor():TreeAdaptor {
  return adaptor;
}
>>

@returnScope.ruleReturnMembers() ::= <<
<ASTLabelType> tree;
public function get tree():Object { return tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var root_0:<ASTLabelType> = null;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it |var <it.label.text>_tree:<ASTLabelType>=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it |var <it.label.text>_tree:<ASTLabelType>=null;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new
 RewriteRuleSubtreeStream(adaptor,"rule <it>");}; separator="\n">
>>

/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = <ASTLabelType>(adaptor.nil());<\n>
<endif>
<endif>
<endif>
>>

// T r a c k i n g  R u l e  E l e m e n t s
```

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions)
 ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(label, {<label>.tree})>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope)
 ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<ruleRefRuleRootTrack(...)>
<listLabel(label, {<label>.tree})>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
  referencedWildcardLabels,
  referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels];
 separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = <ASTLabelType>(adaptor.nil());
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = <ASTLabelType>(adaptor.rulePostProcessing(root_0));
input.replaceChildren(adaptor.getParent(retval.start),
                      adaptor.getChildIndex(retval.start),
                      adaptor.getChildIndex(_last),
                      retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
```

```
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token
 <it>",<it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
  separator="\n"
>
<referencedWildcardLabels
  :{it |var  stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"wildcard
<it>",<it>);};
  separator="\n"
>
<referencedWildcardListLabels
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"wildcard
<it>",list_<it>);};
  separator="\n"
>
<referencedRuleLabels
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"token
<it>",list_<it>);};
  separator="\n"
>
>>

/** Generate code for an optional rewrite block; note
 it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
```

```
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext}; separator="||"> ) {
  <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el
 | stream_<el>.hasNext}; separator="||">) ) {
  throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
  <a.alt>
}<\n>
<else>
{
```

```
  <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
var root_<treeLevel>:<ASTLabelType> = <ASTLabelType>(adaptor.nil());
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/**
 Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot
```

```
/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>));<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>,
 <createImaginaryNode(token,terminalOptions,args)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<createImaginaryNode(token,terminalOptions,args)>,
root_<treeLevel>));<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
*  let's us refer to $rule to mean previous value.  I am reusing the
*  variable 'tree' sitting in retval struct to hold the value of root_0 right
*  before I set it during rewrites.  The assign will be to retval.tree.
*/
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>));<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.addChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action)
 ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<action>, root_<treeLevel>));<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
```

```
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>


createImaginaryNode(tokenType,terminalOptions,args)
 ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
<ASTLabelType>(adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>))
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
>>
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/ActionScript/AST.stg

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```
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*/

/** Templates for building ASTs during tree parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
 *  is combined into tokenRef, ruleRef, ...
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
```

```
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = default(<ASTLabelType>);
<ASTLabelType> _last = default(<ASTLabelType>);
<endif>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(rewriteMode)>
retval.Tree = (<ASTLabelType>)_first_0;
if (adaptor.GetParent(retval.Tree)!=null && adaptor.IsNil(adaptor.GetParent(retval.Tree)))
  retval.Tree = (<ASTLabelType>)adaptor.GetParent(retval.Tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel)
 ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = default(<ASTLabelType>);
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(root.el.rule)>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>.Tree;
<else>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down) {
```

```
  Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
  <children:element()>
  Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<enclosingTreeLevel>,
 root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
```

```
alOptions.text)>,<terminalOptions.text;
 format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree
 = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>
```

```
/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if
 (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.DupTree(<label>);
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text;
```

```
 format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>

matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text;
 format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
```

```
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<treeLevel>, <label>.Tree);
<else> <! rewrite mode !>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>.Tree;
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>

/** x+=rule auto construct
 */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
```

```
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last
 = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
<else>
<super.ruleRefTrack(...)>
<endif>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRuleRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
```

```
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now;
 override to
*  change NextToken to NextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,args) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif>stream_<token>.NextNode())
<else>
stream_<token>.NextNode()
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):
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DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
scalaTypeInitMap ::= [
 "Int":"0",
 "Long":"0",
 "Float":"0.0f",
 "Double":"0.0",
 "Boolean":"false",
 "Byte":"0",
 "Short":"0",
 "Char":"0",
 default:"null" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
* and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
         docComment, recognizer,
         name, tokens, tokenNames, rules, cyclicDFAs,

   bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
import org.antlr.runtime._
<if(TREE_PARSER)>
import org.antlr.runtime.tree._
<endif>
<@end>

```
<docComment>
<recognizer>
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
    superClass="Lexer") ::= <<
object <grammar.recognizerName> {
  <tokens:{it | val <it.name> = <it.type>}; separator="\n">

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
}

class <grammar.recognizerName>(input: CharStream, state<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>: RecognizerSharedState) extends <@superClassName><superClass><@end>(input,
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
  import <grammar.recognizerName>._
   <actions.lexer.members>

  // delegates
  <grammar.delegates:
      {g|<g.recognizerName> <g:delegateName()>}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|<g.recognizerName> <g:delegateName()>}; separator="\n">
  <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>

  def this(input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>: CharStream) =
     this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)

<if(memoize)>
<if(grammar.grammarIsRoot)>
     state.ruleMemo = new Array[java.util.Map[_,_]](<numRules>+1)<\n> <! index from 1..n !>
<endif>
<endif>
      <grammar.directDelegates:
       {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this)}; separator="\n">
      <grammar.delegators:
       {g|this.<g:delegateName()>
 = <g:delegateName()>}; separator="\n">
      <last(grammar.delegators):{g|gParent = <g:delegateName()>}>

  override def getGrammarFileName = "<fileName>"

<if(filterMode)>
```

```
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>
  <cyclicDFAs:{dfa | private val dfa<dfa.decisionNumber> = new
<grammar.recognizerName>.DFA<dfa.decisionNumber>(this)}; separator="\n">
}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
*  for matches.  No error can be generated upon error; just rewind, consume
*  a token and then try again.  backtracking needs to be set as well.
*  Make rule memoization happen only at levels above 1 as we start mTokens
*  at backtracking==1.
*/
filteringNextToken() ::= <<
override def nextToken(): Token = {
  while (true) {
     if ( input.LA(1)==CharStream.EOF ) {
        var eof: Token = new CommonToken((CharStream)input,Token.EOF,

      Token.DEFAULT_CHANNEL,
                           input.index(),input.index())
        eof.setLine(getLine())
        eof.setCharPositionInLine(getCharPositionInLine())
        return eof
     }
     state.token = null
 state.channel = Token.DEFAULT_CHANNEL
     state.tokenStartCharIndex = input.index()
     state.tokenStartCharPositionInLine = input.getCharPositionInLine()
     state.tokenStartLine = input.getLine()
 state.text = null
     try {
        val m = input.mark()
        state.backtracking=1 <! means we won't throw slow exception !>
        state.failed=false
        mTokens()
        state.backtracking=0
        <! mTokens backtracks with synpred at backtracking==2
          and we set the synpredgate to allow actions at level 1. !>
        if ( state.failed ) {
           input.rewind(m)
           input.consume() <! advance one char and try again !>
        }
        else
```

```
 {
            emit()
            return state.token
          }
      }
      catch {
         case re: RecognitionException =>
         // shouldn't happen in backtracking mode, but...
         reportError(re)
         recover(re)
      }
  }
}

override def memoize(input: IntStream,
 ruleIndex: Int,
 ruleStartIndex: Int) = {
if ( state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex)
}

override def alreadyParsedRule(input: IntStream, ruleIndex: Int):Boolean {
if ( state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex)
return false
}
>>

actionGate() ::= "state.backtracking==0"

filteringActionGate() ::= "state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
           bitsets, inputStreamType, superClass,
           labelType, members, rewriteElementType,
           filterMode, ASTLabelType="Object") ::= <<
object <grammar.recognizerName>
 {
<if(grammar.grammarIsRoot)>
  val tokenNames = Array(
     "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
  )<\n>
<endif>

  <tokens:{it | val <it.name> = <it.type>}; separator="\n">

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
```

```
                words64=it.bits)>}>
}

class <grammar.recognizerName>(input: <inputStreamType>, state<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>: RecognizerSharedState) extends <@superClassName><superClass><@end>(input, state) {
  import <grammar.recognizerName>._
  // delegates
  <grammar.delegates:
      {g|public <g.recognizerName> <g:delegateName()>}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|public <g.recognizerName> <g:delegateName()>}; separator="\n">
  <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>

   <@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
  def this(input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>: <inputStreamType>) =
     this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)

     <parserCtorBody()>
     <grammar.directDelegates:
      {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this)}; separator="\n">
     <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>};
separator="\n">
     <last(grammar.delegators):{g|gParent = <g:delegateName()>}>
  <@end>

  override def getTokenNames: Array[String] = tokenNames
  override def getGrammarFileName = "<fileName>"

  <members>

  <rules; separator="\n\n">

<! generate rule/method definitions for imported rules so they
 appear to be defined in this recognizer. !>
   // Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
  @throws(classOf[RecognitionException])
  def <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>): <returnType()> = \{
<if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope.attribut
es:{a|<a.name>}; separator=", ">) \}}; separator="\n">

  <synpreds:{p | <synpred(p)>}>
```

```
  <cyclicDFAs:{dfa | private val dfa<dfa.decisionNumber> = new
<grammar.recognizerName>.DFA<dfa.decisionNumber>(this)}; separator="\n">
}
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new Array[java.util.Map[_,_]](<length(grammar.allImportedRules)>+1)<\n> <! index from
1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="Object", superClass="Parser",
 labelType="Token",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="TokenStream", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
*  stream is a different type.
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>}
        ) ::= <<
<genericParser(inputStreamType="TreeNodeStream", rewriteElementType="Node", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
*  rules created for syntactic predicates.  As they never have return values
*  nor parameters etc..., just give simplest possible method.  Don't do
*  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
*  be in a rule by themselves.
*/
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
@throws(classOf[RecognitionException])
def <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>): Unit = {
  <ruleLabelDefs()>
```

```
<if(trace)>
  traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
  try {
     <block>
  }
  finally {
     traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  }
<else>
  <block>
<endif>
}
// $ANTLR end <ruleName>
>>

synpred(name) ::= <<
final def <name>(): Boolean = {
  state.backtracking+=1
  <@start()>
  val start = input.mark()
  try {
     <name>_fragment() // can never throw exception
  } catch {
     case re: RecognitionException =>
     System.err.println("impossible: "+re)
  }
  val success = !state.failed
  input.rewind(start)
  <@stop()>
  state.backtracking-=1
  state.failed=false
   success
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) return <ruleReturnValue()><endif>
```

```
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; return <ruleReturnValue()>}<endif>
>>

/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
// <fileName>:<description>
@throws(classOf[RecognitionException])
final
 def <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>): <returnType()> = {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>)<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  try {
     <ruleMemoization(name=ruleName)>
     <block>
     <ruleCleanUp()>
     <(ruleDescriptor.actions.after):execAction()>
  }
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  catch {
     case re: RecognitionException =>
     reportError(re)
     recover(input,re)
 <@setErrorReturnValue()>
  }<\n>
<endif>
<endif>
<endif>
  finally {
```

```
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
    <memoize()>
    <ruleScopeCleanUp()>
    <finally>
  }
  <@postamble()>

 return <ruleReturnValue()>
}
// $ANTLR end "<ruleName>"
>>

catch(decl,action) ::= <<
catch (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
val retval = new <returnType()>()
retval.start = input.LT(1)<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
var <a.name>: <a.type> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>
}>
<endif>
<if(memoize)>
val <ruleDescriptor.name>_StartIndex = input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | <it>_stack.push(new <it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | <it.name>_stack.push(new <it.name>_scope())}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | <it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | <it.name>_stack.pop()}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
   :{it | var <it.label.text>: <labelType> = null}; separator="\n"
>
```

```
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | var list_<it.label.text>: java.util.List=null}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|var <ll.label.text>: RuleReturnScope = null}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it | var <it.label.text>: <labelType>=null}; separator="\n"
>
<ruleDescriptor.charLabels:{it | int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
  :{it | var list_<it.label.text>: java.util.List=null}; separator="\n"
>
>>

ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
>>

ruleCleanUp()
 ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1)<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex) }
<endif>
<endif>
>>
```

```
/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
@throws(classOf[RecognitionException])
final def m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>): Unit = {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>)<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  try {
<if(nakedBlock)>
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      try <block><\n>
<else>
      var _type = <ruleName>

 var _channel = BaseRecognizer.DEFAULT_TOKEN_CHANNEL
      <ruleMemoization(name=ruleName)>
      <lexerRuleLabelDefs()>
      <ruleDescriptor.actions.init>
      try <block>
      <ruleCleanUp()>
      state.`type` = _type
      state.channel = _channel
      <(ruleDescriptor.actions.after):execAction()>
<endif>
  }
  finally {
      <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>)<endif>
      <ruleScopeCleanUp()>
      <memoize()>
  }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
@throws(classOf[RecognitionException])
def mTokens(): Unit = {
  <block><\n>
}
```

```
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber>
 = <maxAlt>
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
alt<decisionNumber> match {
  <alts:{a | <altSwitchCase(i,a)>}>
  case _ =>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<decision>
<@postdecision()>
alt<decisionNumber> match {
  <alts:{a | <altSwitchCase(i,a)>}>
  case _ =>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
```

```
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives
 */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
var cnt<decisionNumber>: Int = 0
<decls>
<@preloop()>
var loop<decisionNumber>_quitflag = false
while (!loop<decisionNumber>_quitflag) {
  var alt<decisionNumber>:Int = <maxAlt>
  <@predecision()>
  <decision>
  <@postdecision()>
  alt<decisionNumber> match {
     <alts:{a | <altSwitchCase(i,a)>}>
 case _ =>
    if ( cnt<decisionNumber> >= 1 ) loop<decisionNumber>_quitflag = true
    else {
    <ruleBacktrackFailure()>
        val eee = new EarlyExitException(<decisionNumber>, input)
        <@earlyExitException()>
        throw eee
    }
  }
  cnt<decisionNumber>+=1
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
//
 <fileName>:<description>
<decls>
<@preloop()>
var loop<decisionNumber>_quitflag = false
while (!loop<decisionNumber>_quitflag) {
  var alt<decisionNumber>:Int = <maxAlt>
  <@predecision()>
  <decision>
```

```
  <@postdecision()>
  alt<decisionNumber> match {
      <alts:{a | <altSwitchCase(i,a)>}>
 case _ => loop<decisionNumber>._quitflag = true
  }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> =>
  <@prealt()>
  <alt>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew)
 ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
```

```
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=<endif>`match`(input,<token>,FOLLOW_<token>_in_<ruleName><elementIndex>)<if(label)>
.asInstanceOf[<labelType>]<endif>
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new java.util.ArrayList()
list_<label>.add(<elem>)<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
`match`(<char>)
<checkRuleBacktrackFailure()>
>>

/**
 match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1)<\n>
<else>
<label>=input.LT(1).asInstanceOf[<labelType>]<\n>
```

```
<endif>
<endif>
if ( <s> ) {
  input.consume()
  <postmatchCode>
<if(!LEXER)>
  state.errorRecovery=false<\n>
<endif>
  <if(backtracking)>state.failed=false<endif>
}
else {
  <ruleBacktrackFailure()>
  val mse = new MismatchedSetException(null,input)
  <@mismatchedSetException()>
<if(LEXER)>
  recover(mse)
  throw mse
<else>
  throw mse
  <! use following code to make it recover inline; remove throw mse;
  recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>)
  !>
<endif>
}<\n>
>>

matchRuleBlockSet
 ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
val <label>Start = getCharIndex()
`match`(<string>)
<checkRuleBacktrackFailure()>
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL, <label>Start,
getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
`match`(<string>)
```

```
<checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=input.LT(1).asInstanceOf[<labelType>]<\n>
<endif>
matchAny(input)
<checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/**
 Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
matchAny()
<checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
*  and a return value or values.  The 'rule' argument was the
*  target rule name, but now is type Rule, whose toString is
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">)<\n>
state._fsp-=1
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
```

```
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
*
*
  The 'rule' argument was the target rule name, but now
*  is type Rule, whose toString is same: the rule name.
*  Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
val <label>Start<elementIndex> = getCharIndex()
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<checkRuleBacktrackFailure()>
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/**
 EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
val <label>Start<elementIndex> = getCharIndex()
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
`match`(EOF)
<checkRuleBacktrackFailure()>
val <label> = new <labelType>(input, EOF, Token.DEFAULT_CHANNEL, <label>Start<elementIndex>,
getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
`match`(EOF)
```

```
<checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                       ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()           ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root,
 actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
  `match`(input, Token.DOWN, null)
  <checkRuleBacktrackFailure()>
  <children:element()>
  `match`(input, Token.UP, null)
  <checkRuleBacktrackFailure()>
}
<else>
`match`(input, Token.DOWN, null)
<checkRuleBacktrackFailure()>
<children:element()>
`match`(input, Token.UP, null)
<checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>")
}
>>

// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
```

```
<edges;
 separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  val nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input)<\n>
  <@noViableAltException()>
  throw nvae<\n>
<endif>
}
>>

/** Same as a normal DFA state except that we don't examine lookahead
*  for the bypass alternative.  It delays error detection but this
*  is faster, smaller, and more what people expect.  For (X)? people
*  expect "if ( LA(1)==X ) match(X);" and that's it.
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer
 so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else {
  alt<decisionNumber>=<eotPredictsAlt>
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>"
```

```
/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The
 code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
<edges; separator="\n">
case _ =>
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  val nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input)<\n>
  <@noViableAltException()>
  throw nvae<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
  <edges; separator="\n">
  case _ =>
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
<edges; separator="\n"><\n>
case _ =>
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<endif>
}<\n>
>>
```

```
dfaEdgeSwitch(labels, targetState) ::= <<
case <labels:{it | <it>}; separator=" | "> =>
  {
  <targetState>
   }
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input)
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
val DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin;
 wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n    \"">}>"
val DFA<dfa.decisionNumber>_transitionS: Array[String] = Array(
      <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
)

val DFA<dfa.decisionNumber>_eot: Array[Short] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eotS)
val DFA<dfa.decisionNumber>_eof: Array[Short] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eofS)
val DFA<dfa.decisionNumber>_min: Array[Char] =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS)
val DFA<dfa.decisionNumber>_max: Array[Char] =
```

```
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS)
val DFA<dfa.decisionNumber>_accept: Array[Short] =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_acceptS)
val
 DFA<dfa.decisionNumber>_special: Array[Short] =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_specialS)
val DFA<dfa.decisionNumber>_transition = new
Array[Array[Short]](DFA<dfa.decisionNumber>_transitionS.length)

for (i \<- DFA<dfa.decisionNumber>_transition.indices) {
  DFA<dfa.decisionNumber>_transition(i) =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_transitionS(i))
}

class DFA<dfa.decisionNumber> extends DFA {

  def this(recognizer: BaseRecognizer) = {
     this()
     this.recognizer = recognizer
     this.decisionNumber = <dfa.decisionNumber>
     this.eot = DFA<dfa.decisionNumber>_eot
     this.eof = DFA<dfa.decisionNumber>_eof
     this.min = DFA<dfa.decisionNumber>_min
     this.max = DFA<dfa.decisionNumber>_max
     this.accept = DFA<dfa.decisionNumber>_accept
     this.special = DFA<dfa.decisionNumber>_special
     this.transition = DFA<dfa.decisionNumber>_transition
  }
  override def getDescription = "<dfa.description>"
   <@errorMethod()>
<if(dfa.specialStateSTs)>
  @throws(classOf[NoViableAltException])
  override def specialStateTransition(s: Int, _input: IntStream):Int = {
     <if(LEXER)>
     val input = _input
     <endif>
     <if(PARSER)>
     val input = _input.asInstanceOf[TokenStream]
     <endif>
     <if(TREE_PARSER)>
     val input = _input.asInstanceOf[TreeNodeStream]
     <endif>
   val _s = s
     s match {
     <dfa.specialStateSTs:{state |
     case <i0> => <! compressed special state numbers 0..n-1 !>
        <state>}; separator="\n">
     case _ =>
```

```
    }
<if(backtracking)>
    if (state.backtracking>0) {state.failed=true; return -1}<\n>
<endif>
    val nvae = new NoViableAltException(getDescription(), <dfa.decisionNumber>, _s, input)
    error(nvae)
    throw nvae
  }<\n>
<endif>
}<\n>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState)
 ::= <<
val LA<decisionNumber>_<stateNumber>: Int = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
val index<decisionNumber>_<stateNumber>: Int = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if ( s>=0 ) return s
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>}<\n>
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber><\n>
>>


// D F A  E X P R E S S I O N S

andPredicates(left,right)
```

```
 ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,\"\")>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
*  somewhere.  Must ask for the lookahead directly.
*/
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >=<lower>
&& input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= "<ranges; separator=\"||\">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
class <scope.name>_scope
 {
   <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
}
val <scope.name>_stack = new collection.mutable.Stack[<scope.name>_scope]<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
class <scope.name>_scope {
   <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
}
val <scope.name>_stack = new collection.mutable.Stack[<scope.name>_scope]<\n>
<endif>
>>

returnStructName(r) ::= "<r.name>_return"
```

```
returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
Unit
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
*  values.
*/
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
Unit
<endif>
<endif>
>>

delegateName(d)
 ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*  must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<scalaTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
var <label.label.text>: <ruleLabelType(referencedRule=label.referencedRule)> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))><\n>
>>

/** Define a return struct for a rule if the code needs to access its
*  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
```

```
*  subgroups to stick in members.
*  TODO(matthewllloyd): make this static
*/
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
final class <ruleDescriptor:returnStructName()> extends
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope {
  <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
  <@ruleReturnMembers()>
}
<endif>
>>

parameterScope(scope)
 ::= <<
<scope.attributes:{it | <it.name>: <it.type>}; separator=", ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack(<scope>_stack.size-<negIndex>-1).<attr.name>
<else>
<if(index)>
<scope>_stack(<index>).<attr.name>
<else>
<scope>_stack.top.<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack(<scope>_stack.size-<negIndex>-1).<attr.name> = <expr>
<else>
<if(index)>
<scope>_stack(<index>).<attr.name> = <expr>
<else>
<scope>_stack.top.<attr.name> = <expr>
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
```

```
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/**
 reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(if (<scope>!=null) <scope>.<attr.name> else <initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>
<else>
<attr.name> =<expr>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(if (<scope>!=null) <scope>.getText() else null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(if (<scope>!=null) <scope>.getType() else 0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(if (<scope>!=null)
 <scope>.getLine() else 0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(if (<scope>!=null) <scope>.getCharPositionInLine() else 0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(if (<scope>!=null) <scope>.getChannel() else 0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(if (<scope>!=null) <scope>.getTokenIndex() else 0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(if (<scope>!=null) Integer.valueOf(<scope>.getText()) else 0)"
```

```
ruleLabelPropertyRef_start(scope,attr) ::= "(if (<scope>!=null) <scope>.start.asInstanceOf[<labelType>] else null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(if (<scope>!=null) <scope>.stop.asInstanceOf[<labelType>] else null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(if (<scope>!=null) <scope>.tree.asInstanceOf[<ASTLabelType>] else
null)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(if (<scope>!=null) (input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
  input.getTreeAdaptor().getTokenStopIndex(<scope>.start))) else null)
<else>
(if (<scope>!=null) input.toString(<scope>.start,<scope>.stop) else null)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "(if (<scope>!=null) <scope>.st else null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getType() else 0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getLine() else 0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getCharPositionInLine() else -1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getChannel() else 0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getTokenIndex() else 0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
   "(if (<scope>!=null) <scope>.getText() else null)"
lexerRuleLabelPropertyRef_int(scope,attr)
 ::=
   "(if (<scope>!=null) Integer.valueOf(<scope>.getText()) else 0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(retval.start.asInstanceOf[<labelType>])"
rulePropertyRef_stop(scope,attr) ::= "(retval.stop.asInstanceOf[<labelType>])"
rulePropertyRef_tree(scope,attr) ::= "(retval.tree.asInstanceOf[<ASTLabelType>])"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
>>
```

```
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr)
 ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "Integer.valueOf(<scope>.getText())"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
val <name> = new BitSet(Array[Long](<words64:{it | <it>L};separator=",">))<\n>
>>

codeFileExtension()
 ::= ".scala"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Scala/Scala.stg
No license file was found, but licenses were detected in source scan.

```
/*
[The "BSD license"]
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*/

/** Templates for building ASTs during normal parsing.
*
*  Deal with many combinations.  Dimensions are:
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of
 combinations.
*/
group ASTParser;

@rule.setErrorReturnValue() ::= <<
RetVal.Tree := Adaptor.ErrorNode(Input, RetVal.Start as IToken,
```

```
 Input.LT(-1), RE) as I<ASTLabelType>;
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<label>_tree := <createNodeFromToken(...)>;
Adaptor.AddChild(Root[0], <label>_tree);
<if(backtracking)>
end;
<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
<label>_tree := <createNodeFromToken(...)>;
Root[0] := Adaptor.BecomeRoot(<label>_tree, Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions)
 ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>
```

```
/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label
 plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<super.matchSet(..., postmatchCode={<if(backtracking)>if (State.Backtracking = 0) then
<endif>Adaptor.AddChild(Root[0], <createNodeFromToken(...)>);})>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(label)>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
<super.matchSet(..., postmatchCode={<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[0] :=
Adaptor.BecomeRoot(<createNodeFromToken(...)>, Root[0]) as I<ASTLabelType>;})>
>>

// RULE REF
 AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
```

```
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Adaptor.AddChild(Root[0], <label>.Tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[0] := Adaptor.BecomeRoot(<label>.Tree, Root[0])
as I<ASTLabelType>;
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".Tree",...)>
>>

//
 WILDCARD AST

wildcard(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
 <label>_tree := Adaptor.CreateNode(<label>) as I<ASTLabelType>;
 Adaptor.AddChild(Root[0], <label>_tree);
<if(backtracking)>
end;
<endif>
>>
```

```
wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
 <label>_tree := Adaptor.CreateNode(<label>) as I<ASTLabelType>;
 Root[0] := Adaptor.BecomeRoot(<label>_tree, Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create(<label>) <! new MethodNode(IDLabel) !>
<else>
Adaptor.CreateNode(<label>) as I<ASTLabelType>
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>
if (State.Backtracking = 0)
 then
begin<\n>
<endif>
RetVal.Tree := Adaptor.RulePostProcessing(Root[0]) as I<ASTLabelType>;
<if(!TREE_PARSER)>
Adaptor.SetTokenBoundaries(RetVal.Tree, RetVal.Start as IToken, RetVal.Stop as IToken);
<endif>
<if(backtracking)>
<\n>end;
<endif>
>>

Found in path(s):
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*/

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
*  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
*/

parserMembers() ::= <<
 protected DebugTreeAdaptor adaptor;
 public void setTreeAdaptor(TreeAdaptor adaptor) {
<if(grammar.grammarIsRoot)>
  this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
  this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif>
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
 }
 public
 TreeAdaptor getTreeAdaptor() {
  return adaptor;
 }
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>
```

```
createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this,port,<if(TREE_PARSER)>input.getTreeAdaptor()<else>adaptor<endif>);
setDebugListener(proxy);
set<inputStreamType>(new Debug<inputStreamType>(input,proxy));
try {
 proxy.handshake();
}
catch (IOException ioe) {
 reportError(ioe);
}
>>

@ctorForRootGrammar.finally() ::= <<
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
proxy.setTreeAdaptor(adap);
>>

@ctorForProfilingRootGrammar.finally() ::=<<
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
>>

@ctorForPredefinedListener.superClassRef() ::= "super(input, dbg);"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)> <! don't create new adaptor for delegates !>
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
<endif>
>>

@rewriteElement.pregen()
 ::= "dbg.location(<e.line>,<e.pos>);"
```

Found in path(s):
* /antlr-3-5-3-jar/org/antlr/codegen/templates/Java/ASTDbg.stg

1.499 proc-log 3.0.0

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1.502 libtirpc 1.3.2-2ubuntu0.1

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1.503 failureaccess 1.0.1

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1.504 @npmcli/metavuln-calculator 7.1.1

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1.505 npm-install-checks 6.3.0

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1.506 bcpkix-fips 2.0.7

1.506.1 Available under license :

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```
/**
   * Base constructor.
   * <p>
   * The authorizer attempts to perform matching (including the use of the wildcard) in accordance with RFC 6125.
   * </p>
   * <p>
   * Known suffixes is a list of public domain suffixes that can't be used as wild cards for
   * example *.com, or c*c.com, as a dns wildcard could match every/most .com domains if a registrar were issue it.
   * If *.com is in the known suffixes list will not be allowed to match.
   * </p>
   *
   * @param knownSuffixes a set of suffixes that cannot be wild-carded, e.g. { ".com", ".net", ".org" }
   */
```

Found in path(s):
* /bcpkix-fips-2-0-7-sources-jar/org/bouncycastle/est/jcajce/JsseDefaultHostnameAuthorizer.java

1.507 amqp-client 5.25.0

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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/DefaultCredentialsRefreshService.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/TlsUtils.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/OAuth2ClientCredentialsGrantCredentialsProvider.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/CredentialsRefreshService.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/RefreshProtectedCredentialsProvider.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/OAuthTokenManagementException.java
*

/amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/UpdateSecretExtension.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/tools/jsonrpc/JsonRpcMappingException.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/TopologyRecoveryRetryHandlerBuilder.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RetryResult.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/tools/jsonrpc/JsonRpcMapper.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/BackoffPolicy.java
*
/amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/DefaultRetryHandler.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/SslEngineConfigurators.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RetryHandler.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/SocketConfigurators.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/SocketChannelConfigurators.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/CredentialsProvider.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/ErrorOnWriteListener.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RetryContext.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/WorkPoolFullException.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/tools/jsonrpc/JacksonJsonRpcMapper.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/DefaultCredentialsProvider.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/TopologyRecoveryRetryLogic.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/SocketChannelFrameHandlerState.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/NioLoop.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/MetricsCollector.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/NoOpMetricsCollector.java
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* Dropwizard Metrics implementation of {@link MetricsCollector}.
* Note transactions are not supported (see {@link MetricsCollector}.
* Metrics provides out-of-the-box support for report backends like JMX,
* Graphite, Ganglia, or plain HTTP. See Metrics documentation for
* more details.
*
* @see MetricsCollector
*/
```

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* Based on org.stringtree.json.JSONReader, licensed under APL and
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/SslEngineConfigurator.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/UnblockedCallback.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/ReturnCallback.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/BlockedCallback.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/ConfirmCallback.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/ConnectionFactoryConfigurator.java
*
/amqp-client-5-25-0-sources-jar/com/rabbitmq/client/Delivery.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/RpcWrapper.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/RpcContinuationRpcWrapper.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/ConsumerShutdownSignalCallback.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/CancelCallback.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/DeliverCallback.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/RabbitMqObservationDocumentation.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/DefaultDeliverObservationConvention.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/DeliverObservationConvention.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/PublishContext.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/PublishObservationConvention.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/NoOpObservationCollector.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/ObservationCollector.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/MicrometerObservationCollectorBuilder.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/DeliverContext.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/observation/micrometer/MicrometerObservationCollector.java
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* Micrometer provides out-of-the-box support for report backends like JMX,
* Graphite, Ganglia, Atlas, Datadog, etc. See Micrometer documentation for
* more details.
*
* Note Micrometer requires Java 8 or more, so does this {@link MetricsCollector}.
*
* @see MetricsCollector
* @since 4.3.0
*/

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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/GetResponse.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/SslEngineFrameBuilder.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RecordedExchangeBinding.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RecordedQueue.java

* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/TrustEverythingTrustManager.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/TopologyRecoveryException.java
*
 /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RecordedExchange.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/DefaultExceptionHandler.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/RecoveryListener.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/AMQConnection.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/SocketChannelConfigurator.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/ChannelManager.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RecordedNamedEntity.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/ClientVersion.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/Connection.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/Channel.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RecordedEntity.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/utility/Utility.java
*
 /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/ExternalMechanism.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/SelectorHolder.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/RecoveryCanBeginListener.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/ShutdownListener.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/QueueRecoveryListener.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/ChannelN.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/Return.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/ContentHeaderPropertyReader.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/utility/BlockingValueOrException.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/HeaderWriteRequest.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/SaslMechanism.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/SocketChannelRegistration.java
*
 /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/FrameHandler.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/ShutdownSignalException.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/Frame.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/nio/SslEngineByteBufferOutputStream.java
* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/AutorecoveringChannel.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/AMQChannel.java
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* /amqp-client-5-25-0-sources-jar/com/rabbitmq/client/impl/recovery/Utils.java
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1.508 urllib3 1.24.1

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Contributions to the urllib3 project

Creator & Maintainer

* Andrey Petrov <andrey.petrov@shazow.net>

Contributors

In chronological order:

* victor.vde <http://code.google.com/u/victor.vde/>
 * HTTPS patch (which inspired HTTPSConnectionPool)

* erikcederstrand <http://code.google.com/u/erikcederstrand/>
 * NTLM-authenticated HTTPSConnectionPool
 * Basic-authenticated HTTPSConnectionPool (merged into make_headers)

* niphlod <niphlod@gmail.com>
 * Client-verified SSL certificates for HTTPSConnectionPool
 * Response gzip and deflate encoding support
 * Better unicode support for filepost using StringIO buffers

* btoconnor <brian@btoconnor.net>
 * Non-multipart encoding for POST requests

* p.dobrogost <http://code.google.com/u/@WBRSRlBZDhBFXQB6/>
 * Code review, PEP8 compliance, benchmark fix

* kennethreitz <me@kennethreitz.com>
 * Bugfixes, suggestions, Requests integration

* georgemarshall <https://github.com/georgemarshall>
 * Bugfixes, Improvements and Test
 coverage

* Thomas Kluyver <thomas@kluyver.me.uk>
 * Python 3 support

* brandon-rhodes <http://rhodesmill.org/brandon>
 * Design review, bugfixes, test coverage.

* studer <theo.studer@gmail.com>
 * IPv6 url support and test coverage

* Shivaram Lingamneni <slingamn@cs.stanford.edu>
 * Support for explicitly closing pooled connections

* hartator <hartator@gmail.com>
 * Corrected multipart behavior for params

* Thomas Weischuh <thomas@t-8ch.de>
 * Support for TLS SNI
 * API unification of ssl_version/cert_reqs
 * SSL fingerprint and alternative hostname verification
 * Bugfixes in testsuite

* Sune Kirkeby <mig@ibofobi.dk>
 * Optional SNI-support for Python 2 via PyOpenSSL.

* Marc Schlaich <marc.schlaich@gmail.com>
 * Various bugfixes and test improvements.

* Bryce Boe <bbzbryce@gmail.com>
 * Correct six.moves conflict
 * Fixed pickle support of some exceptions

* Boris Figovsky <boris.figovsky@ravellosystems.com>
 * Allowed to skip SSL hostname verification

* Cory Benfield
 <https://lukasa.co.uk/about/>
 * Stream method for Response objects.
 * Return native strings in header values.
 * Generate 'Host' header when using proxies.

* Jason Robinson <jaywink@basshero.org>
 * Add missing WrappedSocket.fileno method in PyOpenSSL

* Audrius Butkevicius <audrius.butkevicius@elastichosts.com>
 * Fixed a race condition

* Stanislav Vitkovskiy <stas.vitkovsky@gmail.com>
 * Added HTTPS (CONNECT) proxy support

* Stephen Holsapple <sholsapp@gmail.com>
 * Added abstraction for granular control of request fields

* Martin von Gagern <Martin.vGagern@gmx.net>
 * Support for non-ASCII header parameters

* Kevin Burke <kev@inburke.com> and Pavel Kirichenko <juanych@yandex-team.ru>

* Support for separate connect and request timeouts

* Peter Waller <p@pwaller.net>
* HTTPResponse.tell() for determining amount received over the wire

* Nipunn Koorapati <nipunn1313@gmail.com>
* Ignore default ports when comparing hosts for equality

* Danilo @dbrgn <https://dbrgn.ch/>
* Disabled TLS compression by default on Python 3.2+
* Disabled TLS compression in pyopenssl contrib module
* Configurable cipher suites in pyopenssl contrib module

* Roman Bogorodskiy <roman.bogorodskiy@ericsson.com>
* Account retries on proxy errors

* Nicolas Delaby <nicolas.delaby@ezeep.com>
* Use the platform-specific CA certificate locations

* Josh Schneier <https://github.com/jschneier>
* HTTPHeaderDict and associated tests and docs
* Bugfixes, docs, test coverage

* Tahia Khan <http://tahia.tk/>
* Added Timeout examples in docs

* Arthur Grunseid <https://grunseid.com>
* source_address support and tests (with https://github.com/bui)

* Ian Cordasco <graffatcolmingov@gmail.com>
* PEP8 Compliance and Linting
* Add ability to pass socket options to an HTTP Connection

* Erik Tollerud <erik.tollerud@gmail.com>
* Support for standard library io module.

* Krishna Prasad <kprasad.iitd@gmail.com>
* Google App Engine documentation

* Aaron Meurer
<asmeurer@gmail.com>
* Added Url.url, which unparses a Url

* Evgeny Kapun <abacabadabacaba@gmail.com>
* Bugfixes

* Benjamen Meyer <bm_witness@yahoo.com>
* Security Warning Documentation update for proper capture

* Shivan Sornarajah <github@sornars.com>
 * Support for using ConnectionPool and PoolManager as context managers.

* Alex Gaynor <alex.gaynor@gmail.com>
 * Updates to the default SSL configuration

* Tomas Tomecek <ttomecek@redhat.com>
 * Implemented generator for getting chunks from chunked responses.

* tlynn <https://github.com/tlynn>
 * Respect the warning preferences at import.

* David D. Riddle <ddriddle@illinois.edu>
 * IPv6 bugfixes in testsuite

* Thea Flowers <magicalgirl@google.com>
 * App Engine environment tests.
 * Documentation re-write.

* John Krauss <https://github.com/talos>
 * Clues to debugging problems with `cryptography` dependency in docs

* Disassem <https://github.com/Disassem>
 * Fix pool-default headers not applying for url-encoded
 requests like GET.

* James Atherfold <jlatherfold@hotmail.com>
 * Bugfixes relating to cleanup of connections during errors.

* Christian Pedersen <https://github.com/chripede>
 * IPv6 HTTPS proxy bugfix

* Jordan Moldow <https://github.com/jmoldow>
 * Fix low-level exceptions leaking from ``HTTPResponse.stream()``.
 * Bugfix for ``ConnectionPool.urlopen(release_conn=False)``.
 * Creation of ``HTTPConnectionPool.ResponseCls``.

* Predrag Gruevski <https://github.com/obi1kenobi>
 * Made cert digest comparison use a constant-time algorithm.

* Adam Talsma <https://github.com/a-tal>
 * Bugfix to ca_cert file paths.

* Evan Meagher <https://evanmeagher.net>
 * Bugfix related to `memoryview` usage in PyOpenSSL adapter

* John Vandenberg <jayvdb@gmail.com>

* Python 2.6 fixes; pyflakes and pep8 compliance

* Andy Caldwell <andy.m.caldwell@googlemail.com>
 * Bugfix related to reusing connections in indeterminate states.

* Ville Skytt <ville.skytta@iki.fi>
 * Logging efficiency
 improvements, spelling fixes, Travis config.

* Shige Takeda <smtakeda@gmail.com>
 * Started Recipes documentation and added a recipe about handling concatenated gzip data in HTTP response

* Jesse Shapiro <jesse@jesseshapiro.net>
 * Various character-encoding fixes/tweaks
 * Disabling IPv6 DNS when IPv6 connections not supported

* David Foster <http://dafoster.net/>
 * Ensure order of request and response headers are preserved.

* Jeremy Cline <jeremy@jcline.org>
 * Added connection pool keys by scheme

* Aviv Palivoda <palaviv@gmail.com>
 * History list to Retry object.
 * HTTPResponse contains the last Retry object.

* Nate Prewitt <nate.prewitt@gmail.com>
 * Ensure timeouts are not booleans and greater than zero.
 * Fixed infinite loop in ``stream`` when amt=None.
 * Added length_remaining to determine remaining data to be read.
 * Added enforce_content_length to raise exception when incorrect content-length received.

* Seth Michael Larson <sethmichaellarson@protonmail.com>
 * Created selectors backport that supports PEP 475.

* Alexandre Dias <alex.dias@smarkets.com>
 * Don't retry on timeout if method not in whitelist

* Moinuddin Quadri <moin18@gmail.com>
 * Lazily load idna package

* Tom White <s6yg1ez3@mail2tor.com>
 * Made SOCKS handler differentiate socks5h from socks5 and socks4a from socks4.

* Tim Burke <tim.burke@gmail.com>
 * Stop buffering entire deflate-encoded responses.

* Tuukka Mustonen <tuukka.mustonen@gmail.com>

* Add counter for status_forcelist retries.

* Erik Rose <erik@mozilla.com>
 * Bugfix to pyopenssl vendoring

* Wolfgang Richter <wolfgang.richter@gmail.com>
 * Bugfix related to loading full certificate chains with PyOpenSSL backend.

* Mike Miller <github@mikeage.net>
 * Logging improvements to include the HTTP(S) port when opening a new connection

* Ioannis Tziakos <mail@itziakos.gr>
 * Fix ``util.selectors._fileobj_to_fd`` to accept ``long``.
 * Update appveyor tox setup to use the 64bit python.

* Akamai
 (through Jesse Shapiro) <jshapiro@akamai.com>
 * Ongoing maintenance

* Dominique Leuenberger <dimstar@opensuse.org>
 * Minor fixes in the test suite

* Will Bond <will@wbond.net>
 * Add Python 2.6 support to ``contrib.securetransport``

* Aleksei Alekseev <alekseev.yeskela@gmail.com>
 * using auth info for socks proxy

* Chris Wilcox <git@crwilcox.com>
 * Improve contribution guide
 * Add ``HTTPResponse.geturl`` method to provide ``urllib2.urlopen().geturl()`` behavior

* Bruce Merry <https://www.brucemerry.org.za>
 * Fix leaking exceptions when system calls are interrupted with zero timeout

* Hugo van Kemenade <https://github.com/hugovk>
 * Drop support for EOL Python 2.6

* Tim Bell <https://github.com/timb07>
 * Bugfix for responses with Content-Type: message/* logging warnings

* Justin Bramley <https://github.com/jbramleycl>
 * Add ability to handle multiple Content-Encodings

* [Your name or handle] <[email or website]>
 * [Brief summary of your changes]

1.509 aspect-j 1.8.13

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1.514 ubuntu-keyring 2021.03.26

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1.515 jakarta-validation-api 2.0.2

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 ~
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* /jakarta-validation-api-2-0-2-sources-3-jar/META-INF/maven/jakarta.validation/jakarta.validation-api/pom.xml
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*
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* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Validator.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/CascadableDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintTarget.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/FutureOrPresent.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Null.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintValidatorContext.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ExecutableDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/groups/Default.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/MessageInterpolator.java
*
 /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/valueextraction/Unwrapping.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/valueextraction/ValueExtractor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraintvalidation/ValidationTarget.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/MethodDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/UnexpectedTypeException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/BeanDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Digits.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/bootstrap/ProviderSpecificBootstrap.java
*
 /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/valueextraction/UnwrapByDefault.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/NegativeOrZero.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintViolation.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintDefinitionException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ValidateUnwrappedValue.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraintvalidation/SupportedValidationTarget.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/groups/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/spi/ValidationProvider.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ElementKind.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/GroupConversionDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/valueextraction/ExtractedValue.java
*
 /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/bootstrap/GenericBootstrap.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/MethodType.java
* /jakarta-validation-api-2-0-2-sources-3-
jar/javax/validation/valueextraction/ValueExtractorDeclarationException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ConstructorDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraintvalidation/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/AssertTrue.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Path.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/executable/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/valueextraction/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/PositiveOrZero.java

*
 /jakarta-validation-api-2-0-2-sources-3-
jar/javax/validation/valueextraction/ValueExtractorDefinitionException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/BootstrapConfiguration.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ElementDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ContainerElementTypeDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/GroupDefinitionException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Min.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/groups/ConvertGroup.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/Scope.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Max.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ReportAsSingleViolation.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ReturnValueDescriptor.java
*
 /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ParameterNameProvider.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Pattern.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/NoProviderFoundException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Validation.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ValidatorContext.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/NotBlank.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/spi/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Constraint.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Valid.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/CrossParameterDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ClockProvider.java
*
 /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Configuration.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/executable/ValidateOnExecution.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Size.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/PastOrPresent.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintViolationException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/bootstrap/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/TraversableResolver.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/executable/ExecutableValidator.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ValidationProviderResolver.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ValidatorFactory.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ContainerDescriptor.java
*
 /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ConstraintDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/ParameterDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/NotNull.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/package-info.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/GroupSequence.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Negative.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintValidatorFactory.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ValidationException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/OverridesAttribute.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/spi/BootstrapState.java

* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Email.java
*
/jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintDeclarationException.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/metadata/PropertyDescriptor.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/ConstraintValidator.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/executable/ExecutableType.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/AssertFalse.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Future.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/DecimalMax.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Positive.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/NotEmpty.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/spi/ConfigurationState.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/Payload.java
*
/jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/DecimalMin.java
* /jakarta-validation-api-2-0-2-sources-3-jar/javax/validation/constraints/Past.java

1.516 kotlin 1.9.10

1.516.1 Available under license :

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1.517 ignite-core 2.13.0

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// --
// List of ignite-core module's dependencies provided as a part of this distribution.
// --

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1.518 coreutils 8.32-4.1ubuntu1.2

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]
# spdx-license-ids

[![npm version](https://img.shields.io/npm/v/spdx-license-ids.svg)](https://www.npmjs.com/package/spdx-license-ids)
[![Github Actions](https://action-badges.now.sh/jslicense/spdx-license-ids)](https://wdp9fww0r9.execute-api.us-west-2.amazonaws.com/production/results/jslicense/spdx-license-ids)

A list of [SPDX license](https://spdx.org/licenses/) identifiers
```

Installation

[Download JSON directly](https://raw.githubusercontent.com/jslicense/spdx-license-ids/main/index.json), or [use](https://docs.npmjs.com/cli/install) [npm](https://docs.npmjs.com/about-npm/):

```
npm install spdx-license-ids
```

[Node.js](https://nodejs.org/) API

require('spdx-license-ids')

Type: `string[]`

All license IDs except for the currently deprecated ones.

```javascript
const ids = require('spdx-license-ids');
//=> ['0BSD', 'AAL', 'ADSL', 'AFL-1.1', 'AFL-1.2', 'AFL-2.0', 'AFL-2.1', 'AFL-3.0', 'AGPL-1.0-only', ...]

ids.includes('BSD-3-Clause'); //=> true
ids.includes('CC-BY-1.0');
 //=> true

ids.includes('GPL-3.0'); //=> false
```

require('spdx-license-ids/deprecated')

Type: `string[]`

Deprecated license IDs.

```javascript
const deprecatedIds = require('spdx-license-ids/deprecated');
//=> ['AGPL-1.0', 'AGPL-3.0', 'GFDL-1.1', 'GFDL-1.2', 'GFDL-1.3', 'GPL-1.0', 'GPL-2.0', ...]

deprecatedIds.includes('BSD-3-Clause'); //=> false
deprecatedIds.includes('CC-BY-1.0'); //=> false

deprecatedIds.includes('GPL-3.0'); //=> true
```

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1.521 libsemanage-common 3.3-1build2

1.521.1 Available under license :

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Version 2.1, February 1999

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* /accessors-smart-1-2-sources-5-jar/net/minidev/asm/Accessor.java
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Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple2,
    or consider a pattern matching anonymous function: `{ case (a, b) => ... }
 val x: ((Int, Int) => Int) = (((a, b)) => a)
                              ^
not-a-legal-formal-parameter-tuple.scala:3: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple2,
    or consider a pattern matching anonymous function: `{ case (param1, param2) => ... }
 val y: ((Int, Int, Int) => Int) = (((a, !!)) => a)
                                   ^
not-a-legal-formal-parameter-tuple.scala:4: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the
 Tuple3,
    or consider a pattern matching anonymous function: `{ case (param1, ..., param3) => ... }
```

```
 val z: ((Int, Int, Int) => Int) = (((a, NotAPatternVariableName, c)) => a)
                                    ^
three errors found
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limitations under the License.

The dotty compiler frontend has been developed since November 2012 by Martin
Odersky. It is expected and hoped for that the list of contributors to the
codebase will grow quickly. Dotty draws inspiration and code from the original
Scala compiler "nsc", which is developed at scala/scala [1].

The majority of the dotty codebase is new code, with the exception of the
components mentioned below. We have for each component tried to come up with a
list of the original authors in the scala/scala
 [1] codebase. Apologies if some
major authors were omitted by oversight.

 * dotty.tools.dotc.ast: The syntax tree handling is mostly new, but some
   elements, such as the idea of tree copiers and the `TreeInfo` module,
   were adopted from scala/scala [1]. The original authors of these parts
   include Martin Odersky, Paul Phillips, Adriaan Moors, and Matthias Zenger.

 * dotty.tools.dotc.classpath: The classpath handling is taken mostly as is
   from scala/scala [1]. The original authors were Grzegorz Kossakowski,
   Micha Pociecha, Lukas  Rytz, Jason Zaugg and others.

 * dotty.tools.dotc.config: The configuration components were adapted and
   extended from scala/scala [1]. The original sources were authored by Paul
   Phillips with contributions from Martin Odersky, Miguel Garcia and others.

 * dotty.tools.dotc.core: The core data structures and operations are mostly
   new. Some parts (e.g. those dealing with names) were adapted from
   scala/scala [1]. These were
 originally authored by Martin Odersky, Adriaan
   Moors, Jason Zaugg, Paul Phillips, Eugene Burmako and others.

 * dotty.tools.dotc.core.pickling: The classfile readers were adapted from the
   current Scala compiler. Original authors were Martin Odersky, Iulian
```

Dragos, Matthias Zenger and others.

* dotty.tools.dotc.parsing: The lexical and syntactic analysis components
were adapted from the current Scala compiler. They were originally authored
by Martin Odersky, Burak Emir, Paul Phillips, Lex Spoon, Sean McDirmid and
others.

* dotty.tools.dotc.profile: The per-phase profiling support is taken mostly
as is from scala/scala. The original author was Mike Skells.

* dotty.tools.dotc.reporting: Adapted from scala/scala [1] with some heavy
modifications. They were originally authored by Matthias Zenger, Martin
Odersky, and others.

* dotty.tools.dotc.typer: This is new code except for some minor components
(e.g. the ConstantFolder). It uses however
many solution details that have
been developed over time by many people, including Jason Zaugg, Adriaan
Moors, Lukas Rytz, Paul Phillips, Grzegorz Kossakowski, and others.

* dotty.tools.dotc.util: The utilities package is a mix of new and adapted
components. The files in scala/scala [1] were originally authored by many
people, including Paul Phillips, Martin Odersky, Sean McDirmid, and others.

* dotty.tools.io: The I/O support library was adapted from current Scala
compiler. Original authors were Paul Phillips and others.

* dotty.test.DottyBytecodeTest: Is an adaptation of the bytecode testing from
scala/scala [1]. It has been reworked to fit the needs of dotty. Original
authors include: Adrian Moors, Lukas Rytz, Grzegorz Kossakowski, Paul
Phillips.

* dotty.tools.dotc.sbt and everything in sbt-bridge: The sbt compiler phases
are based on [2] which attempts to integrate the sbt phases into scalac and
is itself based on the compiler
bridge in sbt 0.13 [3], but has been
heavily adapted and refactored. Original authors were Mark Harrah, Grzegorz
Kossakowski, Martin Duhemm, Adriaan Moors and others.

* dotty.tools.dotc.plugins: Adapted from scala/scala [1] with some
modifications. They were originally authored by Lex Spoon, Som Snytt,
Adriaan Moors, Paul Phillips and others.

* dotty.tools.scaladoc: The Scaladoc documentation utility ships some
third-party JavaScript and CSS libraries which are located under
scaladoc/resources/dotty_res/styles/, scaladoc/resources/dotty_res/scripts/, docs/css/ and
docs/js/. Please refer to the license header of the concerned files for
details.

* dotty.tools.dotc.coverage: Coverage instrumentation utilities have been
  adapted from the scoverage plugin for scala 2 [5], which is under the
  Apache 2.0 license.

* The Dotty codebase contains parts which are derived from
  the ScalaPB protobuf library [4], which is under the Apache 2.0 license.

[1]
https://github.com/scala/scala
[2] https://github.com/adriaanm/scala/tree/sbt-api-consolidate/src/compiler/scala/tools/sbt
[3] https://github.com/sbt/sbt/tree/0.13/compile/interface/src/main/scala/xsbt
[4] https://github.com/lampepfl/dotty/pull/5783/files
[5] https://github.com/scoverage/scalac-scoverage-plugin

1.530 just-diff-apply 5.5.0

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1.532 bash 5.1-6ubuntu1.1

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Jackson JSON processor

Jackson is a high-performance, Free/Open Source JSON processing library.
It was originally written by Tatu Saloranta (tatu.saloranta@iki.fi), and has
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It is currently developed by a community of developers.

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Ext headers	GL/glext.h	Khronos
	GL/glxext.h	Khronos
	GL/wglext.h	Khronos
	KHR/khrplatform.h	Khronos

****

---
include/GL/gl.h :

Mesa 3-D
graphics library

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****

---
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include/GL/glxext.h
include/GL/wglxext.h :

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## GIFLIB v5.2.2

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tree/README

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tree/openbsd-reallocarray.c

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1.537 jackson-datatype-joda 2.4.5

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1.538 pekko-http_3 1.0.0

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validate-npm-package-license
============================

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```javascript
var valid = require('validate-npm-package-license');
```

SPDX license identifiers are valid license strings:

```javascript

var assert = require('assert');
var validSPDXExpression = {
 validForNewPackages: true,
 validForOldPackages: true,
 spdx: true
};

assert.deepEqual(valid('MIT'), validSPDXExpression);
assert.deepEqual(valid('BSD-2-Clause'), validSPDXExpression);
assert.deepEqual(valid('Apache-2.0'), validSPDXExpression);
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```

The function will return a warning and suggestion for nearly-correct license identifiers:

```javascript
assert.deepEqual(
 valid('Apache 2.0'),
 {
  validForOldPackages: false,
  validForNewPackages: false,
  warnings: [
   'license should be ' +
   'a valid SPDX license expression (without "LicenseRef"), ' +
   '"UNLICENSED", or ' +
    '"SEE LICENSE IN <filename>"',
   'license is similar to the valid expression "Apache-2.0"'
  ]
 }
);
```

SPDX expressions are valid, too ...

```javascript
// Simple SPDX license expression for dual licensing
assert.deepEqual(
 valid('(GPL-3.0-only OR BSD-2-Clause)'),
 validSPDXExpression
);
```

... except if they contain `LicenseRef`:

```javascript
var warningAboutLicenseRef = {
 validForOldPackages: false,
 validForNewPackages: false,
 spdx: true,
 warnings: [
  'license should be ' +
  'a valid SPDX license expression (without "LicenseRef"), ' +
  '"UNLICENSED", or ' +
  '"SEE LICENSE IN <filename>"',
 ]
};

assert.deepEqual(
 valid('LicenseRef-Made-Up'),
 warningAboutLicenseRef
);

assert.deepEqual(
 valid('(MIT OR LicenseRef-Made-Up)'),
 warningAboutLicenseRef
);
```

If you can't describe your licensing terms with standardized SPDX identifiers, put the terms in a file in the package and point users there:

```javascript
assert.deepEqual(
 valid('SEE
 LICENSE IN LICENSE.txt'),
 {
  validForNewPackages: true,
  validForOldPackages: true,
  inFile: 'LICENSE.txt'
```

```
 }
);

assert.deepEqual(
 valid('SEE LICENSE IN license.md'),
 {
   validForNewPackages: true,
   validForOldPackages: true,
   inFile: 'license.md'
 }
);
```

If there aren't any licensing terms, use `UNLICENSED`:

```javascript
var unlicensed = {
 validForNewPackages: true,
 validForOldPackages: true,
 unlicensed: true
};
assert.deepEqual(valid('UNLICENSED'), unlicensed);
assert.deepEqual(valid('UNLICENCED'), unlicensed);
```

1.540 npm-audit-report 5.0.0

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1.541 go.mongodb.org-mongo-driver 1.17.4

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1.546 acl 2.3.1-1

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1.558 python-certifi 2019.03.09

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file (certdata.txt). This file can be found in the mozilla source tree:
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##
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(For example, a function in a library to compute square roots has

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Section 6 states terms for distribution of such executables.

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Whether this is true is especially significant if the work can be
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threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data
structure layouts and accessors, and small macros and small inline
functions (ten lines or less in length), then the use of the object
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1.571 xxhash 0.8.1-1

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/json-smart-2-3-sources-6-jar/net/minidev/json/writer/DefaultMapperOrdered.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/JSONObject.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/writer/JsonReader.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/JSONArray.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/JStylerObj.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/writer/DefaultMapperCollection.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserString.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/writer/ArraysMapper.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserBase.java
* /json-smart-2-3-sources-6-jar/net/minidev/json/parser/JSONParserReader.java

1.573 e2fsprogs 1.46.5-2ubuntu1.2

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Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

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This is the Debian GNU/Linux prepackaged version of the static EXT2
file system consistency checker (e2fsck.static). The EXT2 utilities
were written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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```
#
# This is a Makefile stub which handles the creation of BSD shared
# libraries.
#
# In order to use this stub, the following makefile variables must be defined.
#
# BSDLIB_VERSION = 1.0
# BSDLIB_IMAGE = libce
# BSDLIB_MYDIR = et
# BSDLIB_INSTALL_DIR = $(SHLIBDIR)
#

all:: image

real-subdirs:: Makefile
 @echo " MKDIR pic"
 @mkdir -p pic

BSD_LIB = $(BSDLIB_IMAGE).so.$(BSDLIB_VERSION)
BSDLIB_PIC_FLAG = -fpic

image:  $(BSD_LIB)

$(BSD_LIB): $(OBJS)
 (cd pic; ld -Bshareable -o $(BSD_LIB) $(LDFLAGS_SHLIB) $(OBJS))
 $(MV) pic/$(BSD_LIB) .
 $(RM) -f ../$(BSD_LIB)
 (cd ..; $(LN) $(LINK_BUILD_FLAGS) \
  `echo $(my_dir) | sed -e 's;lib/;;'`/$(BSD_LIB) $(BSD_LIB))
```

```
install-shlibs install:: $(BSD_LIB)
 @echo " INSTALL_PROGRAM $(BSDLIB_INSTALL_DIR)/$(BSD_LIB)"
 @$(INSTALL_PROGRAM) $(BSD_LIB) \
  $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)
 @-$(LDCONFIG)

install-strip: install

install-shlibs-strip:: install-shlibs

uninstall-shlibs uninstall::
 $(RM) -f $(DESTDIR)$(BSDLIB_INSTALL_DIR)/$(BSD_LIB)

clean::
 $(RM)
 -rf pic
 $(RM) -f $(BSD_LIB)
 $(RM) -f ../$(BSD_LIB)
```

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Index: tdbsa/tdb.c
==========
--- tdbsa.orig/tdb.c
+++ tdbsa/tdb.c
@@ -4,11 +4,11 @@ Rev: 23371
Last Changed Date: 2007-06-06 20:14:06 -0400 (Wed, 06 Jun 2007)
*/
 /*
- Unix SMB/CIFS implementation.
+ trivial database library - standalone version

- trivial database library - private includes
-
- Copyright (C) Andrew Tridgell 2005
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    ** NOTE! The following LGPL license applies to the tdb
    ** library. This does NOT imply that all of Samba is released
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Gadi Oxman, August 1995

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This is the Debian GNU/Linux prepackaged version of the EXT2 file system utilities (e2fsck, mke2fs, etc.). The EXT2 utilities were written by Theodore Ts'o <tytso@mit.edu> and Remy Card <card@masi.ibp.fr>.

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This package was added to the e2fsprogs debian source package by
Theodore Ts'o <tytso@mit.edu> on Sat Mar 15 15:33:37 EST 2003

It is part of the main e2fsprogs distribution, which can be found at:

http://sourceforge.net/projects/e2fsprogs

Upstream Author: Theodore Ts'o <tytso@mit.edu>

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1.574 npm-packlist 8.0.2

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1.575 jetty-http-spi 9.4.18.v20190429

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The following artifacts are EPL and ASL2.
* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
 * javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

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* java.sun.security.ssl

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http://openjdk.java.net/legal/gplv2+ce.html

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org.ow2.asm:asm-commons
org.ow2.asm:asm

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org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

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org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
 org.apache.tomcat:tomcat-el-api
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
 org.apache.tomcat:tomcat-util

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 org.apache.tomcat:tomcat-jasper-el

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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1.576 commons-lang3 3.7

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libfreetype/src/psaux/psintrp.c
libfreetype/src/psaux/psintrp.h
libfreetype/src/psaux/psread.c
libfreetype/src/psaux/psread.h
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jQuery UI v1.13.2

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Mesa 3-D Graphics Library v21.0.3

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GL/wglext.h Khronos
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****

---
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Mesa 3-D
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1.579 @isaacs/string-locale-compare 1.1.0

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 /org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/PullRequest.java
* /org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/GistRevision.java
* /org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/client/GitHubResponse.java
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* /org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/RepositoryContents.java
* /org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/RepositoryIssue.java
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* /org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/event/PullRequestReviewCommentPayload.java
*
/org-eclipse-egit-github-core-2-1-5-sources-1-jar/org/eclipse/egit/github/core/CommitStatus.java
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1.585 read-package-json-fast 3.0.2

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1.586 jetty-servlets 9.4.18.v20190429

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* org.eclipse.jetty.orbit:javax.security.auth.message

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* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
 * javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

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* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
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org.ow2.asm:asm-commons
org.ow2.asm:asm

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org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

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org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
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 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
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org.eclipse.jetty.toolchain:jetty-schemas

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1.594 https-proxy-agent 7.0.5

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1.595 perl 5.34.0-3ubuntu1.4

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Upstream-Name: perl
Source: http://www.perl.com/CPAN/src/5.0/
Comment:
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bzip2/libbzip2 version 1.0.5 of 10 December 2007

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1.598 safer-buffer 2.1.2

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1.599 reactor-core 3.0.7.RELEASE

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* /reactor-core-3-0-7-release-sources-jar/reactor/util/concurrent/QueueSupplier.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/ParallelScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuples.java
*
/reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/ExecutorScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/ElasticScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/BlockingFirstSubscriber.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/Scheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple6.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple4.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/SynchronousSink.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/ExecutorServiceScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple2.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple5.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/Cancellation.java
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/reactor-core-3-0-7-release-sources-jar/reactor/util/function/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/Signal.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/concurrent/WaitStrategy.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/BlockingLastSubscriber.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/Logger.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/ImmediateScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/concurrent/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple7.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple3.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/TimedScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/GroupedFlux.java
*
/reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/SingleScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/adapter/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoToCompletableFuture.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/function/Tuple8.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/Disposable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/SingleWorkerScheduler.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/Exceptions.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/concurrent/SpscLinkedArrayQueue.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/concurrent/SpscArrayQueue.java
* /reactor-core-3-0-7-release-sources-jar/reactor/util/Loggers.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/RejectedDisposable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ImmutableSignal.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MutableNextSignal.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/BlockingMonoSubscriber.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoFilterWhen.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/DisposableContainer.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxFilterWhen.java
*
/reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/EmptyDisposableContainer.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/scheduler/ScheduledRunnable.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxBufferBoundary.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoPublishOn.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelFluxHide.java

* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/BlockingSink.java
*
 /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSkipUntil.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxRepeat.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ConnectableFluxOnAssembly.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoMaterialize.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxPublishMulticast.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoRunnable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelArraySource.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxZip.java
* /reactor-core-3-0-7-release-sources-jar/reactor/adapter/JdkFlowAdapter.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/LambdaSubscriber.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxRetryWhen.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxPeekStateful.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoSingle.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/LambdaMonoSubscriber.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoNever.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxConcatIterable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ConnectableFlux.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxRepeatWhen.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxOnBackpressureLatest.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/InnerConsumer.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoFilterFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoCallableOnAssembly.java
*
 /reactor-core-3-0-7-release-sources-jar/reactor/core/Producer.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxBatch.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoHasElements.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxBufferPredicate.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/Loopback.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoReduce.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/SignalPeek.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxBufferTimeOrSize.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxTakeLastOne.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoHandleFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSubscribeOnCallable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoLogFuseable.java
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 /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxRefCount.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxWindowTimeOrSize.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSwitchMap.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxMapSignal.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoHide.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxFilterFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoFirst.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxReplay.java

* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxOnBackpressureBufferStrategy.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoDoFinallyFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoIgnoreEmpty.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxAutoConnect.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelRunOn.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelGroup.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxTakeLast.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoDematerialize.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxScanSeed.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxMapFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/SignalLogger.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxWindowPredicate.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/DelegateProcessor.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxRetry.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoAny.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxTake.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoThenMap.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoSubscribeOnCallable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxError.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxPublishOn.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoTakeLastOne.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoFlatMap.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxRetryPredicate.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoElementAt.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxDelaySubscription.java
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 /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxPeekFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxCancelOn.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelMap.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxDefer.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxFirstEmitting.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxWindowWhen.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxLogFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoCollectList.java

* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelCollect.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/package-info.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxFlatMap.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoElapsed.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoWhen.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoLog.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxArray.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxMerge.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSkipUntilOther.java
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* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSampleTimeout.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSample.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxAwaitOnSubscribe.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxCallableOnAssembly.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxNever.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxEmpty.java
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/reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxDetach.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoMapFuseable.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxDistinct.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelMergeSort.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/EventLoopProcessor.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoUntilOther.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxWithLatestFrom.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxConcatArray.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoSink.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxFilter.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelConcatMap.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxDistinctUntilChanged.java
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/reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxLog.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/ParallelFlatMap.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoRetry.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxBufferWhen.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxUsing.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxElapsed.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxJust.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSource.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/InnerOperator.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/DirectProcessor.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/FluxSkipLast.java
* /reactor-core-3-0-7-release-sources-jar/reactor/core/publisher/MonoRetryWhen.java
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It was originally written by Tatu Saloranta (tatu.saloranta@iki.fi), and has
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analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

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==

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1.608 json-parse 1.3.1

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1.609 commons-collections 4.4

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1.610 pekko-parsing_3 1.0.0

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1.611 spdx-exceptions 2.5.0

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1.613 jaxb-api 2.3.1

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* /jnr-posix-3-1-19-sources-5-jar/jnr/posix/OpenBSDFileStat.java
* /jnr-posix-3-1-19-sources-5-jar/jnr/posix/AixFileStat.java
* /jnr-posix-3-1-19-sources-5-jar/jnr/posix/OpenBSDPasswd.java
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1.617 path-scurry 1.11.1

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1.618 cpp 12.3.0-1ubuntu1~22.04.2

1.618.1 Available under license :

This is the Debian GNU/Linux prepackaged version of the GNU compiler
collection, containing Ada, C, C++, D, Fortran 95, Go, Objective-C,
Objective-C++, and Modula-2 compilers, documentation, and support
libraries. In addition, Debian provides the gm2 compiler, either in
the same source package, or built from a separate same source package.
Packaging is done by the Debian GCC Maintainers
<debian-gcc@lists.debian.org>, with sources obtained from:

 ftp://gcc.gnu.org/pub/gcc/releases/ (for full releases)
 svn://gcc.gnu.org/svn/gcc/   (for prereleases)
 ftp://sourceware.org/pub/newlib/   (for newlib)
 git://git.savannah.gnu.org/gm2.git   (for Modula-2)

The current gcc-12 source package is taken from the git gcc-12-branch.

Changes: See changelog.Debian.gz

Debian splits the GNU Compiler Collection into packages for each language,
library, and documentation as follows:

Language   Compiler package Library package   Documentation

Ada

gnat-12 libgnat-12 gnat-12-doc
C gcc-12 gcc-12-doc
C++ g++-12 libstdc++6 libstdc++6-12-doc
D gdc-12
Fortran 95 gfortran-12 libgfortran5 gfortran-12-doc
Go gccgo-12 libgo0
Objective C gobjc-12 libobjc4
Objective C++ gobjc++-12
Modula-2 gm2-12 libgm2

For some language run-time libraries, Debian provides source files, development files, debugging symbols and libraries containing position-independent code in separate packages:

Language	Sources	Development	Debugging	Position-Independent
C++		libstdc++6-12-dbg		libstdc++6-12-pic
D	libphobos-12-dev			

Additional packages include:

All languages:
libgcc1, libgcc2, libgcc4 GCC intrinsics (platform-dependent)
gcc-12-base
Base files common to all compilers
gcc-12-soft-float Software floating point (ARM only)
gcc-12-source The sources with patches

Ada:
libgnat-util12-dev, libgnat-util12 GNAT version library

C:
cpp-12, cpp-12-doc GNU C Preprocessor
libssp0-dev, libssp0 GCC stack smashing protection library
libquadmath0 Math routines for the __float128 type
fixincludes Fix non-ANSI header files

C, C++ and Fortran 95:
libgomp1-dev, libgomp1 GCC OpenMP (GOMP) support library
libitm1-dev, libitm1 GNU Transactional Memory Library

Biarch support: On some 64-bit platforms which can also run 32-bit code, Debian provides additional packages containing 32-bit versions of some libraries. These packages have names beginning with 'lib32' instead of 'lib', for example lib32stdc++6. Similarly, on some 32-bit platforms which can also run 64-bit code, Debian provides additional
packages with names
beginning with 'lib64' instead of 'lib'. These packages contain 64-bit

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- libatomic
- libdecnumber
- libgomp
- libitm
- libssp
- libstdc++-v3
- libobjc
- libgfortran

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D:
gdc-12 GNU D Compiler
libphobos-12-dev D standard runtime library

The D source package is made up of the following components.

The D front-end for GCC:
- d/*

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The DMD Compiler implementation of the D programming language:

- d/dmd/*

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The Zlib data compression library:
- d/phobos/etc/c/zlib/*

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If ALPN is used to negotiate HTTP/2 connections, then the following
artifacts may be included in the distribution or downloaded when ALPN
module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
are hosted at github and both modified and original are under GPL v2 with
classpath exceptions.
http://openjdk.java.net/legal/gplv2+ce.html

OW2

The following artifacts are licensed by the OW2 Foundation according to the
terms of http://asm.ow2.org/license.html

org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

The following artifacts are ASL2 licensed. Based on selected classes from
following Apache Tomcat jars, all ASL2
 licensed.

org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
 org.apache.tomcat:tomcat-el-api
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
 org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-el-api

Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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Unix systems for simple password protection. Copyright 1996 Aki Yoshida,
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1.620 path-key 3.1.1

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1.621 libnettle6 3.7.3-1build2

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1.622 grpc-context 1.69.0

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1.623 debianutils 5.5-1ubuntu2

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* /debianutils-5-5-orig-tar-xz/debianutils-5.5/po4a/de/add-shell.8
* /debianutils-5-5-orig-tar-xz/debianutils-5.5/po4a/de/savelog.8
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1.624 selinux 3.3-1build2

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1.625 diffutils 1:3.8-0ubuntu2

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GNU `sdiff' was written by Thomas Lord.  GNU `cmp' was written by
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/AsyncCacheLoader.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/stats/ConcurrentStatsCounter.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/LinkedDeque.java

* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Policy.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WriteOrderDeque.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/UnboundedLocalCache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/RemovalListener.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/CacheLoader.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Cache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/AbstractLinkedDeque.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/stats/CacheStats.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Ticker.java
*
/caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/AccessOrderDeque.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/BoundedLocalCache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Caffeine.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/stats/DisabledStatsCounter.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/base/UnsafeAccess.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/RemovalCause.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/SingleConsumerQueue.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Pacer.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/base/package-info.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WriteThroughEntry.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Buffer.java
*
 /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/LocalLoadingCache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/CacheWriter.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/stats/GuardedStatsCounter.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FrequencySketch.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/LocalCache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Node.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/References.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/BoundedBuffer.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/package-info.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/LocalAsyncLoadingCache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/LocalManualCache.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SerializationProxy.java
*
 /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/package-info.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/Async.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PDWMS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILMWW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WIMWA.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSMSAR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILSMWAW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSLSMSAW.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FWAWMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SILSMWA.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSLMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PSWMS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSSAR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSSMWW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSLSMWAW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SIA.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PWMW.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PDAWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSL.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PDAWMS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSSA.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FWA.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSLSMSAR.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FSW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSLSMWWR.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSLSMWWR.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FSAMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SISMSA.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PWAWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSLS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SILMSR.java

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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PDW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SILSMWW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FSARMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSMWAWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSA.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WISAWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SIMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSLSMSW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WISMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FWWMS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILSWR.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FSAWMS.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WSMWAW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SILSMSAR.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SIMWA.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SILMW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSLMWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILAW.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/FSWRMW.java

* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/WILMWA.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/PWWR.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSSMSAW.java
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 /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SSLSW.java
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* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SIMS.java
* /caffeine-2-9-3-sources-jar/com/github/benmanes/caffeine/cache/SISMSR.java
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1.627 grpc-protobuf 1.69.0

1.627.1 Available under license :

Apache-2.0

1.628 ignite-indexing 2.13.0

1.628.1 Available under license :

ignite-indexing
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The Apache Software Foundation (http://www.apache.org/).
// --
// List of ignite-indexing module's dependencies provided as a part of this distribution.

// --

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For H2 Database Engine (http://www.h2database.com) com.h2database:h2:jar:1.4.197

==========

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==========

For Lucene Common Analyzers (http://lucene.apache.org/lucene-parent/lucene-analyzers-common) org.apache.lucene:lucene-analyzers-common:jar:7.4.0

==========

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For Lucene Core (http://lucene.apache.org/lucene-parent/lucene-core) org.apache.lucene:lucene-core:jar:7.4.0

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==========

For Lucene QueryParsers (http://lucene.apache.org/lucene-parent/lucene-queryparser) org.apache.lucene:lucene-queryparser:jar:7.4.0

==========

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==========

For
Apache Commons Codec (https://commons.apache.org/proper/commons-codec/) commons-codec:commons-codec:jar:1.13

==========

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==========

For ignite-core (https://ignite.apache.org/ignite-parent-internal/ignite-core) org.apache.ignite:ignite-core:jar:2.13.0

==========

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1.632 httpcomponents-core 4.4.16

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1.633 jackson-dataformat-yaml 2.18.2

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1.634 metrics-jvm 4.1.0

1.635 mime-type 1.4.2

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1.636 lsb 11.1.0ubuntu4

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1.637 npm-pick-manifest 9.1.0

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1.638 @npmcli/run-script 8.1.0

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1.639 mpdecimal 2.5.1-2build2

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1.641 go-toml v1.9.4

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localtime.go, localtime_test.go:

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go/ed46f5086358513cf8c25f8e3f022cb838a49d66/civil/civil_test.go
Changes:
  * Renamed files from civil* to localtime*.
  * Package changed from civil to toml.

* 'Local' prefix added to all structs.

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1.642 pacote 18.0.6

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1.643 j2objc-annotations 3.0.0

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Found in path(s):
* /j2objc-annotations-3-0-0-jar/META-INF/maven/com.google.j2objc/j2objc-annotations/pom.xml

1.644 reflectwalk 1.0.2

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1.645 openjdk-jre 11.0.27u6

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```
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### xwd utility
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Description: Makes the generated copyright headers reproducible
Author: Emmanuel Bourg <ebourg@apache.org>
Forwarded: no
--- a/make/jdk/src/classes/build/tools/cldrconverter/CopyrightHeaders.java
+++ b/make/jdk/src/classes/build/tools/cldrconverter/CopyrightHeaders.java
@@ -26,6 +26,7 @@
package build.tools.cldrconverter;

import java.util.Calendar;
+import java.util.Date;
import java.util.GregorianCalendar;
import java.util.Locale;
import java.util.TimeZone;
@@ -150,8 +151,14 @@
    }

    private static int getYear() {
-       return new GregorianCalendar(TimeZone.getTimeZone("America/Los_Angeles"),
-                                    Locale.US).get(Calendar.YEAR);
+   Date date = new Date();
+   if (System.getenv("SOURCE_DATE_EPOCH") != null) {
+   date = new Date(1000 * Long.valueOf(System.getenv("SOURCE_DATE_EPOCH")));
+   }
+
+   GregorianCalendar calendar = new GregorianCalendar(TimeZone.getTimeZone("UTC"), Locale.ENGLISH);
+   calendar.setTime(date);
+
        return calendar.get(Calendar.YEAR);
    }

    // no instantiation
--- a/make/jdk/src/classes/build/tools/generatelsrequivmaps/EquivMapsGenerator.java
+++ b/make/jdk/src/classes/build/tools/generatelsrequivmaps/EquivMapsGenerator.java
@@ -34,9 +34,13 @@
import java.time.ZonedDateTime;
import java.util.ArrayList;
import java.util.Arrays;
+import java.util.Calendar;
+import java.util.Date;

```
+import java.util.GregorianCalendar;
import java.util.List;
import java.util.Locale;
import java.util.Map;
+import java.util.TimeZone;
import java.util.TreeMap;
import java.util.stream.Collectors;
import java.util.regex.Pattern;
@@ -266,8 +270,15 @@
        + "}";

    private static String getOpenJDKCopyright() {
-       int year = ZonedDateTime.now(ZoneId
-               .of("America/Los_Angeles")).getYear();
+       Date date = new Date();
+       if (System.getenv("SOURCE_DATE_EPOCH") != null) {
+           date = new Date(1000 * Long.valueOf(System.getenv("SOURCE_DATE_EPOCH")));
+
        }
+
+       GregorianCalendar calendar = new GregorianCalendar(TimeZone.getTimeZone("UTC"), Locale.ENGLISH);
+       calendar.setTime(date);
+
+       int year = calendar.get(Calendar.YEAR);
        return String.format(Locale.US, COPYRIGHT, year);
    }
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.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

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Ext headers GL/glext.h Khronos
GL/glxext.h Khronos
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---
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Mesa 3-D
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                    Why is this required?\
                    See https://glassfish.dev.java.net/issues/show_bug.cgi?id=5385\
                    By doing this, we allow user have any version of apache-commons lib\
                    in their application class loader hierarchy. They don't even have to\
                    set delegation=false in sun-web.xml! This is the true advantage of\
                    using OSGi.
 Sahoo.\
                \
-->\
<Export-Package>org.aopalliance.*;version=$\{aopalliance.version\}</Export-Package>\
<Private-Package>!*</Private-Package>\
</instructions>\
</configuration>\
<executions>\
<execution>\
<id>osgi-manifest</id>\
<phase>process-classes</phase>\
<goals>\
<goal>manifest</goal>\
</goals>\
</execution>\
</executions>\
</plugin>\
</plugins>\
</build>\
<dependencies>\
<dependency>\
<groupId>aopalliance</groupId>\
<artifactId>aopalliance</artifactId>\
<version>$\{aopalliance.version\}</version>\
<optional>true</optional>\
</dependency>\
</dependencies>\
</project>\
}
```

Found in path(s):
* /aopalliance-2-6-1-zip/aopalliance-2.6.1.rtf

1.647 hamcrest-library 1.3

1.647.1 Available under license :

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@page
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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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* org.eclipse.jetty.orbit:javax.security.auth.message

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* org.eclipse.jetty.orbit:javax.mail.glassfish

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
 * javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
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module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
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http://openjdk.java.net/legal/gplv2+ce.html

OW2

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terms of http://asm.ow2.org/license.html

org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

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org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

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following Apache Tomcat jars, all ASL2
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org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
 org.apache.tomcat:tomcat-el-api
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
 org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-el-api

Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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1.653 jakarta-annotation-api 1.3.5

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Source Code

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* https://github.com/eclipse-ee4j/common-annotations-api

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1.654 joda-time 2.9.1

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1.655 swagger 1.5.3

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```
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public class License {
  private String name;
  private String url;

  public License name(String name) {
    setName(name);
    return this;
  }

  public License url(String url) {
    setUrl(url);
    return this;
  }

  public String getName() {
    return name;
  }

  public void setName(String name) {
    this.name = name;
  }

  public String getUrl() {
    return url;
  }

  public void setUrl(String url) {
    this.url = url;
  }

  @Override
  public int hashCode() {
    final int prime = 31;
    int result = 1;
    result = prime * result + ((name == null) ? 0 : name.hashCode());
    result = prime * result + ((url == null) ? 0 : url.hashCode());
    return result;
  }

  @Override
  public boolean equals(Object obj) {
    if (this == obj) {
      return true;
    }
    if (obj == null) {
```

```
            return false;
        }
        if (getClass()
    != obj.getClass()) {
            return false;
        }
        License other = (License) obj;
        if (name == null) {
            if (other.name != null) {
                return false;
            }
        } else if (!name.equals(other.name)) {
            return false;
        }
        if (url == null) {
            if (other.url != null) {
                return false;
            }
        } else if (!url.equals(other.url)) {
            return false;
        }
        return true;
      }
    }
```

1.656 hostname 3.23ubuntu2

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hostname -- set the host name or show the host/domain name

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1.657 tuf-js 2.2.1

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1.658 snake-yaml 2.3

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Manifest-Version: 1.0
Automatic-Module-Name: org.snakeyaml.engine.v2
Bnd-LastModified: 1618842641913
Build-Jdk: 11.0.10
Built-By: somov
Bundle-Description: Core YAML 1.2 parser and emitter for Java
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt
Bundle-ManifestVersion: 2
Bundle-Name: SnakeYAML Engine
Bundle-SymbolicName: org.snakeyaml.engine
Bundle-Version: 2.3.0
Created-By: Apache Maven Bundle Plugin
Export-Package: org.snakeyaml.engine.v2.api;version="2.3",org.snakeyam
l.engine.v2.api.lowlevel;version="2.3",org.snakeyaml.engine.v2.commen
ts;version="2.3",org.snakeyaml.engine.v2.common;version="2.3",org.sna
keyaml.engine.v2.composer;version="2.3",org.snakeyaml.engine.v2.const
ructor;version="2.3",org.snakeyaml.engine.v2.emitter;version="2.3",or
g.snakeyaml.engine.v2.env;version="2.3",org.snakeyaml.engine.v2.event
s;version="2.3",org.snakeyaml.engine.v2.exceptions;version="2.3",org.
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canner;version="2.3",org.snakeyaml.engine.v2.serializer;version="2.3"
,org.snakeyaml.engine.v2.tokens;version="2.3"
Import-Package: org.snakeyaml.engine.v2.api;version="[2.3,3)",org.snak
eyaml.engine.v2.comments;version="[2.3,3)",org.snakeyaml.engine.v2.co
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ion="[2.3,3)",org.snakeyaml.engine.v2.resolver;version="[2.3,3)",org.
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.serializer;version="[2.3,3)",org.snakeyaml.engine.v2.tokens;version=
"[2.3,3)"
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"
Tool: Bnd-4.2.0.201903051501

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1.659 libxi 2:1.8-1build1

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1.660 gson 2.11.0

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* /gson-2-11-0-sources-1-jar/com/google/gson/stream/MalformedJsonException.java
* /gson-2-11-0-sources-1-jar/com/google/gson/stream/JsonReader.java
* /gson-2-11-0-sources-1-jar/com/google/gson/stream/JsonToken.java
* /gson-2-11-0-sources-1-jar/com/google/gson/stream/JsonWriter.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/ToNumberPolicy.java
* /gson-2-11-0-sources-1-jar/com/google/gson/ToNumberStrategy.java
* /gson-2-11-0-sources-1-jar/com/google/gson/stream/package-info.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/ArrayTypeAdapter.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/JsonReaderInternalAccess.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/MapTypeAdapterFactory.java
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 /gson-2-11-0-sources-1-jar/com/google/gson/TypeAdapterFactory.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/CollectionTypeAdapterFactory.java
* /gson-2-11-0-sources-1-jar/com/google/gson/TypeAdapter.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/ReflectiveTypeAdapterFactory.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/ObjectTypeAdapter.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/TypeAdapters.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/bind/JsonTreeWriter.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/FormattingStyle.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/ReflectionAccessFilterHelper.java
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 /gson-2-11-0-sources-1-jar/com/google/gson/internal/UnsafeAllocator.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/annotations/Since.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/JsonParseException.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/JsonSerializationContext.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/JsonPrimitive.java
* /gson-2-11-0-sources-1-jar/com/google/gson/JsonNull.java
* /gson-2-11-0-sources-1-jar/com/google/gson/FieldNamingPolicy.java
* /gson-2-11-0-sources-1-jar/com/google/gson/JsonElement.java
* /gson-2-11-0-sources-1-jar/com/google/gson/JsonSerializer.java
* /gson-2-11-0-sources-1-jar/com/google/gson/annotations/SerializedName.java
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 /gson-2-11-0-sources-1-jar/com/google/gson/package-info.java
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* /gson-2-11-0-sources-1-jar/com/google/gson/JsonArray.java
* /gson-2-11-0-sources-1-jar/com/google/gson/internal/Primitives.java

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1.663 pcre2 10.39-3ubuntu0.1

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The following artifacts are EPL.
* org.eclipse.jetty.orbit:org.eclipse.jdt.core

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* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.
https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
artifacts may be included in the distribution or downloaded when ALPN
module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
are hosted at github and both modified and original are under GPL v2 with
classpath exceptions.
http://openjdk.java.net/legal/gplv2+ce.html

OW2

The following artifacts are licensed by the OW2 Foundation according to the
terms of http://asm.ow2.org/license.html

org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

The following artifacts are ASL2 licensed. Based on selected classes from following Apache Tomcat jars, all ASL2 licensed.

org.mortbay.jasper:apache-jsp
org.apache.tomcat:tomcat-jasper
org.apache.tomcat:tomcat-juli
org.apache.tomcat:tomcat-jsp-api
org.apache.tomcat:tomcat-el-api
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-api
org.apache.tomcat:tomcat-util-scan
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-el-api

Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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1.665 grpc-netty-shaded 1.69.0

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1.689 debconf 1.5.79ubuntu1

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1.694 semver 7.6.2

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1.700 libnpmdiff 6.1.4

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1.701 pcre 2:8.39-13ubuntu0.22.04.1

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This package was put together by me, Mark Baker <mbaker@iee.org> from the
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1.702 jnr-constants 0.10.4

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* /jnr-constants-0-10-4-sources-1-jar/jnr/constants/Constant.java
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1.703 @npmcli/name-from-folder 2.0.0

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1.704 xerces-j 2.12.2

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1.705 error_prone_annotations 2.30.0

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* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/concurrent/LazyInit.java
* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/IncompatibleModifiers.java
*
 /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/Immutable.java
* /error-prone-annotations-2-30-0-sources-jar/module-info.java
* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/RequiredModifiers.java
* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/CompileTimeConstant.java
* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/SuppressPackageLocation.java
* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/ForOverride.java
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jar/com/google/errorprone/annotations/OverridingMethodsMustInvokeSuper.java
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* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/RestrictedApi.java
* /error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/FormatString.java
*
/error-prone-annotations-2-30-0-sources-jar/com/google/errorprone/annotations/DoNotMock.java
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1.706 node.js 20.19.5-1nodesource1

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```
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#ifndef OPENSSL_UI_H
# define OPENSSL_UI_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_UI_H
# endif

# include <openssl/opensslconf.h>

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
```

```
#  include <openssl/crypto.h>
# endif
# include <openssl/safestack.h>
# include <openssl/pem.h>
# include <openssl/types.h>
# include <openssl/uierr.h>

/* For compatibility reasons, the macro OPENSSL_NO_UI is currently retained */
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  ifdef OPENSSL_NO_UI_CONSOLE
#   define OPENSSL_NO_UI
#  endif
# endif

# ifdef  __cplusplus
extern
 "C" {
# endif

/*
* All the following functions return -1 or NULL on error and in some cases
* (UI_process()) -2 if interrupted or in some other way cancelled. When
* everything is fine, they return 0, a positive value or a non-NULL pointer,
* all depending on their purpose.
*/

/* Creators and destructor.   */
UI *UI_new(void);
UI *UI_new_method(const UI_METHOD *method);
void UI_free(UI *ui);

/*-
  The following functions are used to add strings to be printed and prompt
  strings to prompt for data.  The names are UI_{add,dup}_<function>_string
  and UI_{add,dup}_input_boolean.

  UI_{add,dup}_<function>_string have the following meanings:
      add     add a text or prompt string.  The pointers given to these
              functions are used verbatim, no copying is done.
      dup     make a copy of the text or prompt string, then add the copy
              to the collection of strings in the user interface.
      <function>
              The function
 is a name for the functionality that the given
              string shall be used for.  It can be one of:
                    input   use the string as data prompt.
                    verify  use the string as verification prompt.  This
                          is used to verify a previous input.
```

```
                info    use the string for informational output.
                error   use the string for error output.
 Honestly, there's currently no difference between info and error for the
 moment.

 UI_{add,dup}_input_boolean have the same semantics for "add" and "dup",
 and are typically used when one wants to prompt for a yes/no response.

 All of the functions in this group take a UI and a prompt string.
 The string input and verify addition functions also take a flag argument,
 a buffer for the result to end up with, a minimum input size and a maximum
 input size (the result buffer MUST be large enough to be able to contain
 the
maximum number of characters).  Additionally, the verify addition
 functions takes another buffer to compare the result against.
 The boolean input functions take an action description string (which should
 be safe to ignore if the expected user action is obvious, for example with
 a dialog box with an OK button and a Cancel button), a string of acceptable
 characters to mean OK and to mean Cancel.  The two last strings are checked
 to make sure they don't have common characters.  Additionally, the same
 flag argument as for the string input is taken, as well as a result buffer.
 The result buffer is required to be at least one byte long.  Depending on
 the answer, the first character from the OK or the Cancel character strings
 will be stored in the first byte of the result buffer.  No NUL will be
 added, so the result is *not* a string.

 On success, the all return an index of the added information.  That index
 is useful when retrieving results with UI_get0_result().
*/
int UI_add_input_string(UI *ui, const char *prompt, int flags,
                char *result_buf, int minsize, int maxsize);
int UI_dup_input_string(UI *ui, const char *prompt, int flags,
                char *result_buf, int minsize, int maxsize);
int UI_add_verify_string(UI *ui, const char *prompt, int flags,
                 char *result_buf, int minsize, int maxsize,
                 const char *test_buf);
int UI_dup_verify_string(UI *ui, const char *prompt, int flags,
                 char *result_buf, int minsize, int maxsize,
                 const char *test_buf);
int UI_add_input_boolean(UI *ui, const char *prompt, const char *action_desc,
                 const char *ok_chars, const char *cancel_chars,
                 int flags, char *result_buf);
int UI_dup_input_boolean(UI *ui, const char *prompt, const char *action_desc,
                 const char *ok_chars, const char *cancel_chars,
                  int flags, char *result_buf);
int UI_add_info_string(UI *ui, const char *text);
int UI_dup_info_string(UI *ui, const char *text);
int UI_add_error_string(UI *ui, const char *text);
```

```
int UI_dup_error_string(UI *ui, const char *text);

/* These are the possible flags.  They can be or'ed together. */
/* Use to have echoing of input */
# define UI_INPUT_FLAG_ECHO             0x01
/*
* Use a default password.  Where that password is found is completely up to
* the application, it might for example be in the user data set with
* UI_add_user_data().  It is not recommended to have more than one input in
* each UI being marked with this flag, or the application might get
* confused.
*/
# define UI_INPUT_FLAG_DEFAULT_PWD      0x02

/*-
* The user of these routines may want to define flags of their own.  The core
* UI won't look at those, but will pass them on to the method routines.  They
* must use higher bits so they don't get confused with the UI bits above.
 * UI_INPUT_FLAG_USER_BASE tells which is the lowest bit to use.  A good
* example of use is this:
*
*    #define MY_UI_FLAG1       (0x01 << UI_INPUT_FLAG_USER_BASE)
*
*/
# define UI_INPUT_FLAG_USER_BASE 16

/*-
* The following function helps construct a prompt.
* phrase_desc is a textual short description of the phrase to enter,
* for example "pass phrase", and
* object_name is the name of the object
* (which might be a card name or a file name) or NULL.
* The returned string shall always be allocated on the heap with
* OPENSSL_malloc(), and need to be free'd with OPENSSL_free().
*
* If the ui_method doesn't contain a pointer to a user-defined prompt
* constructor, a default string is built, looking like this:
*
*       "Enter {phrase_desc} for {object_name}:"
*
* So, if phrase_desc has the value "pass phrase" and object_name has
* the value "foo.key", the resulting string is:
*
*       "Enter pass phrase for foo.key:"
*/
char *UI_construct_prompt(UI *ui_method,
                          const char *phrase_desc, const char *object_name);
```

```
/*
* The following function is used to store a pointer to user-specific data.
* Any previous such pointer will be returned and replaced.
*
* For callback purposes, this function makes a lot more sense than using
* ex_data, since the latter requires that different parts of OpenSSL or
* applications share the same ex_data index.
*
* Note that the UI_OpenSSL() method completely ignores the user data. Other
* methods may not, however.
*/
void *UI_add_user_data(UI *ui, void *user_data);
/*
* Alternatively, this function is used to duplicate the user data.
* This uses the duplicator method function.  The destroy function will
* be used to free the user data in this case.
*/
int UI_dup_user_data(UI *ui, void *user_data);
/* We need a user data retrieving function as well.  */
void *UI_get0_user_data(UI *ui);

/* Return the result associated with a prompt given with the index i. */
const char *UI_get0_result(UI
 *ui, int i);
int UI_get_result_length(UI *ui, int i);

/* When all strings have been added, process the whole thing. */
int UI_process(UI *ui);

/*
* Give a user interface parameterised control commands.  This can be used to
* send down an integer, a data pointer or a function pointer, as well as be
* used to get information from a UI.
*/
int UI_ctrl(UI *ui, int cmd, long i, void *p, void (*f) (void));

/* The commands */
/*
* Use UI_CONTROL_PRINT_ERRORS with the value 1 to have UI_process print the
* OpenSSL error stack before printing any info or added error messages and
* before any prompting.
*/
# define UI_CTRL_PRINT_ERRORS           1
/*
* Check if a UI_process() is possible to do again with the same instance of
* a user interface.  This makes UI_ctrl() return 1 if it is redoable, and 0
* if not.
*/
```

```
# define UI_CTRL_IS_REDOABLE           2

/* Some methods may use extra data */
# define UI_set_app_data(s,arg)         UI_set_ex_data(s,0,arg)
# define UI_get_app_data(s)
          UI_get_ex_data(s,0)

# define UI_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_UI, l, p, newf, dupf, freef)
int UI_set_ex_data(UI *r, int idx, void *arg);
void *UI_get_ex_data(const UI *r, int idx);

/* Use specific methods instead of the built-in one */
void UI_set_default_method(const UI_METHOD *meth);
const UI_METHOD *UI_get_default_method(void);
const UI_METHOD *UI_get_method(UI *ui);
const UI_METHOD *UI_set_method(UI *ui, const UI_METHOD *meth);

# ifndef OPENSSL_NO_UI_CONSOLE

/* The method with all the built-in thingies */
UI_METHOD *UI_OpenSSL(void);

# endif

/*
* NULL method.  Literally does nothing, but may serve as a placeholder
* to avoid internal default.
*/
const UI_METHOD *UI_null(void);

/* ---------- For method writers ---------- */
/*-
  A method contains a number of functions that implement the low level
  of the User Interface.  The functions are:

      an opener       This function starts a
 session, maybe by opening
                  a channel to a tty, or by opening a window.
      a writer        This function is called to write a given string,
                  maybe to the tty, maybe as a field label in a
                  window.
      a flusher       This function is called to flush everything that
                  has been output so far.  It can be used to actually
                  display a dialog box after it has been built.
      a reader        This function is called to read a given prompt,
                  maybe from the tty, maybe from a field in a
                  window.  Note that it's called with all string
```

structures, not only the prompt ones, so it must
check such things itself.

a closer This function closes the session, maybe by closing the channel to the tty, or closing the window.

All these functions are expected to return:

0 on error.

1 on success.

-1 on out-of-band events, for example if some prompting has been canceled (by pressing Ctrl-C, for example). This is only checked when returned by the flusher or the reader.

The way this is used, the opener is first called, then the writer for all strings, then the flusher, then the reader for all strings and finally the closer. Note that if you want to prompt from a terminal or other command line interface, the best is to have the reader also write the prompts instead of having the writer do it. If you want to prompt from a dialog box, the writer can be used to build up the contents of the box, and the flusher to actually display the box and run the event loop until all data has been given, after which the reader only grabs the given data and puts them back into the UI strings.

All method functions take a UI as argument. Additionally, the writer and the reader take a UI_STRING.
*/

```
/*
* The UI_STRING type is the data structure that contains all the needed info
* about a string or a prompt, including test data for a verification prompt.
*/
typedef struct ui_string_st UI_STRING;

SKM_DEFINE_STACK_OF_INTERNAL(UI_STRING, UI_STRING, UI_STRING)
#define sk_UI_STRING_num(sk) OPENSSL_sk_num(ossl_check_const_UI_STRING_sk_type(sk))
#define sk_UI_STRING_value(sk, idx) ((UI_STRING
*)OPENSSL_sk_value(ossl_check_const_UI_STRING_sk_type(sk), (idx)))
#define sk_UI_STRING_new(cmp) ((STACK_OF(UI_STRING)
*)OPENSSL_sk_new(ossl_check_UI_STRING_compfunc_type(cmp)))
#define sk_UI_STRING_new_null() ((STACK_OF(UI_STRING) *)OPENSSL_sk_new_null())
#define sk_UI_STRING_new_reserve(cmp, n) ((STACK_OF(UI_STRING)
*)OPENSSL_sk_new_reserve(ossl_check_UI_STRING_compfunc_type(cmp), (n)))
#define sk_UI_STRING_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_UI_STRING_sk_type(sk), (n))
#define sk_UI_STRING_free(sk) OPENSSL_sk_free(ossl_check_UI_STRING_sk_type(sk))
#define
```

```
 sk_UI_STRING_zero(sk) OPENSSL_sk_zero(ossl_check_UI_STRING_sk_type(sk))
#define sk_UI_STRING_delete(sk, i) ((UI_STRING *)OPENSSL_sk_delete(ossl_check_UI_STRING_sk_type(sk),
(i)))
#define sk_UI_STRING_delete_ptr(sk, ptr) ((UI_STRING
*)OPENSSL_sk_delete_ptr(ossl_check_UI_STRING_sk_type(sk), ossl_check_UI_STRING_type(ptr)))
#define sk_UI_STRING_push(sk, ptr) OPENSSL_sk_push(ossl_check_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_type(ptr))
#define sk_UI_STRING_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_type(ptr))
#define sk_UI_STRING_pop(sk) ((UI_STRING *)OPENSSL_sk_pop(ossl_check_UI_STRING_sk_type(sk)))
#define sk_UI_STRING_shift(sk) ((UI_STRING *)OPENSSL_sk_shift(ossl_check_UI_STRING_sk_type(sk)))
#define sk_UI_STRING_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_UI_STRING_sk_type(sk),ossl_check_UI_STRING_freefunc_type(freefunc))
#define sk_UI_STRING_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_UI_STRING_sk_type(sk),
 ossl_check_UI_STRING_type(ptr), (idx))
#define sk_UI_STRING_set(sk, idx, ptr) ((UI_STRING *)OPENSSL_sk_set(ossl_check_UI_STRING_sk_type(sk),
(idx), ossl_check_UI_STRING_type(ptr)))
#define sk_UI_STRING_find(sk, ptr) OPENSSL_sk_find(ossl_check_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_type(ptr))
#define sk_UI_STRING_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_type(ptr))
#define sk_UI_STRING_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_type(ptr), pnum)
#define sk_UI_STRING_sort(sk) OPENSSL_sk_sort(ossl_check_UI_STRING_sk_type(sk))
#define sk_UI_STRING_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_UI_STRING_sk_type(sk))
#define sk_UI_STRING_dup(sk) ((STACK_OF(UI_STRING)
*)OPENSSL_sk_dup(ossl_check_const_UI_STRING_sk_type(sk)))
#define sk_UI_STRING_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(UI_STRING)
*)OPENSSL_sk_deep_copy(ossl_check_const_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_copyfunc_type(copyfunc),
 ossl_check_UI_STRING_freefunc_type(freefunc)))
#define sk_UI_STRING_set_cmp_func(sk, cmp)
((sk_UI_STRING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_UI_STRING_sk_type(sk),
ossl_check_UI_STRING_compfunc_type(cmp)))


/*
* The different types of strings that are currently supported. This is only
* needed by method authors.
*/
enum UI_string_types {
  UIT_NONE = 0,
  UIT_PROMPT,              /* Prompt for a string */
  UIT_VERIFY,              /* Prompt for a string and verify */
  UIT_BOOLEAN,             /* Prompt for a yes/no response */
  UIT_INFO,              /* Send info to the user */
  UIT_ERROR                /* Send an error message to the user */
};
```

```
/* Create and manipulate methods */
UI_METHOD *UI_create_method(const char *name);
void UI_destroy_method(UI_METHOD *ui_method);
int UI_method_set_opener(UI_METHOD *method, int (*opener) (UI *ui));
int UI_method_set_writer(UI_METHOD *method,

        int (*writer) (UI *ui, UI_STRING *uis));
int UI_method_set_flusher(UI_METHOD *method, int (*flusher) (UI *ui));
int UI_method_set_reader(UI_METHOD *method,
                  int (*reader) (UI *ui, UI_STRING *uis));
int UI_method_set_closer(UI_METHOD *method, int (*closer) (UI *ui));
int UI_method_set_data_duplicator(UI_METHOD *method,
                          void *(*duplicator) (UI *ui, void *ui_data),
                          void (*destructor)(UI *ui, void *ui_data));
int UI_method_set_prompt_constructor(UI_METHOD *method,
                            char *(*prompt_constructor) (UI *ui,
                                                         const char
                                                         *phrase_desc,
                                                         const char
                                                         *object_name));
int UI_method_set_ex_data(UI_METHOD *method,
 int idx, void *data);
int (*UI_method_get_opener(const UI_METHOD *method)) (UI *);
int (*UI_method_get_writer(const UI_METHOD *method)) (UI *, UI_STRING *);
int (*UI_method_get_flusher(const UI_METHOD *method)) (UI *);
int (*UI_method_get_reader(const UI_METHOD *method)) (UI *, UI_STRING *);
int (*UI_method_get_closer(const UI_METHOD *method)) (UI *);
char *(*UI_method_get_prompt_constructor(const UI_METHOD *method))
   (UI *, const char *, const char *);
void *(*UI_method_get_data_duplicator(const UI_METHOD *method)) (UI *, void *);
void (*UI_method_get_data_destructor(const UI_METHOD *method)) (UI *, void *);
const void *UI_method_get_ex_data(const UI_METHOD *method, int idx);

/*
* The following functions are helpers for method writers to access relevant
* data from a UI_STRING.
*/

/* Return type of the UI_STRING */
enum UI_string_types UI_get_string_type(UI_STRING *uis);
/* Return input flags of the UI_STRING */
int UI_get_input_flags(UI_STRING *uis);
/* Return the actual string
 to output (the prompt, info or error) */
const char *UI_get0_output_string(UI_STRING *uis);
/*
* Return the optional action string to output (the boolean prompt
```

```
* instruction)
*/
const char *UI_get0_action_string(UI_STRING *uis);
/* Return the result of a prompt */
const char *UI_get0_result_string(UI_STRING *uis);
int UI_get_result_string_length(UI_STRING *uis);
/*
* Return the string to test the result against.  Only useful with verifies.
*/
const char *UI_get0_test_string(UI_STRING *uis);
/* Return the required minimum size of the result */
int UI_get_result_minsize(UI_STRING *uis);
/* Return the required maximum size of the result */
int UI_get_result_maxsize(UI_STRING *uis);
/* Set the result of a UI_STRING. */
int UI_set_result(UI *ui, UI_STRING *uis, const char *result);
int UI_set_result_ex(UI *ui, UI_STRING *uis, const char *result, int len);

/* A couple of popular utility functions */
int UI_UTIL_read_pw_string(char *buf, int length, const char *prompt,

                           int verify);
int UI_UTIL_read_pw(char *buf, char *buff, int size, const char *prompt,
                    int verify);
UI_METHOD *UI_UTIL_wrap_read_pem_callback(pem_password_cb *cb, int rwflag);


# ifdef  __cplusplus
}
# endif
#endif
```

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File: aclocal.m4 (only for ICU4C)
Section: pkg.m4 - Macros to locate and utilise pkg-config.

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"""

```
/*
* WARNING: do not edit!
* Generated by util/mkbuildinf.pl
*
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* https://www.openssl.org/source/license.html
*/

#define PLATFORM "platform: BSD-x86_64"
#define DATE "built on: Wed Mar  5 20:59:54 2025 UTC"

/*
* Generate compiler_flags as an array of individual characters. This is a
* workaround for the situation where CFLAGS gets too long for a C90 string
* literal
*/
static const char compiler_flags[] = {
  'c','o','m','p','i','l','e','r',':',' ','.','.','/','c','o','n',
  'f','i','g','/','f','a','k','e','_','g','c','c','.','p','l',' ',
  '-','f','P','I','C',' ','-','p','t','h','r','e','a','d',' ','-',
  'W','a',',','-','-','n','o','e','x','e','c','s','t','a','c','k',
  ' ','-','W','a','l','l','
```

```
 ,'-','O','3',' ','-','D','L','_','E',
  'N','D','I','A','N',' ','-','D','O','P','E','N','S','S','L','_',
  'P','I','C',' ','-','D','_','T','H','R','E','A','D','_','S','A',
  'F','E',' ','-','D','_','R','E','E','N','T','R','A','N','T',' ',
  '-','D','O','P','E','N','S','S','L','_','B','U','I','L','D','I',
  'N','G','_','O','P','E','N','S','S','L',' ','-','D','N','D','E',
  'B','U','G','\0'
};
UNRECOGNIZED LICENSE; MD5 sum: 991175f9d8effe5f2fdf0fc7f6380984
/*
* WARNING: do not edit!
* Generated by util/mkbuildinf.pl
*
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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#define PLATFORM "platform: BSD-x86_64"
#define DATE "built on: Wed Mar  5 21:00:10 2025 UTC"

/*
* Generate compiler_flags as an array of individual characters. This is a
* workaround for the situation where CFLAGS gets too long for a C90 string
* literal
*/
static const char compiler_flags[] = {
  'c','o','m','p','i','l','e','r',':',' ','c','c',' ','-','f','P',
  'I','C',' ','-','p','t','h','r','e','a','d',' ','-','W','a','l',
  'l',' ','-','O','3',' ','-','D','L','_','E','N','D','I','A','N',
  ' ','-','D','O','P','E','N','S','S','L','_','P','I','C',' ','-',
  'D','_','T','H','R','E','A','D','_','S','A','F','E','
 ','-','D',
  '_','R','E','E','N','T','R','A','N','T',' ','-','D','O','P','E',
  'N','S','S','L','_','B','U','I','L','D','I','N','G','_','O','P',
  'E','N','S','S','L',' ','-','D','N','D','E','B','U','G','\0'
};
/*
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* this file except in compliance with the License.  You can obtain a copy
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* https://www.openssl.org/source/license.html
*/
```

```
#ifndef OPENSSL_ERR_H
# define OPENSSL_ERR_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_ERR_H
# endif

# include <openssl/e_os2.h>

# ifndef OPENSSL_NO_STDIO
#  include <stdio.h>
#  include <stdlib.h>
# endif

# include <openssl/types.h>
# include <openssl/bio.h>
# include <openssl/lhash.h>
# include <openssl/cryptoerr_legacy.h>

#ifdef  __cplusplus
extern "C" {
#endif

# ifndef OPENSSL_NO_DEPRECATED_3_0
#  ifndef OPENSSL_NO_FILENAMES
#   define ERR_PUT_error(l,f,r,fn,ln)      ERR_put_error(l,f,r,fn,ln)
#  else
#   define ERR_PUT_error(l,f,r,fn,ln)      ERR_put_error(l,f,r,NULL,0)
#  endif
# endif

# include
 <limits.h>
# include <errno.h>

# define ERR_TXT_MALLOCED        0x01
# define ERR_TXT_STRING          0x02

# if !defined(OPENSSL_NO_DEPRECATED_3_0) || defined(OSSL_FORCE_ERR_STATE)
#  define ERR_FLAG_MARK           0x01
#  define ERR_FLAG_CLEAR          0x02

#  define ERR_NUM_ERRORS  16
```

```
struct err_state_st {
  int err_flags[ERR_NUM_ERRORS];
  int err_marks[ERR_NUM_ERRORS];
  unsigned long err_buffer[ERR_NUM_ERRORS];
  char *err_data[ERR_NUM_ERRORS];
  size_t err_data_size[ERR_NUM_ERRORS];
  int err_data_flags[ERR_NUM_ERRORS];
  char *err_file[ERR_NUM_ERRORS];
  int err_line[ERR_NUM_ERRORS];
  char *err_func[ERR_NUM_ERRORS];
  int top, bottom;
};
# endif

/* library */
# define ERR_LIB_NONE          1
# define ERR_LIB_SYS           2
# define ERR_LIB_BN            3
# define ERR_LIB_RSA           4
# define ERR_LIB_DH            5
# define ERR_LIB_EVP           6
# define ERR_LIB_BUF           7
# define ERR_LIB_OBJ           8
# define ERR_LIB_PEM
          9
# define ERR_LIB_DSA           10
# define ERR_LIB_X509          11
/* #define ERR_LIB_METH       12 */
# define ERR_LIB_ASN1          13
# define ERR_LIB_CONF          14
# define ERR_LIB_CRYPTO        15
# define ERR_LIB_EC            16
# define ERR_LIB_SSL           20
/* #define ERR_LIB_SSL23      21 */
/* #define ERR_LIB_SSL2       22 */
/* #define ERR_LIB_SSL3       23 */
/* #define ERR_LIB_RSAREF     30 */
/* #define ERR_LIB_PROXY      31 */
# define ERR_LIB_BIO           32
# define ERR_LIB_PKCS7         33
# define ERR_LIB_X509V3        34
# define ERR_LIB_PKCS12        35
# define ERR_LIB_RAND          36
# define ERR_LIB_DSO           37
# define ERR_LIB_ENGINE        38
# define ERR_LIB_OCSP          39
# define ERR_LIB_UI            40
# define ERR_LIB_COMP          41
```

```
# define ERR_LIB_ECDSA          42
# define ERR_LIB_ECDH           43
# define ERR_LIB_OSSL_STORE     44
# define ERR_LIB_FIPS
   45
# define ERR_LIB_CMS            46
# define ERR_LIB_TS             47
# define ERR_LIB_HMAC           48
/* # define ERR_LIB_JPAKE       49 */
# define ERR_LIB_CT             50
# define ERR_LIB_ASYNC          51
# define ERR_LIB_KDF            52
# define ERR_LIB_SM2            53
# define ERR_LIB_ESS            54
# define ERR_LIB_PROP           55
# define ERR_LIB_CRMF           56
# define ERR_LIB_PROV           57
# define ERR_LIB_CMP            58
# define ERR_LIB_OSSL_ENCODER    59
# define ERR_LIB_OSSL_DECODER    60
# define ERR_LIB_HTTP           61

# define ERR_LIB_USER           128

# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define ASN1err(f, r) ERR_raise_data(ERR_LIB_ASN1, (r), NULL)
#  define ASYNCerr(f, r) ERR_raise_data(ERR_LIB_ASYNC, (r), NULL)
#  define BIOerr(f, r) ERR_raise_data(ERR_LIB_BIO, (r), NULL)
#  define BNerr(f, r)  ERR_raise_data(ERR_LIB_BN, (r), NULL)
#  define BUFerr(f, r) ERR_raise_data(ERR_LIB_BUF, (r), NULL)
#  define CMPerr(f, r) ERR_raise_data(ERR_LIB_CMP,
 (r), NULL)
#  define CMSerr(f, r) ERR_raise_data(ERR_LIB_CMS, (r), NULL)
#  define COMPerr(f, r) ERR_raise_data(ERR_LIB_COMP, (r), NULL)
#  define CONFerr(f, r) ERR_raise_data(ERR_LIB_CONF, (r), NULL)
#  define CRMFerr(f, r) ERR_raise_data(ERR_LIB_CRMF, (r), NULL)
#  define CRYPTOerr(f, r) ERR_raise_data(ERR_LIB_CRYPTO, (r), NULL)
#  define CTerr(f, r) ERR_raise_data(ERR_LIB_CT, (r), NULL)
#  define DHerr(f, r)  ERR_raise_data(ERR_LIB_DH, (r), NULL)
#  define DSAerr(f, r) ERR_raise_data(ERR_LIB_DSA, (r), NULL)
#  define DSOerr(f, r) ERR_raise_data(ERR_LIB_DSO, (r), NULL)
#  define ECDHerr(f, r) ERR_raise_data(ERR_LIB_ECDH, (r), NULL)
#  define ECDSAerr(f, r) ERR_raise_data(ERR_LIB_ECDSA, (r), NULL)
#  define ECerr(f, r)  ERR_raise_data(ERR_LIB_EC, (r), NULL)
#  define ENGINEerr(f, r) ERR_raise_data(ERR_LIB_ENGINE, (r), NULL)
#  define ESSerr(f, r) ERR_raise_data(ERR_LIB_ESS, (r), NULL)
#  define EVPerr(f, r) ERR_raise_data(ERR_LIB_EVP, (r), NULL)
#  define FIPSerr(f,
```

```
 r) ERR_raise_data(ERR_LIB_FIPS, (r), NULL)
#  define HMACerr(f, r) ERR_raise_data(ERR_LIB_HMAC, (r), NULL)
#  define HTTPerr(f, r) ERR_raise_data(ERR_LIB_HTTP, (r), NULL)
#  define KDFerr(f, r) ERR_raise_data(ERR_LIB_KDF, (r), NULL)
#  define OBJerr(f, r) ERR_raise_data(ERR_LIB_OBJ, (r), NULL)
#  define OCSPerr(f, r) ERR_raise_data(ERR_LIB_OCSP, (r), NULL)
#  define OSSL_STOREerr(f, r) ERR_raise_data(ERR_LIB_OSSL_STORE, (r), NULL)
#  define PEMerr(f, r) ERR_raise_data(ERR_LIB_PEM, (r), NULL)
#  define PKCS12err(f, r) ERR_raise_data(ERR_LIB_PKCS12, (r), NULL)
#  define PKCS7err(f, r) ERR_raise_data(ERR_LIB_PKCS7, (r), NULL)
#  define PROPerr(f, r) ERR_raise_data(ERR_LIB_PROP, (r), NULL)
#  define PROVerr(f, r) ERR_raise_data(ERR_LIB_PROV, (r), NULL)
#  define RANDerr(f, r) ERR_raise_data(ERR_LIB_RAND, (r), NULL)
#  define RSAerr(f, r) ERR_raise_data(ERR_LIB_RSA, (r), NULL)
#  define KDFerr(f, r) ERR_raise_data(ERR_LIB_KDF, (r), NULL)
#  define SM2err(f, r) ERR_raise_data(ERR_LIB_SM2,
 (r), NULL)
#  define SSLerr(f, r) ERR_raise_data(ERR_LIB_SSL, (r), NULL)
#  define SYSerr(f, r) ERR_raise_data(ERR_LIB_SYS, (r), NULL)
#  define TSerr(f, r) ERR_raise_data(ERR_LIB_TS, (r), NULL)
#  define UIerr(f, r) ERR_raise_data(ERR_LIB_UI, (r), NULL)
#  define X509V3err(f, r) ERR_raise_data(ERR_LIB_X509V3, (r), NULL)
#  define X509err(f, r) ERR_raise_data(ERR_LIB_X509, (r), NULL)
# endif

/*-
* The error code packs differently depending on if it records a system
* error or an OpenSSL error.
*
* A system error packs like this (we follow POSIX and only allow positive
* numbers that fit in an |int|):
*
* +-+-------------------------------------------------------------+
* |1|                  system error number                        |
* +-+-------------------------------------------------------------+
*
* An OpenSSL error packs like this:
*
* <---------------------------- 32 bits -------------------------->
*    <--- 8 bits --->< ------------------ 23 bits ----------------->
 * +-+---------------+---------------------------------------------+
* |0|    library    |                  reason                     |
* +-+---------------+---------------------------------------------+
*
* A few of the reason bits are reserved as flags with special meaning:
*
*                  <5 bits-<>--------- 19 bits ----------------->
*                 +-------+-+-----------------------------------+
```

```
*                | rflags| |         reason                |
*                +-------+-+-----------------------------------+
*                        ^
*                        |
*                       ERR_RFLAG_FATAL = ERR_R_FATAL
*
* The reason flags are part of the overall reason code for practical
* reasons, as they provide an easy way to place different types of
* reason codes in different numeric ranges.
*
* The currently known reason flags are:
*
* ERR_RFLAG_FATAL      Flags that the reason code is considered fatal.
*
                      For backward compatibility reasons, this flag
*                       is also the code for ERR_R_FATAL (that reason
*                       code served the dual purpose of flag and reason
*                       code in one in pre-3.0 OpenSSL).
* ERR_RFLAG_COMMON     Flags that the reason code is common to all
*                       libraries.  All ERR_R_ macros must use this flag,
*                       and no other _R_ macro is allowed to use it.
*/

/* Macros to help decode recorded system errors */
# define ERR_SYSTEM_FLAG              ((unsigned int)INT_MAX + 1)
# define ERR_SYSTEM_MASK               ((unsigned int)INT_MAX)

/*
* Macros to help decode recorded OpenSSL errors
* As expressed above, RFLAGS and REASON overlap by one bit to allow
* ERR_R_FATAL to use ERR_RFLAG_FATAL as its reason code.
*/
# define ERR_LIB_OFFSET               23L
# define ERR_LIB_MASK                0xFF
# define ERR_RFLAGS_OFFSET             18L
# define ERR_RFLAGS_MASK
            0x1F
# define ERR_REASON_MASK              0X7FFFFF

/*
* Reason flags are defined pre-shifted to easily combine with the reason
* number.
*/
# define ERR_RFLAG_FATAL              (0x1 << ERR_RFLAGS_OFFSET)
# define ERR_RFLAG_COMMON              (0x2 << ERR_RFLAGS_OFFSET)

# define ERR_SYSTEM_ERROR(errcode)      (((errcode) & ERR_SYSTEM_FLAG) != 0)
```

```
static ossl_unused ossl_inline int ERR_GET_LIB(unsigned long errcode)
{
  if (ERR_SYSTEM_ERROR(errcode))
     return ERR_LIB_SYS;
  return (errcode >> ERR_LIB_OFFSET) & ERR_LIB_MASK;
}

static ossl_unused ossl_inline int ERR_GET_RFLAGS(unsigned long errcode)
{
  if (ERR_SYSTEM_ERROR(errcode))
     return 0;
  return errcode & (ERR_RFLAGS_MASK << ERR_RFLAGS_OFFSET);
}

static ossl_unused ossl_inline int ERR_GET_REASON(unsigned long errcode)
{
  if (ERR_SYSTEM_ERROR(errcode))
     return errcode & ERR_SYSTEM_MASK;
  return errcode & ERR_REASON_MASK;
}

static ossl_unused ossl_inline int ERR_FATAL_ERROR(unsigned
 long errcode)
{
  return (ERR_GET_RFLAGS(errcode) & ERR_RFLAG_FATAL) != 0;
}

static ossl_unused ossl_inline int ERR_COMMON_ERROR(unsigned long errcode)
{
  return (ERR_GET_RFLAGS(errcode) & ERR_RFLAG_COMMON) != 0;
}

/*
* ERR_PACK is a helper macro to properly pack OpenSSL error codes and may
* only be used for that purpose.  System errors are packed internally.
* ERR_PACK takes reason flags and reason code combined in |reason|.
* ERR_PACK ignores |func|, that parameter is just legacy from pre-3.0 OpenSSL.
*/
# define ERR_PACK(lib,func,reason)                              \
  ( (((unsigned long)(lib)    & ERR_LIB_MASK   ) << ERR_LIB_OFFSET) | \
    (((unsigned long)(reason) & ERR_REASON_MASK)) )

# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SYS_F_FOPEN            0
#  define SYS_F_CONNECT          0
#  define SYS_F_GETSERVBYNAME    0
#  define SYS_F_SOCKET           0
#  define SYS_F_IOCTLSOCKET      0
```

```
#  define SYS_F_BIND            0
#
  define SYS_F_LISTEN           0
#  define SYS_F_ACCEPT          0
#  define SYS_F_WSASTARTUP      0
#  define SYS_F_OPENDIR         0
#  define SYS_F_FREAD           0
#  define SYS_F_GETADDRINFO     0
#  define SYS_F_GETNAMEINFO     0
#  define SYS_F_SETSOCKOPT      0
#  define SYS_F_GETSOCKOPT      0
#  define SYS_F_GETSOCKNAME     0
#  define SYS_F_GETHOSTBYNAME   0
#  define SYS_F_FFLUSH          0
#  define SYS_F_OPEN            0
#  define SYS_F_CLOSE           0
#  define SYS_F_IOCTL           0
#  define SYS_F_STAT            0
#  define SYS_F_FCNTL           0
#  define SYS_F_FSTAT           0
#  define SYS_F_SENDFILE        0
# endif

/*
* All ERR_R_ codes must be combined with ERR_RFLAG_COMMON.
*/

/* "we came from here" global reason codes, range 1..255 */
# define ERR_R_SYS_LIB         (ERR_LIB_SYS/* 2 */ | ERR_RFLAG_COMMON)
# define ERR_R_BN_LIB          (ERR_LIB_BN/* 3 */ | ERR_RFLAG_COMMON)
# define ERR_R_RSA_LIB         (ERR_LIB_RSA/*
 4 */ | ERR_RFLAG_COMMON)
# define ERR_R_DH_LIB          (ERR_LIB_DH/* 5 */ | ERR_RFLAG_COMMON)
# define ERR_R_EVP_LIB         (ERR_LIB_EVP/* 6 */ | ERR_RFLAG_COMMON)
# define ERR_R_BUF_LIB         (ERR_LIB_BUF/* 7 */ | ERR_RFLAG_COMMON)
# define ERR_R_OBJ_LIB         (ERR_LIB_OBJ/* 8 */ | ERR_RFLAG_COMMON)
# define ERR_R_PEM_LIB         (ERR_LIB_PEM/* 9 */ | ERR_RFLAG_COMMON)
# define ERR_R_DSA_LIB         (ERR_LIB_DSA/* 10 */ | ERR_RFLAG_COMMON)
# define ERR_R_X509_LIB        (ERR_LIB_X509/* 11 */ | ERR_RFLAG_COMMON)
# define ERR_R_ASN1_LIB        (ERR_LIB_ASN1/* 13 */ | ERR_RFLAG_COMMON)
# define ERR_R_CONF_LIB        (ERR_LIB_CONF/* 14 */ | ERR_RFLAG_COMMON)
# define ERR_R_CRYPTO_LIB      (ERR_LIB_CRYPTO/* 15 */ | ERR_RFLAG_COMMON)
# define ERR_R_EC_LIB          (ERR_LIB_EC/* 16 */ | ERR_RFLAG_COMMON)
# define ERR_R_SSL_LIB         (ERR_LIB_SSL/* 20 */ | ERR_RFLAG_COMMON)
# define ERR_R_BIO_LIB         (ERR_LIB_BIO/* 32 */ | ERR_RFLAG_COMMON)
# define ERR_R_PKCS7_LIB
      (ERR_LIB_PKCS7/* 33 */ | ERR_RFLAG_COMMON)
# define ERR_R_X509V3_LIB      (ERR_LIB_X509V3/* 34 */ | ERR_RFLAG_COMMON)
```

```
# define ERR_R_PKCS12_LIB       (ERR_LIB_PKCS12/* 35 */ | ERR_RFLAG_COMMON)
# define ERR_R_RAND_LIB         (ERR_LIB_RAND/* 36 */ | ERR_RFLAG_COMMON)
# define ERR_R_DSO_LIB          (ERR_LIB_DSO/* 37 */ | ERR_RFLAG_COMMON)
# define ERR_R_ENGINE_LIB       (ERR_LIB_ENGINE/* 38 */ | ERR_RFLAG_COMMON)
# define ERR_R_UI_LIB           (ERR_LIB_UI/* 40 */ | ERR_RFLAG_COMMON)
# define ERR_R_ECDSA_LIB        (ERR_LIB_ECDSA/* 42 */ | ERR_RFLAG_COMMON)
# define ERR_R_OSSL_STORE_LIB   (ERR_LIB_OSSL_STORE/* 44 */ | ERR_RFLAG_COMMON)
# define ERR_R_CMS_LIB          (ERR_LIB_CMS/* 46 */ | ERR_RFLAG_COMMON)
# define ERR_R_TS_LIB           (ERR_LIB_TS/* 47 */ | ERR_RFLAG_COMMON)
# define ERR_R_CT_LIB           (ERR_LIB_CT/* 50 */ | ERR_RFLAG_COMMON)
# define ERR_R_PROV_LIB         (ERR_LIB_PROV/* 57 */ | ERR_RFLAG_COMMON)
# define ERR_R_ESS_LIB          (ERR_LIB_ESS/* 54
 */ | ERR_RFLAG_COMMON)
# define ERR_R_CMP_LIB          (ERR_LIB_CMP/* 58 */ | ERR_RFLAG_COMMON)
# define ERR_R_OSSL_ENCODER_LIB (ERR_LIB_OSSL_ENCODER/* 59 */ | ERR_RFLAG_COMMON)
# define ERR_R_OSSL_DECODER_LIB (ERR_LIB_OSSL_DECODER/* 60 */ | ERR_RFLAG_COMMON)

/* Other common error codes, range 256..2^ERR_RFLAGS_OFFSET-1 */
# define ERR_R_FATAL                    (ERR_RFLAG_FATAL|ERR_RFLAG_COMMON)
# define ERR_R_MALLOC_FAILURE           (256|ERR_R_FATAL)
# define ERR_R_SHOULD_NOT_HAVE_BEEN_CALLED      (257|ERR_R_FATAL)
# define ERR_R_PASSED_NULL_PARAMETER    (258|ERR_R_FATAL)
# define ERR_R_INTERNAL_ERROR           (259|ERR_R_FATAL)
# define ERR_R_DISABLED                 (260|ERR_R_FATAL)
# define ERR_R_INIT_FAIL                (261|ERR_R_FATAL)
# define ERR_R_PASSED_INVALID_ARGUMENT  (262|ERR_RFLAG_COMMON)
# define ERR_R_OPERATION_FAIL           (263|ERR_R_FATAL)
# define ERR_R_INVALID_PROVIDER_FUNCTIONS
  (264|ERR_R_FATAL)
# define ERR_R_INTERRUPTED_OR_CANCELLED (265|ERR_RFLAG_COMMON)
# define ERR_R_NESTED_ASN1_ERROR        (266|ERR_RFLAG_COMMON)
# define ERR_R_MISSING_ASN1_EOS         (267|ERR_RFLAG_COMMON)
# define ERR_R_UNSUPPORTED              (268|ERR_RFLAG_COMMON)
# define ERR_R_FETCH_FAILED             (269|ERR_RFLAG_COMMON)
# define ERR_R_INVALID_PROPERTY_DEFINITION      (270|ERR_RFLAG_COMMON)
# define ERR_R_UNABLE_TO_GET_READ_LOCK  (271|ERR_R_FATAL)
# define ERR_R_UNABLE_TO_GET_WRITE_LOCK (272|ERR_R_FATAL)

typedef struct ERR_string_data_st {
  unsigned long error;
  const char *string;
} ERR_STRING_DATA;

DEFINE_LHASH_OF_INTERNAL(ERR_STRING_DATA);
#define lh_ERR_STRING_DATA_new(hfn, cmp) ((LHASH_OF(ERR_STRING_DATA)
*)OPENSSL_LH_new(ossl_check_ERR_STRING_DATA_lh_hashfunc_type(hfn),
ossl_check_ERR_STRING_DATA_lh_compfunc_type(cmp)))
#define lh_ERR_STRING_DATA_free(lh) OPENSSL_LH_free(ossl_check_ERR_STRING_DATA_lh_type(lh))
```

```
#define
 lh_ERR_STRING_DATA_flush(lh) OPENSSL_LH_flush(ossl_check_ERR_STRING_DATA_lh_type(lh))
#define lh_ERR_STRING_DATA_insert(lh, ptr) ((ERR_STRING_DATA
*)OPENSSL_LH_insert(ossl_check_ERR_STRING_DATA_lh_type(lh),
ossl_check_ERR_STRING_DATA_lh_plain_type(ptr)))
#define lh_ERR_STRING_DATA_delete(lh, ptr) ((ERR_STRING_DATA
*)OPENSSL_LH_delete(ossl_check_ERR_STRING_DATA_lh_type(lh),
ossl_check_const_ERR_STRING_DATA_lh_plain_type(ptr)))
#define lh_ERR_STRING_DATA_retrieve(lh, ptr) ((ERR_STRING_DATA
*)OPENSSL_LH_retrieve(ossl_check_ERR_STRING_DATA_lh_type(lh),
ossl_check_const_ERR_STRING_DATA_lh_plain_type(ptr)))
#define lh_ERR_STRING_DATA_error(lh) OPENSSL_LH_error(ossl_check_ERR_STRING_DATA_lh_type(lh))
#define lh_ERR_STRING_DATA_num_items(lh)
OPENSSL_LH_num_items(ossl_check_ERR_STRING_DATA_lh_type(lh))
#define lh_ERR_STRING_DATA_node_stats_bio(lh, out)
OPENSSL_LH_node_stats_bio(ossl_check_const_ERR_STRING_DATA_lh_type(lh), out)
#define lh_ERR_STRING_DATA_node_usage_stats_bio(lh,
 out) OPENSSL_LH_node_usage_stats_bio(ossl_check_const_ERR_STRING_DATA_lh_type(lh), out)
#define lh_ERR_STRING_DATA_stats_bio(lh, out)
OPENSSL_LH_stats_bio(ossl_check_const_ERR_STRING_DATA_lh_type(lh), out)
#define lh_ERR_STRING_DATA_get_down_load(lh)
OPENSSL_LH_get_down_load(ossl_check_ERR_STRING_DATA_lh_type(lh))
#define lh_ERR_STRING_DATA_set_down_load(lh, dl)
OPENSSL_LH_set_down_load(ossl_check_ERR_STRING_DATA_lh_type(lh), dl)
#define lh_ERR_STRING_DATA_doall(lh, dfn)
OPENSSL_LH_doall(ossl_check_ERR_STRING_DATA_lh_type(lh),
ossl_check_ERR_STRING_DATA_lh_doallfunc_type(dfn))


/* 12 lines and some on an 80 column terminal */
#define ERR_MAX_DATA_SIZE       1024

/* Building blocks */
void ERR_new(void);
void ERR_set_debug(const char *file, int line, const char *func);
void ERR_set_error(int lib, int reason, const char *fmt, ...);
void ERR_vset_error(int lib, int reason, const char *fmt, va_list args);

/* Main error raising functions */
# define ERR_raise(lib, reason) ERR_raise_data((lib),(reason),NULL)
#
 define ERR_raise_data                              \
  (ERR_new(),                                       \
   ERR_set_debug(OPENSSL_FILE,OPENSSL_LINE,OPENSSL_FUNC),     \
   ERR_set_error)

# ifndef OPENSSL_NO_DEPRECATED_3_0
/* Backward compatibility */
```

```
#  define ERR_put_error(lib, func, reason, file, line)         \
   (ERR_new(),                                                 \
    ERR_set_debug((file), (line), OPENSSL_FUNC),               \
    ERR_set_error((lib), (reason), NULL))
# endif

void ERR_set_error_data(char *data, int flags);

unsigned long ERR_get_error(void);
unsigned long ERR_get_error_all(const char **file, int *line,
                                const char **func,
                                const char **data, int *flags);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
unsigned long ERR_get_error_line(const char **file, int *line);
OSSL_DEPRECATEDIN_3_0
unsigned long ERR_get_error_line_data(const
 char **file, int *line,
                                      const char **data, int *flags);
#endif
unsigned long ERR_peek_error(void);
unsigned long ERR_peek_error_line(const char **file, int *line);
unsigned long ERR_peek_error_func(const char **func);
unsigned long ERR_peek_error_data(const char **data, int *flags);
unsigned long ERR_peek_error_all(const char **file, int *line,
                                 const char **func,
                                 const char **data, int *flags);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
unsigned long ERR_peek_error_line_data(const char **file, int *line,
                                       const char **data, int *flags);
# endif
unsigned long ERR_peek_last_error(void);
unsigned long ERR_peek_last_error_line(const char **file, int *line);
unsigned long ERR_peek_last_error_func(const char **func);
unsigned long ERR_peek_last_error_data(const char **data, int *flags);
unsigned long ERR_peek_last_error_all(const
 char **file, int *line,
                                      const char **func,
                                      const char **data, int *flags);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
unsigned long ERR_peek_last_error_line_data(const char **file, int *line,
                                            const char **data, int *flags);
# endif

void ERR_clear_error(void);
```

```
char *ERR_error_string(unsigned long e, char *buf);
void ERR_error_string_n(unsigned long e, char *buf, size_t len);
const char *ERR_lib_error_string(unsigned long e);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 const char *ERR_func_error_string(unsigned long e);
# endif
const char *ERR_reason_error_string(unsigned long e);

void ERR_print_errors_cb(int (*cb) (const char *str, size_t len, void *u),
                         void *u);
# ifndef OPENSSL_NO_STDIO
void ERR_print_errors_fp(FILE *fp);
# endif
void ERR_print_errors(BIO *bp);

void ERR_add_error_data(int num, ...);
void ERR_add_error_vdata(int
 num, va_list args);
void ERR_add_error_txt(const char *sepr, const char *txt);
void ERR_add_error_mem_bio(const char *sep, BIO *bio);

int ERR_load_strings(int lib, ERR_STRING_DATA *str);
int ERR_load_strings_const(const ERR_STRING_DATA *str);
int ERR_unload_strings(int lib, ERR_STRING_DATA *str);

#ifndef OPENSSL_NO_DEPRECATED_1_1_0
# define ERR_load_crypto_strings() \
  OPENSSL_init_crypto(OPENSSL_INIT_LOAD_CRYPTO_STRINGS, NULL)
# define ERR_free_strings() while(0) continue
#endif
#ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 void ERR_remove_thread_state(void *);
#endif
#ifndef OPENSSL_NO_DEPRECATED_1_0_0
OSSL_DEPRECATEDIN_1_0_0 void ERR_remove_state(unsigned long pid);
#endif
#ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 ERR_STATE *ERR_get_state(void);
#endif

int ERR_get_next_error_library(void);

int ERR_set_mark(void);
int ERR_pop_to_mark(void);
int ERR_clear_last_mark(void);

#ifdef  __cplusplus
}
```

```
#endif

#endif
[
 "AGPL-1.0",
 "AGPL-3.0",
 "BSD-2-Clause-FreeBSD",
 "BSD-2-Clause-NetBSD",
 "GFDL-1.1",
 "GFDL-1.2",
 "GFDL-1.3",
 "GPL-1.0",
 "GPL-2.0",
 "GPL-2.0-with-GCC-exception",
 "GPL-2.0-with-autoconf-exception",
 "GPL-2.0-with-bison-exception",
 "GPL-2.0-with-classpath-exception",
 "GPL-2.0-with-font-exception",
 "GPL-3.0",
 "GPL-3.0-with-GCC-exception",
 "GPL-3.0-with-autoconf-exception",
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/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/conf.h.in
*
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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef  OPENSSL_CONF_H
# define OPENSSL_CONF_H
# pragma once
```

```
# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_CONF_H
# endif

# include <openssl/bio.h>
# include <openssl/lhash.h>
# include <openssl/safestack.h>
# include <openssl/e_os2.h>
# include <openssl/types.h>
# include <openssl/conferr.h>

#ifdef  __cplusplus
extern "C" {
#endif

typedef struct {
  char *section;
  char *name;
  char *value;
} CONF_VALUE;

SKM_DEFINE_STACK_OF_INTERNAL(CONF_VALUE, CONF_VALUE, CONF_VALUE)
#define sk_CONF_VALUE_num(sk) OPENSSL_sk_num(ossl_check_const_CONF_VALUE_sk_type(sk))
#define
 sk_CONF_VALUE_value(sk, idx) ((CONF_VALUE
*)OPENSSL_sk_value(ossl_check_const_CONF_VALUE_sk_type(sk), (idx)))
#define sk_CONF_VALUE_new(cmp) ((STACK_OF(CONF_VALUE)
*)OPENSSL_sk_new(ossl_check_CONF_VALUE_compfunc_type(cmp)))
#define sk_CONF_VALUE_new_null() ((STACK_OF(CONF_VALUE) *)OPENSSL_sk_new_null())
#define sk_CONF_VALUE_new_reserve(cmp, n) ((STACK_OF(CONF_VALUE)
*)OPENSSL_sk_new_reserve(ossl_check_CONF_VALUE_compfunc_type(cmp), (n)))
#define sk_CONF_VALUE_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_CONF_VALUE_sk_type(sk), (n))
#define sk_CONF_VALUE_free(sk) OPENSSL_sk_free(ossl_check_CONF_VALUE_sk_type(sk))
#define sk_CONF_VALUE_zero(sk) OPENSSL_sk_zero(ossl_check_CONF_VALUE_sk_type(sk))
#define sk_CONF_VALUE_delete(sk, i) ((CONF_VALUE
*)OPENSSL_sk_delete(ossl_check_CONF_VALUE_sk_type(sk), (i)))
#define sk_CONF_VALUE_delete_ptr(sk, ptr) ((CONF_VALUE
*)OPENSSL_sk_delete_ptr(ossl_check_CONF_VALUE_sk_type(sk), ossl_check_CONF_VALUE_type(ptr)))
#define
 sk_CONF_VALUE_push(sk, ptr) OPENSSL_sk_push(ossl_check_CONF_VALUE_sk_type(sk),
ossl_check_CONF_VALUE_type(ptr))
#define sk_CONF_VALUE_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_CONF_VALUE_sk_type(sk),
ossl_check_CONF_VALUE_type(ptr))
#define sk_CONF_VALUE_pop(sk) ((CONF_VALUE
*)OPENSSL_sk_pop(ossl_check_CONF_VALUE_sk_type(sk)))
#define sk_CONF_VALUE_shift(sk) ((CONF_VALUE
*)OPENSSL_sk_shift(ossl_check_CONF_VALUE_sk_type(sk)))
```

```
#define sk_CONF_VALUE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_CONF_VALUE_sk_type(sk),ossl_check_CONF_VALUE_freefunc_type(freef
unc))
#define sk_CONF_VALUE_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_CONF_VALUE_sk_type(sk),
ossl_check_CONF_VALUE_type(ptr), (idx))
#define sk_CONF_VALUE_set(sk, idx, ptr) ((CONF_VALUE
*)OPENSSL_sk_set(ossl_check_CONF_VALUE_sk_type(sk), (idx), ossl_check_CONF_VALUE_type(ptr)))
#define sk_CONF_VALUE_find(sk, ptr) OPENSSL_sk_find(ossl_check_CONF_VALUE_sk_type(sk),
ossl_check_CONF_VALUE_type(ptr))
#define sk_CONF_VALUE_find_ex(sk,
 ptr) OPENSSL_sk_find_ex(ossl_check_CONF_VALUE_sk_type(sk), ossl_check_CONF_VALUE_type(ptr))
#define sk_CONF_VALUE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_CONF_VALUE_sk_type(sk), ossl_check_CONF_VALUE_type(ptr), pnum)
#define sk_CONF_VALUE_sort(sk) OPENSSL_sk_sort(ossl_check_CONF_VALUE_sk_type(sk))
#define sk_CONF_VALUE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_CONF_VALUE_sk_type(sk))
#define sk_CONF_VALUE_dup(sk) ((STACK_OF(CONF_VALUE)
*)OPENSSL_sk_dup(ossl_check_const_CONF_VALUE_sk_type(sk)))
#define sk_CONF_VALUE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(CONF_VALUE)
*)OPENSSL_sk_deep_copy(ossl_check_const_CONF_VALUE_sk_type(sk),
ossl_check_CONF_VALUE_copyfunc_type(copyfunc), ossl_check_CONF_VALUE_freefunc_type(freefunc)))
#define sk_CONF_VALUE_set_cmp_func(sk, cmp)
((sk_CONF_VALUE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_CONF_VALUE_sk_type(sk),
ossl_check_CONF_VALUE_compfunc_type(cmp)))
DEFINE_LHASH_OF_INTERNAL(CONF_VALUE);
#define
 lh_CONF_VALUE_new(hfn, cmp) ((LHASH_OF(CONF_VALUE)
*)OPENSSL_LH_new(ossl_check_CONF_VALUE_lh_hashfunc_type(hfn),
ossl_check_CONF_VALUE_lh_compfunc_type(cmp)))
#define lh_CONF_VALUE_free(lh) OPENSSL_LH_free(ossl_check_CONF_VALUE_lh_type(lh))
#define lh_CONF_VALUE_flush(lh) OPENSSL_LH_flush(ossl_check_CONF_VALUE_lh_type(lh))
#define lh_CONF_VALUE_insert(lh, ptr) ((CONF_VALUE
*)OPENSSL_LH_insert(ossl_check_CONF_VALUE_lh_type(lh),
ossl_check_CONF_VALUE_lh_plain_type(ptr)))
#define lh_CONF_VALUE_delete(lh, ptr) ((CONF_VALUE
*)OPENSSL_LH_delete(ossl_check_CONF_VALUE_lh_type(lh),
ossl_check_const_CONF_VALUE_lh_plain_type(ptr)))
#define lh_CONF_VALUE_retrieve(lh, ptr) ((CONF_VALUE
*)OPENSSL_LH_retrieve(ossl_check_CONF_VALUE_lh_type(lh),
ossl_check_const_CONF_VALUE_lh_plain_type(ptr)))
#define lh_CONF_VALUE_error(lh) OPENSSL_LH_error(ossl_check_CONF_VALUE_lh_type(lh))
#define lh_CONF_VALUE_num_items(lh) OPENSSL_LH_num_items(ossl_check_CONF_VALUE_lh_type(lh))
#define lh_CONF_VALUE_node_stats_bio(lh,
 out) OPENSSL_LH_node_stats_bio(ossl_check_const_CONF_VALUE_lh_type(lh), out)
#define lh_CONF_VALUE_node_usage_stats_bio(lh, out)
OPENSSL_LH_node_usage_stats_bio(ossl_check_const_CONF_VALUE_lh_type(lh), out)
#define lh_CONF_VALUE_stats_bio(lh, out)
OPENSSL_LH_stats_bio(ossl_check_const_CONF_VALUE_lh_type(lh), out)
```

```
#define lh_CONF_VALUE_get_down_load(lh)
OPENSSL_LH_get_down_load(ossl_check_CONF_VALUE_lh_type(lh))
#define lh_CONF_VALUE_set_down_load(lh, dl)
OPENSSL_LH_set_down_load(ossl_check_CONF_VALUE_lh_type(lh), dl)
#define lh_CONF_VALUE_doall(lh, dfn) OPENSSL_LH_doall(ossl_check_CONF_VALUE_lh_type(lh),
ossl_check_CONF_VALUE_lh_doallfunc_type(dfn))


struct conf_st;
struct conf_method_st;
typedef struct conf_method_st CONF_METHOD;

# ifndef OPENSSL_NO_DEPRECATED_3_0
#  include <openssl/conftypes.h>
# endif

/* Module definitions */
typedef struct conf_imodule_st CONF_IMODULE;
typedef struct conf_module_st CONF_MODULE;

STACK_OF(CONF_MODULE);
STACK_OF(CONF_IMODULE);

/* DSO module
 function typedefs */
typedef int conf_init_func (CONF_IMODULE *md, const CONF *cnf);
typedef void conf_finish_func (CONF_IMODULE *md);

# define CONF_MFLAGS_IGNORE_ERRORS       0x1
# define CONF_MFLAGS_IGNORE_RETURN_CODES 0x2
# define CONF_MFLAGS_SILENT              0x4
# define CONF_MFLAGS_NO_DSO              0x8
# define CONF_MFLAGS_IGNORE_MISSING_FILE 0x10
# define CONF_MFLAGS_DEFAULT_SECTION     0x20

int CONF_set_default_method(CONF_METHOD *meth);
void CONF_set_nconf(CONF *conf, LHASH_OF(CONF_VALUE) *hash);
LHASH_OF(CONF_VALUE) *CONF_load(LHASH_OF(CONF_VALUE) *conf, const char *file,
                                long *eline);
# ifndef OPENSSL_NO_STDIO
LHASH_OF(CONF_VALUE) *CONF_load_fp(LHASH_OF(CONF_VALUE) *conf, FILE *fp,
                                   long *eline);
# endif
LHASH_OF(CONF_VALUE) *CONF_load_bio(LHASH_OF(CONF_VALUE) *conf, BIO *bp,
                                    long *eline);
STACK_OF(CONF_VALUE) *CONF_get_section(LHASH_OF(CONF_VALUE) *conf,
```

```
                        const char *section);
char *CONF_get_string(LHASH_OF(CONF_VALUE) *conf, const char *group,
                      const char *name);
long CONF_get_number(LHASH_OF(CONF_VALUE) *conf, const char *group,
                     const char *name);
void CONF_free(LHASH_OF(CONF_VALUE) *conf);
#ifndef OPENSSL_NO_STDIO
int CONF_dump_fp(LHASH_OF(CONF_VALUE) *conf, FILE *out);
#endif
int CONF_dump_bio(LHASH_OF(CONF_VALUE) *conf, BIO *out);
#ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 void OPENSSL_config(const char *config_name);
#endif

#ifndef OPENSSL_NO_DEPRECATED_1_1_0
# define OPENSSL_no_config() \
  OPENSSL_init_crypto(OPENSSL_INIT_NO_LOAD_CONFIG, NULL)
#endif

/*
* New conf code.  The semantics are different from the functions above. If
* that wasn't the case, the above functions would have been replaced
*/

CONF *NCONF_new_ex(OSSL_LIB_CTX *libctx, CONF_METHOD *meth);
OSSL_LIB_CTX *NCONF_get0_libctx(const CONF *conf);
CONF *NCONF_new(CONF_METHOD
 *meth);
CONF_METHOD *NCONF_default(void);
#ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 CONF_METHOD *NCONF_WIN32(void);
#endif
void NCONF_free(CONF *conf);
void NCONF_free_data(CONF *conf);

int NCONF_load(CONF *conf, const char *file, long *eline);
# ifndef OPENSSL_NO_STDIO
int NCONF_load_fp(CONF *conf, FILE *fp, long *eline);
# endif
int NCONF_load_bio(CONF *conf, BIO *bp, long *eline);
STACK_OF(OPENSSL_CSTRING) *NCONF_get_section_names(const CONF *conf);
STACK_OF(CONF_VALUE) *NCONF_get_section(const CONF *conf,
                                        const char *section);
char *NCONF_get_string(const CONF *conf, const char *group, const char *name);
int NCONF_get_number_e(const CONF *conf, const char *group, const char *name,
                       long *result);
#ifndef OPENSSL_NO_STDIO
int NCONF_dump_fp(const CONF *conf, FILE *out);
```

```
#endif
int NCONF_dump_bio(const CONF *conf, BIO *out);

#define NCONF_get_number(c,g,n,r) NCONF_get_number_e(c,g,n,r)

/* Module functions
 */

int CONF_modules_load(const CONF *cnf, const char *appname,
                      unsigned long flags);
int CONF_modules_load_file_ex(OSSL_LIB_CTX *libctx, const char *filename,
                          const char *appname, unsigned long flags);
int CONF_modules_load_file(const char *filename, const char *appname,
                       unsigned long flags);
void CONF_modules_unload(int all);
void CONF_modules_finish(void);
#ifndef OPENSSL_NO_DEPRECATED_1_1_0
# define CONF_modules_free() while(0) continue
#endif
int CONF_module_add(const char *name, conf_init_func *ifunc,
                    conf_finish_func *ffunc);

const char *CONF_imodule_get_name(const CONF_IMODULE *md);
const char *CONF_imodule_get_value(const CONF_IMODULE *md);
void *CONF_imodule_get_usr_data(const CONF_IMODULE *md);
void CONF_imodule_set_usr_data(CONF_IMODULE *md, void *usr_data);
CONF_MODULE *CONF_imodule_get_module(const CONF_IMODULE *md);
unsigned long CONF_imodule_get_flags(const CONF_IMODULE
 *md);
void CONF_imodule_set_flags(CONF_IMODULE *md, unsigned long flags);
void *CONF_module_get_usr_data(CONF_MODULE *pmod);
void CONF_module_set_usr_data(CONF_MODULE *pmod, void *usr_data);

char *CONF_get1_default_config_file(void);

int CONF_parse_list(const char *list, int sep, int nospc,
                    int (*list_cb) (const char *elem, int len, void *usr),
                    void *arg);

void OPENSSL_load_builtin_modules(void);


# ifdef  __cplusplus
}
# endif
#endif
```

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Located in ./vendor/QRCode
- project has been modified to work in Node and some refactoring was done for code cleanup
/*
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*
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* this file except in compliance with the License. You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

/*

```
* Header for dynamic hash table routines Author - Eric Young
*/

#ifndef OPENSSL_LHASH_H
# define OPENSSL_LHASH_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_LHASH_H
# endif

# include <openssl/e_os2.h>
# include <openssl/bio.h>

#ifdef  __cplusplus
extern "C" {
#endif

typedef struct lhash_node_st OPENSSL_LH_NODE;
typedef int (*OPENSSL_LH_COMPFUNC) (const void *, const void *);
typedef unsigned long (*OPENSSL_LH_HASHFUNC) (const void *);
typedef void (*OPENSSL_LH_DOALL_FUNC) (void *);
typedef void (*OPENSSL_LH_DOALL_FUNCARG) (void *, void *);
typedef struct lhash_st OPENSSL_LHASH;

/*
* Macros for
 declaring and implementing type-safe wrappers for LHASH
* callbacks. This way, callbacks can be provided to LHASH structures without
* function pointer casting and the macro-defined callbacks provide
* per-variable casting before deferring to the underlying type-specific
* callbacks. NB: It is possible to place a "static" in front of both the
* DECLARE and IMPLEMENT macros if the functions are strictly internal.
*/

/* First: "hash" functions */
# define DECLARE_LHASH_HASH_FN(name, o_type) \
      unsigned long name##_LHASH_HASH(const void *);
# define IMPLEMENT_LHASH_HASH_FN(name, o_type) \
      unsigned long name##_LHASH_HASH(const void *arg) { \
            const o_type *a = arg; \
            return name##_hash(a); }
# define LHASH_HASH_FN(name) name##_LHASH_HASH

/* Second: "compare" functions */
# define DECLARE_LHASH_COMP_FN(name, o_type) \
      int name##_LHASH_COMP(const void *, const void *);
```

```
# define IMPLEMENT_LHASH_COMP_FN(name, o_type) \
      int
 name##_LHASH_COMP(const void *arg1, const void *arg2) { \
              const o_type *a = arg1;             \
              const o_type *b = arg2; \
              return name##_cmp(a,b); }
# define LHASH_COMP_FN(name) name##_LHASH_COMP

/* Fourth: "doall_arg" functions */
# define DECLARE_LHASH_DOALL_ARG_FN(name, o_type, a_type) \
      void name##_LHASH_DOALL_ARG(void *, void *);
# define IMPLEMENT_LHASH_DOALL_ARG_FN(name, o_type, a_type) \
      void name##_LHASH_DOALL_ARG(void *arg1, void *arg2) { \
              o_type *a = arg1; \
              a_type *b = arg2; \
              name##_doall_arg(a, b); }
# define LHASH_DOALL_ARG_FN(name) name##_LHASH_DOALL_ARG


# define LH_LOAD_MULT    256

int OPENSSL_LH_error(OPENSSL_LHASH *lh);
OPENSSL_LHASH *OPENSSL_LH_new(OPENSSL_LH_HASHFUNC h, OPENSSL_LH_COMPFUNC c);
void OPENSSL_LH_free(OPENSSL_LHASH *lh);
void OPENSSL_LH_flush(OPENSSL_LHASH *lh);
void *OPENSSL_LH_insert(OPENSSL_LHASH *lh, void *data);
void *OPENSSL_LH_delete(OPENSSL_LHASH
 *lh, const void *data);
void *OPENSSL_LH_retrieve(OPENSSL_LHASH *lh, const void *data);
void OPENSSL_LH_doall(OPENSSL_LHASH *lh, OPENSSL_LH_DOALL_FUNC func);
void OPENSSL_LH_doall_arg(OPENSSL_LHASH *lh, OPENSSL_LH_DOALL_FUNCARG func, void *arg);
unsigned long OPENSSL_LH_strhash(const char *c);
unsigned long OPENSSL_LH_num_items(const OPENSSL_LHASH *lh);
unsigned long OPENSSL_LH_get_down_load(const OPENSSL_LHASH *lh);
void OPENSSL_LH_set_down_load(OPENSSL_LHASH *lh, unsigned long down_load);

# ifndef OPENSSL_NO_STDIO
void OPENSSL_LH_stats(const OPENSSL_LHASH *lh, FILE *fp);
void OPENSSL_LH_node_stats(const OPENSSL_LHASH *lh, FILE *fp);
void OPENSSL_LH_node_usage_stats(const OPENSSL_LHASH *lh, FILE *fp);
# endif
void OPENSSL_LH_stats_bio(const OPENSSL_LHASH *lh, BIO *out);
void OPENSSL_LH_node_stats_bio(const OPENSSL_LHASH *lh, BIO *out);
void OPENSSL_LH_node_usage_stats_bio(const OPENSSL_LHASH *lh, BIO *out);

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define _LHASH OPENSSL_LHASH
#
```

```
  define LHASH_NODE OPENSSL_LH_NODE
#  define lh_error OPENSSL_LH_error
#  define lh_new OPENSSL_LH_new
#  define lh_free OPENSSL_LH_free
#  define lh_insert OPENSSL_LH_insert
#  define lh_delete OPENSSL_LH_delete
#  define lh_retrieve OPENSSL_LH_retrieve
#  define lh_doall OPENSSL_LH_doall
#  define lh_doall_arg OPENSSL_LH_doall_arg
#  define lh_strhash OPENSSL_LH_strhash
#  define lh_num_items OPENSSL_LH_num_items
#  ifndef OPENSSL_NO_STDIO
#   define lh_stats OPENSSL_LH_stats
#   define lh_node_stats OPENSSL_LH_node_stats
#   define lh_node_usage_stats OPENSSL_LH_node_usage_stats
#  endif
#  define lh_stats_bio OPENSSL_LH_stats_bio
#  define lh_node_stats_bio OPENSSL_LH_node_stats_bio
#  define lh_node_usage_stats_bio OPENSSL_LH_node_usage_stats_bio
# endif

/* Type checking... */

# define LHASH_OF(type) struct lhash_st_##type

/* Helper macro for internal use */
# define DEFINE_LHASH_OF_INTERNAL(type) \
   LHASH_OF(type) { union lh_##type##_dummy { void* d1; unsigned long
 d2; int d3; } dummy; }; \
   typedef int (*lh_##type##_compfunc)(const type *a, const type *b); \
   typedef unsigned long (*lh_##type##_hashfunc)(const type *a); \
   typedef void (*lh_##type##_doallfunc)(type *a); \
   static ossl_unused ossl_inline type *ossl_check_##type##_lh_plain_type(type *ptr) \
   { \
       return ptr; \
   } \
   static ossl_unused ossl_inline const type *ossl_check_const_##type##_lh_plain_type(const type *ptr) \
   { \
       return ptr; \
   } \
   static ossl_unused ossl_inline const OPENSSL_LHASH *ossl_check_const_##type##_lh_type(const
LHASH_OF(type) *lh) \
   { \
       return (const OPENSSL_LHASH *)lh; \
   } \
   static ossl_unused ossl_inline OPENSSL_LHASH *ossl_check_##type##_lh_type(LHASH_OF(type) *lh) \
   { \
       return (OPENSSL_LHASH *)lh; \
```

```
  } \
  static ossl_unused ossl_inline OPENSSL_LH_COMPFUNC
ossl_check_##type##_lh_compfunc_type(lh_##type##_compfunc cmp) \
  { \
     return (OPENSSL_LH_COMPFUNC)cmp; \

  } \
  static ossl_unused ossl_inline OPENSSL_LH_HASHFUNC
ossl_check_##type##_lh_hashfunc_type(lh_##type##_hashfunc hfn) \
  { \
     return (OPENSSL_LH_HASHFUNC)hfn; \
  } \
  static ossl_unused ossl_inline OPENSSL_LH_DOALL_FUNC
ossl_check_##type##_lh_doallfunc_type(lh_##type##_doallfunc dfn) \
  { \
     return (OPENSSL_LH_DOALL_FUNC)dfn; \
  } \
  LHASH_OF(type)

# define DEFINE_LHASH_OF(type) \
  LHASH_OF(type) { union lh_##type##_dummy { void* d1; unsigned long d2; int d3; } dummy; }; \
  static ossl_unused ossl_inline LHASH_OF(type) *lh_##type##_new(unsigned long (*hfn)(const type *), \
                                                 int (*cfn)(const type *, const type *)) \
  { \
     return (LHASH_OF(type) *) \
        OPENSSL_LH_new((OPENSSL_LH_HASHFUNC)hfn, (OPENSSL_LH_COMPFUNC)cfn); \
  } \
  static ossl_unused ossl_inline void lh_##type##_free(LHASH_OF(type) *lh) \
  { \
     OPENSSL_LH_free((OPENSSL_LHASH *)lh);
 \
  } \
  static ossl_unused ossl_inline void lh_##type##_flush(LHASH_OF(type) *lh) \
  { \
     OPENSSL_LH_flush((OPENSSL_LHASH *)lh); \
  } \
  static ossl_unused ossl_inline type *lh_##type##_insert(LHASH_OF(type) *lh, type *d) \
  { \
     return (type *)OPENSSL_LH_insert((OPENSSL_LHASH *)lh, d); \
  } \
  static ossl_unused ossl_inline type *lh_##type##_delete(LHASH_OF(type) *lh, const type *d) \
  { \
     return (type *)OPENSSL_LH_delete((OPENSSL_LHASH *)lh, d); \
  } \
  static ossl_unused ossl_inline type *lh_##type##_retrieve(LHASH_OF(type) *lh, const type *d) \
  { \
     return (type *)OPENSSL_LH_retrieve((OPENSSL_LHASH *)lh, d); \
  } \
```

```
  static ossl_unused ossl_inline int lh_##type##_error(LHASH_OF(type) *lh) \
  { \
      return OPENSSL_LH_error((OPENSSL_LHASH *)lh); \
  } \
  static ossl_unused ossl_inline unsigned long lh_##type##_num_items(LHASH_OF(type) *lh) \
  { \
      return OPENSSL_LH_num_items((OPENSSL_LHASH
 *)lh); \
  } \
  static ossl_unused ossl_inline void lh_##type##_node_stats_bio(const LHASH_OF(type) *lh, BIO *out) \
  { \
      OPENSSL_LH_node_stats_bio((const OPENSSL_LHASH *)lh, out); \
  } \
  static ossl_unused ossl_inline void lh_##type##_node_usage_stats_bio(const LHASH_OF(type) *lh, BIO *out) \
  { \
      OPENSSL_LH_node_usage_stats_bio((const OPENSSL_LHASH *)lh, out); \
  } \
  static ossl_unused ossl_inline void lh_##type##_stats_bio(const LHASH_OF(type) *lh, BIO *out) \
  { \
      OPENSSL_LH_stats_bio((const OPENSSL_LHASH *)lh, out); \
  } \
  static ossl_unused ossl_inline unsigned long lh_##type##_get_down_load(LHASH_OF(type) *lh) \
  { \
      return OPENSSL_LH_get_down_load((OPENSSL_LHASH *)lh); \
  } \
  static ossl_unused ossl_inline void lh_##type##_set_down_load(LHASH_OF(type) *lh, unsigned long dl) \
  { \
      OPENSSL_LH_set_down_load((OPENSSL_LHASH *)lh, dl); \
  } \
  static ossl_unused ossl_inline void lh_##type##_doall(LHASH_OF(type)
 *lh, \
                                        void (*doall)(type *)) \
  { \
      OPENSSL_LH_doall((OPENSSL_LHASH *)lh, (OPENSSL_LH_DOALL_FUNC)doall); \
  } \
  static ossl_unused ossl_inline void lh_##type##_doall_arg(LHASH_OF(type) *lh, \
                                            void (*doallarg)(type *, void *), \
                                            void *arg) \
  { \
      OPENSSL_LH_doall_arg((OPENSSL_LHASH *)lh, \
                           (OPENSSL_LH_DOALL_FUNCARG)doallarg, arg); \
  } \
  LHASH_OF(type)

#define IMPLEMENT_LHASH_DOALL_ARG_CONST(type, argtype) \
  int_implement_lhash_doall(type, argtype, const type)

#define IMPLEMENT_LHASH_DOALL_ARG(type, argtype) \
```

```
  int_implement_lhash_doall(type, argtype, type)

#define int_implement_lhash_doall(type, argtype, cbargtype) \
  static ossl_unused ossl_inline void \
    lh_##type##_doall_##argtype(LHASH_OF(type) *lh,
 \
                        void (*fn)(cbargtype *, argtype *), \
                        argtype *arg) \
  { \
    OPENSSL_LH_doall_arg((OPENSSL_LHASH *)lh, (OPENSSL_LH_DOALL_FUNCARG)fn, (void *)arg); \
  } \
  LHASH_OF(type)

DEFINE_LHASH_OF_INTERNAL(OPENSSL_STRING);
#define lh_OPENSSL_STRING_new(hfn, cmp) ((LHASH_OF(OPENSSL_STRING)
*)OPENSSL_LH_new(ossl_check_OPENSSL_STRING_lh_hashfunc_type(hfn),
ossl_check_OPENSSL_STRING_lh_compfunc_type(cmp)))
#define lh_OPENSSL_STRING_free(lh) OPENSSL_LH_free(ossl_check_OPENSSL_STRING_lh_type(lh))
#define lh_OPENSSL_STRING_flush(lh) OPENSSL_LH_flush(ossl_check_OPENSSL_STRING_lh_type(lh))
#define lh_OPENSSL_STRING_insert(lh, ptr) ((OPENSSL_STRING
*)OPENSSL_LH_insert(ossl_check_OPENSSL_STRING_lh_type(lh),
ossl_check_OPENSSL_STRING_lh_plain_type(ptr)))
#define lh_OPENSSL_STRING_delete(lh, ptr) ((OPENSSL_STRING
*)OPENSSL_LH_delete(ossl_check_OPENSSL_STRING_lh_type(lh),
ossl_check_const_OPENSSL_STRING_lh_plain_type(ptr)))
#define
 lh_OPENSSL_STRING_retrieve(lh, ptr) ((OPENSSL_STRING
*)OPENSSL_LH_retrieve(ossl_check_OPENSSL_STRING_lh_type(lh),
ossl_check_const_OPENSSL_STRING_lh_plain_type(ptr)))
#define lh_OPENSSL_STRING_error(lh) OPENSSL_LH_error(ossl_check_OPENSSL_STRING_lh_type(lh))
#define lh_OPENSSL_STRING_num_items(lh)
OPENSSL_LH_num_items(ossl_check_OPENSSL_STRING_lh_type(lh))
#define lh_OPENSSL_STRING_node_stats_bio(lh, out)
OPENSSL_LH_node_stats_bio(ossl_check_const_OPENSSL_STRING_lh_type(lh), out)
#define lh_OPENSSL_STRING_node_usage_stats_bio(lh, out)
OPENSSL_LH_node_usage_stats_bio(ossl_check_const_OPENSSL_STRING_lh_type(lh), out)
#define lh_OPENSSL_STRING_stats_bio(lh, out)
OPENSSL_LH_stats_bio(ossl_check_const_OPENSSL_STRING_lh_type(lh), out)
#define lh_OPENSSL_STRING_get_down_load(lh)
OPENSSL_LH_get_down_load(ossl_check_OPENSSL_STRING_lh_type(lh))
#define lh_OPENSSL_STRING_set_down_load(lh, dl)
OPENSSL_LH_set_down_load(ossl_check_OPENSSL_STRING_lh_type(lh), dl)
#define lh_OPENSSL_STRING_doall(lh,
 dfn) OPENSSL_LH_doall(ossl_check_OPENSSL_STRING_lh_type(lh),
ossl_check_OPENSSL_STRING_lh_doallfunc_type(dfn))
DEFINE_LHASH_OF_INTERNAL(OPENSSL_CSTRING);
#define lh_OPENSSL_CSTRING_new(hfn, cmp) ((LHASH_OF(OPENSSL_CSTRING)
*)OPENSSL_LH_new(ossl_check_OPENSSL_CSTRING_lh_hashfunc_type(hfn),
```

```
ossl_check_OPENSSL_CSTRING_lh_compfunc_type(cmp)))
#define lh_OPENSSL_CSTRING_free(lh) OPENSSL_LH_free(ossl_check_OPENSSL_CSTRING_lh_type(lh))
#define lh_OPENSSL_CSTRING_flush(lh) OPENSSL_LH_flush(ossl_check_OPENSSL_CSTRING_lh_type(lh))
#define lh_OPENSSL_CSTRING_insert(lh, ptr) ((OPENSSL_CSTRING
*)OPENSSL_LH_insert(ossl_check_OPENSSL_CSTRING_lh_type(lh),
ossl_check_OPENSSL_CSTRING_lh_plain_type(ptr)))
#define lh_OPENSSL_CSTRING_delete(lh, ptr) ((OPENSSL_CSTRING
*)OPENSSL_LH_delete(ossl_check_OPENSSL_CSTRING_lh_type(lh),
ossl_check_const_OPENSSL_CSTRING_lh_plain_type(ptr)))
#define lh_OPENSSL_CSTRING_retrieve(lh, ptr) ((OPENSSL_CSTRING
*)OPENSSL_LH_retrieve(ossl_check_OPENSSL_CSTRING_lh_type(lh),
 ossl_check_const_OPENSSL_CSTRING_lh_plain_type(ptr)))
#define lh_OPENSSL_CSTRING_error(lh) OPENSSL_LH_error(ossl_check_OPENSSL_CSTRING_lh_type(lh))
#define lh_OPENSSL_CSTRING_num_items(lh)
OPENSSL_LH_num_items(ossl_check_OPENSSL_CSTRING_lh_type(lh))
#define lh_OPENSSL_CSTRING_node_stats_bio(lh, out)
OPENSSL_LH_node_stats_bio(ossl_check_const_OPENSSL_CSTRING_lh_type(lh), out)
#define lh_OPENSSL_CSTRING_node_usage_stats_bio(lh, out)
OPENSSL_LH_node_usage_stats_bio(ossl_check_const_OPENSSL_CSTRING_lh_type(lh), out)
#define lh_OPENSSL_CSTRING_stats_bio(lh, out)
OPENSSL_LH_stats_bio(ossl_check_const_OPENSSL_CSTRING_lh_type(lh), out)
#define lh_OPENSSL_CSTRING_get_down_load(lh)
OPENSSL_LH_get_down_load(ossl_check_OPENSSL_CSTRING_lh_type(lh))
#define lh_OPENSSL_CSTRING_set_down_load(lh, dl)
OPENSSL_LH_set_down_load(ossl_check_OPENSSL_CSTRING_lh_type(lh), dl)
#define lh_OPENSSL_CSTRING_doall(lh, dfn)
OPENSSL_LH_doall(ossl_check_OPENSSL_CSTRING_lh_type(lh),
ossl_check_OPENSSL_CSTRING_lh_doallfunc_type(dfn))


#ifdef
  __cplusplus
}
#endif

#endif
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/ct.h.in
*
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*
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* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/
```

```
#ifndef OPENSSL_CT_H
# define OPENSSL_CT_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_CT_H
# endif

# include <openssl/opensslconf.h>

# ifndef OPENSSL_NO_CT
# include <openssl/types.h>
# include <openssl/safestack.h>
# include <openssl/x509.h>
# include <openssl/cterr.h>
# ifdef  __cplusplus
extern "C" {
# endif


/* Minimum RSA key size, from RFC6962 */
# define SCT_MIN_RSA_BITS 2048

/* All hashes are SHA256 in v1 of Certificate Transparency */
# define CT_V1_HASHLEN SHA256_DIGEST_LENGTH

SKM_DEFINE_STACK_OF_INTERNAL(SCT,
 SCT, SCT)
#define sk_SCT_num(sk) OPENSSL_sk_num(ossl_check_const_SCT_sk_type(sk))
#define sk_SCT_value(sk, idx) ((SCT *)OPENSSL_sk_value(ossl_check_const_SCT_sk_type(sk), (idx)))
#define sk_SCT_new(cmp) ((STACK_OF(SCT) *)OPENSSL_sk_new(ossl_check_SCT_compfunc_type(cmp)))
#define sk_SCT_new_null() ((STACK_OF(SCT) *)OPENSSL_sk_new_null())
#define sk_SCT_new_reserve(cmp, n) ((STACK_OF(SCT)
*)OPENSSL_sk_new_reserve(ossl_check_SCT_compfunc_type(cmp), (n)))
#define sk_SCT_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_SCT_sk_type(sk), (n))
#define sk_SCT_free(sk) OPENSSL_sk_free(ossl_check_SCT_sk_type(sk))
#define sk_SCT_zero(sk) OPENSSL_sk_zero(ossl_check_SCT_sk_type(sk))
#define sk_SCT_delete(sk, i) ((SCT *)OPENSSL_sk_delete(ossl_check_SCT_sk_type(sk), (i)))
#define sk_SCT_delete_ptr(sk, ptr) ((SCT *)OPENSSL_sk_delete_ptr(ossl_check_SCT_sk_type(sk),
ossl_check_SCT_type(ptr)))
#define sk_SCT_push(sk, ptr) OPENSSL_sk_push(ossl_check_SCT_sk_type(sk), ossl_check_SCT_type(ptr))
#define sk_SCT_unshift(sk,
 ptr) OPENSSL_sk_unshift(ossl_check_SCT_sk_type(sk), ossl_check_SCT_type(ptr))
#define sk_SCT_pop(sk) ((SCT *)OPENSSL_sk_pop(ossl_check_SCT_sk_type(sk)))
#define sk_SCT_shift(sk) ((SCT *)OPENSSL_sk_shift(ossl_check_SCT_sk_type(sk)))
```

```
#define sk_SCT_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SCT_sk_type(sk),ossl_check_SCT_freefunc_type(freefunc))
#define sk_SCT_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SCT_sk_type(sk), ossl_check_SCT_type(ptr),
(idx))
#define sk_SCT_set(sk, idx, ptr) ((SCT *)OPENSSL_sk_set(ossl_check_SCT_sk_type(sk), (idx),
ossl_check_SCT_type(ptr)))
#define sk_SCT_find(sk, ptr) OPENSSL_sk_find(ossl_check_SCT_sk_type(sk), ossl_check_SCT_type(ptr))
#define sk_SCT_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SCT_sk_type(sk), ossl_check_SCT_type(ptr))
#define sk_SCT_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_SCT_sk_type(sk),
ossl_check_SCT_type(ptr), pnum)
#define sk_SCT_sort(sk) OPENSSL_sk_sort(ossl_check_SCT_sk_type(sk))
#define
 sk_SCT_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SCT_sk_type(sk))
#define sk_SCT_dup(sk) ((STACK_OF(SCT) *)OPENSSL_sk_dup(ossl_check_const_SCT_sk_type(sk)))
#define sk_SCT_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(SCT)
*)OPENSSL_sk_deep_copy(ossl_check_const_SCT_sk_type(sk), ossl_check_SCT_copyfunc_type(copyfunc),
ossl_check_SCT_freefunc_type(freefunc)))
#define sk_SCT_set_cmp_func(sk, cmp)
((sk_SCT_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SCT_sk_type(sk),
ossl_check_SCT_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(CTLOG, CTLOG, CTLOG)
#define sk_CTLOG_num(sk) OPENSSL_sk_num(ossl_check_const_CTLOG_sk_type(sk))
#define sk_CTLOG_value(sk, idx) ((CTLOG *)OPENSSL_sk_value(ossl_check_const_CTLOG_sk_type(sk),
(idx)))
#define sk_CTLOG_new(cmp) ((STACK_OF(CTLOG)
*)OPENSSL_sk_new(ossl_check_CTLOG_compfunc_type(cmp)))
#define sk_CTLOG_new_null() ((STACK_OF(CTLOG) *)OPENSSL_sk_new_null())
#define sk_CTLOG_new_reserve(cmp, n) ((STACK_OF(CTLOG)
*)OPENSSL_sk_new_reserve(ossl_check_CTLOG_compfunc_type(cmp),
 (n)))
#define sk_CTLOG_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_CTLOG_sk_type(sk), (n))
#define sk_CTLOG_free(sk) OPENSSL_sk_free(ossl_check_CTLOG_sk_type(sk))
#define sk_CTLOG_zero(sk) OPENSSL_sk_zero(ossl_check_CTLOG_sk_type(sk))
#define sk_CTLOG_delete(sk, i) ((CTLOG *)OPENSSL_sk_delete(ossl_check_CTLOG_sk_type(sk), (i)))
#define sk_CTLOG_delete_ptr(sk, ptr) ((CTLOG *)OPENSSL_sk_delete_ptr(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr)))
#define sk_CTLOG_push(sk, ptr) OPENSSL_sk_push(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr))
#define sk_CTLOG_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr))
#define sk_CTLOG_pop(sk) ((CTLOG *)OPENSSL_sk_pop(ossl_check_CTLOG_sk_type(sk)))
#define sk_CTLOG_shift(sk) ((CTLOG *)OPENSSL_sk_shift(ossl_check_CTLOG_sk_type(sk)))
#define sk_CTLOG_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_CTLOG_sk_type(sk),ossl_check_CTLOG_freefunc_type(freefunc))
#define
 sk_CTLOG_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr), (idx))
#define sk_CTLOG_set(sk, idx, ptr) ((CTLOG *)OPENSSL_sk_set(ossl_check_CTLOG_sk_type(sk), (idx),
```

```
ossl_check_CTLOG_type(ptr)))
#define sk_CTLOG_find(sk, ptr) OPENSSL_sk_find(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr))
#define sk_CTLOG_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr))
#define sk_CTLOG_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_type(ptr), pnum)
#define sk_CTLOG_sort(sk) OPENSSL_sk_sort(ossl_check_CTLOG_sk_type(sk))
#define sk_CTLOG_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_CTLOG_sk_type(sk))
#define sk_CTLOG_dup(sk) ((STACK_OF(CTLOG)
*)OPENSSL_sk_dup(ossl_check_const_CTLOG_sk_type(sk)))
#define sk_CTLOG_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(CTLOG)
*)OPENSSL_sk_deep_copy(ossl_check_const_CTLOG_sk_type(sk),
ossl_check_CTLOG_copyfunc_type(copyfunc),
 ossl_check_CTLOG_freefunc_type(freefunc)))
#define sk_CTLOG_set_cmp_func(sk, cmp)
((sk_CTLOG_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_CTLOG_sk_type(sk),
ossl_check_CTLOG_compfunc_type(cmp)))



typedef enum {
  CT_LOG_ENTRY_TYPE_NOT_SET = -1,
  CT_LOG_ENTRY_TYPE_X509 = 0,
  CT_LOG_ENTRY_TYPE_PRECERT = 1
} ct_log_entry_type_t;

typedef enum {
  SCT_VERSION_NOT_SET = -1,
  SCT_VERSION_V1 = 0
} sct_version_t;

typedef enum {
  SCT_SOURCE_UNKNOWN,
  SCT_SOURCE_TLS_EXTENSION,
  SCT_SOURCE_X509V3_EXTENSION,
  SCT_SOURCE_OCSP_STAPLED_RESPONSE
} sct_source_t;

typedef enum {
  SCT_VALIDATION_STATUS_NOT_SET,
  SCT_VALIDATION_STATUS_UNKNOWN_LOG,
  SCT_VALIDATION_STATUS_VALID,
  SCT_VALIDATION_STATUS_INVALID,
  SCT_VALIDATION_STATUS_UNVERIFIED,
  SCT_VALIDATION_STATUS_UNKNOWN_VERSION
} sct_validation_status_t;
```

```
/**********************************************
* CT policy evaluation context functions *
**********************************************/

/*
 * Creates a new, empty policy evaluation context associated with the given
* library context and property query string.
* The caller is responsible for calling CT_POLICY_EVAL_CTX_free when finished
* with the CT_POLICY_EVAL_CTX.
*/
CT_POLICY_EVAL_CTX *CT_POLICY_EVAL_CTX_new_ex(OSSL_LIB_CTX *libctx,
                                              const char *propq);

/*
* The same as CT_POLICY_EVAL_CTX_new_ex() but the default library
* context and property query string is used.
*/
CT_POLICY_EVAL_CTX *CT_POLICY_EVAL_CTX_new(void);

/* Deletes a policy evaluation context and anything it owns. */
void CT_POLICY_EVAL_CTX_free(CT_POLICY_EVAL_CTX *ctx);

/* Gets the peer certificate that the SCTs are for */
X509* CT_POLICY_EVAL_CTX_get0_cert(const CT_POLICY_EVAL_CTX *ctx);

/*
* Sets the certificate associated with the received SCTs.
* Increments the reference count of cert.
* Returns 1 on success, 0 otherwise.
*/
int CT_POLICY_EVAL_CTX_set1_cert(CT_POLICY_EVAL_CTX
 *ctx, X509 *cert);

/* Gets the issuer of the aforementioned certificate */
X509* CT_POLICY_EVAL_CTX_get0_issuer(const CT_POLICY_EVAL_CTX *ctx);

/*
* Sets the issuer of the certificate associated with the received SCTs.
* Increments the reference count of issuer.
* Returns 1 on success, 0 otherwise.
*/
int CT_POLICY_EVAL_CTX_set1_issuer(CT_POLICY_EVAL_CTX *ctx, X509 *issuer);

/* Gets the CT logs that are trusted sources of SCTs */
const CTLOG_STORE *CT_POLICY_EVAL_CTX_get0_log_store(const CT_POLICY_EVAL_CTX *ctx);

/* Sets the log store that is in use. It must outlive the CT_POLICY_EVAL_CTX. */
void CT_POLICY_EVAL_CTX_set_shared_CTLOG_STORE(CT_POLICY_EVAL_CTX *ctx,
```

```
                                CTLOG_STORE *log_store);

/*
* Gets the time, in milliseconds since the Unix epoch, that will be used as the
* current time when checking whether an SCT was issued in the future.
* Such SCTs will fail validation, as required by RFC6962.
 */
uint64_t CT_POLICY_EVAL_CTX_get_time(const CT_POLICY_EVAL_CTX *ctx);

/*
* Sets the time to evaluate SCTs against, in milliseconds since the Unix epoch.
* If an SCT's timestamp is after this time, it will be interpreted as having
* been issued in the future. RFC6962 states that "TLS clients MUST reject SCTs
* whose timestamp is in the future", so an SCT will not validate in this case.
*/
void CT_POLICY_EVAL_CTX_set_time(CT_POLICY_EVAL_CTX *ctx, uint64_t time_in_ms);

/******************
* SCT functions *
******************/

/*
* Creates a new, blank SCT.
* The caller is responsible for calling SCT_free when finished with the SCT.
*/
SCT *SCT_new(void);

/*
* Creates a new SCT from some base64-encoded strings.
* The caller is responsible for calling SCT_free when finished with the SCT.
*/
SCT *SCT_new_from_base64(unsigned char version,
                         const char *logid_base64,
                         ct_log_entry_type_t entry_type,

  uint64_t timestamp,
                         const char *extensions_base64,
                         const char *signature_base64);

/*
* Frees the SCT and the underlying data structures.
*/
void SCT_free(SCT *sct);

/*
* Free a stack of SCTs, and the underlying SCTs themselves.
* Intended to be compatible with X509V3_EXT_FREE.
*/
```

```
void SCT_LIST_free(STACK_OF(SCT) *a);

/*
* Returns the version of the SCT.
*/
sct_version_t SCT_get_version(const SCT *sct);

/*
* Set the version of an SCT.
* Returns 1 on success, 0 if the version is unrecognized.
*/
__owur int SCT_set_version(SCT *sct, sct_version_t version);

/*
* Returns the log entry type of the SCT.
*/
ct_log_entry_type_t SCT_get_log_entry_type(const SCT *sct);

/*
* Set the log entry type of an SCT.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set_log_entry_type(SCT *sct, ct_log_entry_type_t entry_type);

/*
* Gets the ID of the log that an SCT came from.
* Ownership of the log ID remains with the SCT.
*
 Returns the length of the log ID.
*/
size_t SCT_get0_log_id(const SCT *sct, unsigned char **log_id);

/*
* Set the log ID of an SCT to point directly to the *log_id specified.
* The SCT takes ownership of the specified pointer.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set0_log_id(SCT *sct, unsigned char *log_id, size_t log_id_len);

/*
* Set the log ID of an SCT.
* This makes a copy of the log_id.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set1_log_id(SCT *sct, const unsigned char *log_id,
                           size_t log_id_len);

/*
```

```
* Returns the timestamp for the SCT (epoch time in milliseconds).
*/
uint64_t SCT_get_timestamp(const SCT *sct);

/*
* Set the timestamp of an SCT (epoch time in milliseconds).
*/
void SCT_set_timestamp(SCT *sct, uint64_t timestamp);

/*
* Return the NID for the signature used by the SCT.
* For CT v1, this will be either NID_sha256WithRSAEncryption or
* NID_ecdsa_with_SHA256 (or NID_undef if incorrect/unset).
 */
int SCT_get_signature_nid(const SCT *sct);

/*
* Set the signature type of an SCT
* For CT v1, this should be either NID_sha256WithRSAEncryption or
* NID_ecdsa_with_SHA256.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set_signature_nid(SCT *sct, int nid);

/*
* Set *ext to point to the extension data for the SCT. ext must not be NULL.
* The SCT retains ownership of this pointer.
* Returns length of the data pointed to.
*/
size_t SCT_get0_extensions(const SCT *sct, unsigned char **ext);

/*
* Set the extensions of an SCT to point directly to the *ext specified.
* The SCT takes ownership of the specified pointer.
*/
void SCT_set0_extensions(SCT *sct, unsigned char *ext, size_t ext_len);

/*
* Set the extensions of an SCT.
* This takes a copy of the ext.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set1_extensions(SCT *sct, const unsigned char *ext,
                               size_t ext_len);

/*
* Set *sig to point to the signature for the SCT.
```

```
 sig must not be NULL.
* The SCT retains ownership of this pointer.
* Returns length of the data pointed to.
*/
size_t SCT_get0_signature(const SCT *sct, unsigned char **sig);

/*
* Set the signature of an SCT to point directly to the *sig specified.
* The SCT takes ownership of the specified pointer.
*/
void SCT_set0_signature(SCT *sct, unsigned char *sig, size_t sig_len);

/*
* Set the signature of an SCT to be a copy of the *sig specified.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set1_signature(SCT *sct, const unsigned char *sig,
                              size_t sig_len);

/*
* The origin of this SCT, e.g. TLS extension, OCSP response, etc.
*/
sct_source_t SCT_get_source(const SCT *sct);

/*
* Set the origin of this SCT, e.g. TLS extension, OCSP response, etc.
* Returns 1 on success, 0 otherwise.
*/
__owur int SCT_set_source(SCT *sct, sct_source_t source);

/*
* Returns a text string describing the validation status of |sct|.
*/
const char *SCT_validation_status_string(const
 SCT *sct);

/*
* Pretty-prints an |sct| to |out|.
* It will be indented by the number of spaces specified by |indent|.
* If |logs| is not NULL, it will be used to lookup the CT log that the SCT came
* from, so that the log name can be printed.
*/
void SCT_print(const SCT *sct, BIO *out, int indent, const CTLOG_STORE *logs);

/*
* Pretty-prints an |sct_list| to |out|.
* It will be indented by the number of spaces specified by |indent|.
* SCTs will be delimited by |separator|.
```

```
* If |logs| is not NULL, it will be used to lookup the CT log that each SCT
* came from, so that the log names can be printed.
*/
void SCT_LIST_print(const STACK_OF(SCT) *sct_list, BIO *out, int indent,
                    const char *separator, const CTLOG_STORE *logs);

/*
* Gets the last result of validating this SCT.
* If it has not been validated yet, returns SCT_VALIDATION_STATUS_NOT_SET.
*/
sct_validation_status_t SCT_get_validation_status(const SCT *sct);

/*
* Validates
 the given SCT with the provided context.
* Sets the "validation_status" field of the SCT.
* Returns 1 if the SCT is valid and the signature verifies.
* Returns 0 if the SCT is invalid or could not be verified.
* Returns -1 if an error occurs.
*/
__owur int SCT_validate(SCT *sct, const CT_POLICY_EVAL_CTX *ctx);

/*
* Validates the given list of SCTs with the provided context.
* Sets the "validation_status" field of each SCT.
* Returns 1 if there are no invalid SCTs and all signatures verify.
* Returns 0 if at least one SCT is invalid or could not be verified.
* Returns a negative integer if an error occurs.
*/
__owur int SCT_LIST_validate(const STACK_OF(SCT) *scts,
                             CT_POLICY_EVAL_CTX *ctx);


/**********************************
* SCT parsing and serialization *
**********************************/

/*
* Serialize (to TLS format) a stack of SCTs and return the length.
* "a" must not be NULL.
* If "pp" is NULL, just return the length of what
 would have been serialized.
* If "pp" is not NULL and "*pp" is null, function will allocate a new pointer
* for data that caller is responsible for freeing (only if function returns
* successfully).
* If "pp" is NULL and "*pp" is not NULL, caller is responsible for ensuring
* that "*pp" is large enough to accept all of the serialized data.
* Returns < 0 on error, >= 0 indicating bytes written (or would have been)
```

```
* on success.
*/
__owur int i2o_SCT_LIST(const STACK_OF(SCT) *a, unsigned char **pp);

/*
* Convert TLS format SCT list to a stack of SCTs.
* If "a" or "*a" is NULL, a new stack will be created that the caller is
* responsible for freeing (by calling SCT_LIST_free).
* "**pp" and "*pp" must not be NULL.
* Upon success, "*pp" will point to after the last bytes read, and a stack
* will be returned.
* Upon failure, a NULL pointer will be returned, and the position of "*pp" is
* not defined.
*/
STACK_OF(SCT) *o2i_SCT_LIST(STACK_OF(SCT) **a, const unsigned char
 **pp,
                            size_t len);

/*
* Serialize (to DER format) a stack of SCTs and return the length.
* "a" must not be NULL.
* If "pp" is NULL, just returns the length of what would have been serialized.
* If "pp" is not NULL and "*pp" is null, function will allocate a new pointer
* for data that caller is responsible for freeing (only if function returns
* successfully).
* If "pp" is NULL and "*pp" is not NULL, caller is responsible for ensuring
* that "*pp" is large enough to accept all of the serialized data.
* Returns < 0 on error, >= 0 indicating bytes written (or would have been)
* on success.
*/
__owur int i2d_SCT_LIST(const STACK_OF(SCT) *a, unsigned char **pp);

/*
* Parses an SCT list in DER format and returns it.
* If "a" or "*a" is NULL, a new stack will be created that the caller is
* responsible for freeing (by calling SCT_LIST_free).
* "**pp" and "*pp" must not be NULL.
* Upon success, "*pp" will point to after the last bytes read, and a
 stack
* will be returned.
* Upon failure, a NULL pointer will be returned, and the position of "*pp" is
* not defined.
*/
STACK_OF(SCT) *d2i_SCT_LIST(STACK_OF(SCT) **a, const unsigned char **pp,
                            long len);

/*
* Serialize (to TLS format) an |sct| and write it to |out|.
```

```
* If |out| is null, no SCT will be output but the length will still be returned.
* If |out| points to a null pointer, a string will be allocated to hold the
* TLS-format SCT. It is the responsibility of the caller to free it.
* If |out| points to an allocated string, the TLS-format SCT will be written
* to it.
* The length of the SCT in TLS format will be returned.
*/
__owur int i2o_SCT(const SCT *sct, unsigned char **out);

/*
* Parses an SCT in TLS format and returns it.
* If |psct| is not null, it will end up pointing to the parsed SCT. If it
* already points to a non-null pointer, the pointer will be free'd.
* |in| should be a pointer to a string containing the TLS-format SCT.
 * |in| will be advanced to the end of the SCT if parsing succeeds.
* |len| should be the length of the SCT in |in|.
* Returns NULL if an error occurs.
* If the SCT is an unsupported version, only the SCT's 'sct' and 'sct_len'
* fields will be populated (with |in| and |len| respectively).
*/
SCT *o2i_SCT(SCT **psct, const unsigned char **in, size_t len);

/**********************
* CT log functions *
**********************/

/*
* Creates a new CT log instance with the given |public_key| and |name| and
* associates it with the give library context |libctx| and property query
* string |propq|.
* Takes ownership of |public_key| but copies |name|.
* Returns NULL if malloc fails or if |public_key| cannot be converted to DER.
* Should be deleted by the caller using CTLOG_free when no longer needed.
*/
CTLOG *CTLOG_new_ex(EVP_PKEY *public_key, const char *name, OSSL_LIB_CTX *libctx,
                    const char *propq);

/*
* The same as CTLOG_new_ex except that the default library
 context and
* property query string are used.
*/
CTLOG *CTLOG_new(EVP_PKEY *public_key, const char *name);

/*
* Creates a new CTLOG instance with the base64-encoded SubjectPublicKeyInfo DER
* in |pkey_base64| and associated with the given library context |libctx| and
* property query string |propq|. The |name| is a string to help users identify
```

```
* this log.
* Returns 1 on success, 0 on failure.
* Should be deleted by the caller using CTLOG_free when no longer needed.
*/
int CTLOG_new_from_base64_ex(CTLOG **ct_log, const char *pkey_base64,
                             const char *name, OSSL_LIB_CTX *libctx,
                             const char *propq);

/*
* The same as CTLOG_new_from_base64_ex() except that the default
* library context and property query string are used.
* Returns 1 on success, 0 on failure.
*/
int CTLOG_new_from_base64(CTLOG ** ct_log,
                          const char *pkey_base64, const char *name);

/*
* Deletes a CT log instance and its
 fields.
*/
void CTLOG_free(CTLOG *log);

/* Gets the name of the CT log */
const char *CTLOG_get0_name(const CTLOG *log);
/* Gets the ID of the CT log */
void CTLOG_get0_log_id(const CTLOG *log, const uint8_t **log_id,
                       size_t *log_id_len);
/* Gets the public key of the CT log */
EVP_PKEY *CTLOG_get0_public_key(const CTLOG *log);

/**************************
* CT log store functions *
**************************/

/*
* Creates a new CT log store and associates it with the given libctx and
* property query string.
* Should be deleted by the caller using CTLOG_STORE_free when no longer needed.
*/
CTLOG_STORE *CTLOG_STORE_new_ex(OSSL_LIB_CTX *libctx, const char *propq);

/*
* Same as CTLOG_STORE_new_ex except that the default libctx and
* property query string are used.
* Should be deleted by the caller using CTLOG_STORE_free when no longer needed.
*/
CTLOG_STORE *CTLOG_STORE_new(void);
```

```
/*
* Deletes a CT log store and all of the CT log instances held within.
 */
void CTLOG_STORE_free(CTLOG_STORE *store);

/*
* Finds a CT log in the store based on its log ID.
* Returns the CT log, or NULL if no match is found.
*/
const CTLOG *CTLOG_STORE_get0_log_by_id(const CTLOG_STORE *store,
                                        const uint8_t *log_id,
                                        size_t log_id_len);

/*
* Loads a CT log list into a |store| from a |file|.
* Returns 1 if loading is successful, or 0 otherwise.
*/
__owur int CTLOG_STORE_load_file(CTLOG_STORE *store, const char *file);

/*
* Loads the default CT log list into a |store|.
* Returns 1 if loading is successful, or 0 otherwise.
*/
__owur int CTLOG_STORE_load_default_file(CTLOG_STORE *store);

#  ifdef  __cplusplus
}
#  endif
# endif
#endif
```

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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/pkcs12.h.in
*
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* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_PKCS12_H
# define OPENSSL_PKCS12_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_PKCS12_H
# endif

# include <openssl/bio.h>
# include <openssl/core.h>
# include <openssl/x509.h>
# include <openssl/pkcs12err.h>

#ifdef __cplusplus
extern "C" {
#endif

# define PKCS12_KEY_ID   1
# define PKCS12_IV_ID    2
# define PKCS12_MAC_ID   3

/* Default iteration count */
# ifndef PKCS12_DEFAULT_ITER
#  define PKCS12_DEFAULT_ITER     PKCS5_DEFAULT_ITER
```

```
# endif

# define PKCS12_MAC_KEY_LENGTH 20

# define PKCS12_SALT_LEN
 8

/* It's not clear if these are actually needed... */
# define PKCS12_key_gen PKCS12_key_gen_utf8
# define PKCS12_add_friendlyname PKCS12_add_friendlyname_utf8

/* MS key usage constants */

# define KEY_EX  0x10
# define KEY_SIG 0x80

typedef struct PKCS12_MAC_DATA_st PKCS12_MAC_DATA;

typedef struct PKCS12_st PKCS12;

typedef struct PKCS12_SAFEBAG_st PKCS12_SAFEBAG;

SKM_DEFINE_STACK_OF_INTERNAL(PKCS12_SAFEBAG, PKCS12_SAFEBAG, PKCS12_SAFEBAG)
#define sk_PKCS12_SAFEBAG_num(sk)
OPENSSL_sk_num(ossl_check_const_PKCS12_SAFEBAG_sk_type(sk))
#define sk_PKCS12_SAFEBAG_value(sk, idx) ((PKCS12_SAFEBAG
*)OPENSSL_sk_value(ossl_check_const_PKCS12_SAFEBAG_sk_type(sk), (idx)))
#define sk_PKCS12_SAFEBAG_new(cmp) ((STACK_OF(PKCS12_SAFEBAG)
*)OPENSSL_sk_new(ossl_check_PKCS12_SAFEBAG_compfunc_type(cmp)))
#define sk_PKCS12_SAFEBAG_new_null() ((STACK_OF(PKCS12_SAFEBAG) *)OPENSSL_sk_new_null())
#define sk_PKCS12_SAFEBAG_new_reserve(cmp, n) ((STACK_OF(PKCS12_SAFEBAG)
*)OPENSSL_sk_new_reserve(ossl_check_PKCS12_SAFEBAG_compfunc_type(cmp),
 (n)))
#define sk_PKCS12_SAFEBAG_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_PKCS12_SAFEBAG_sk_type(sk), (n))
#define sk_PKCS12_SAFEBAG_free(sk) OPENSSL_sk_free(ossl_check_PKCS12_SAFEBAG_sk_type(sk))
#define sk_PKCS12_SAFEBAG_zero(sk) OPENSSL_sk_zero(ossl_check_PKCS12_SAFEBAG_sk_type(sk))
#define sk_PKCS12_SAFEBAG_delete(sk, i) ((PKCS12_SAFEBAG
*)OPENSSL_sk_delete(ossl_check_PKCS12_SAFEBAG_sk_type(sk), (i)))
#define sk_PKCS12_SAFEBAG_delete_ptr(sk, ptr) ((PKCS12_SAFEBAG
*)OPENSSL_sk_delete_ptr(ossl_check_PKCS12_SAFEBAG_sk_type(sk),
ossl_check_PKCS12_SAFEBAG_type(ptr)))
#define sk_PKCS12_SAFEBAG_push(sk, ptr) OPENSSL_sk_push(ossl_check_PKCS12_SAFEBAG_sk_type(sk),
ossl_check_PKCS12_SAFEBAG_type(ptr))
#define sk_PKCS12_SAFEBAG_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_PKCS12_SAFEBAG_sk_type(sk), ossl_check_PKCS12_SAFEBAG_type(ptr))
#define sk_PKCS12_SAFEBAG_pop(sk) ((PKCS12_SAFEBAG
*)OPENSSL_sk_pop(ossl_check_PKCS12_SAFEBAG_sk_type(sk)))
```

```
#define
 sk_PKCS12_SAFEBAG_shift(sk) ((PKCS12_SAFEBAG
*)OPENSSL_sk_shift(ossl_check_PKCS12_SAFEBAG_sk_type(sk)))
#define sk_PKCS12_SAFEBAG_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_PKCS12_SAFEBAG_sk_type(sk),ossl_check_PKCS12_SAFEBAG_freefunc_
type(freefunc))
#define sk_PKCS12_SAFEBAG_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_PKCS12_SAFEBAG_sk_type(sk), ossl_check_PKCS12_SAFEBAG_type(ptr),
(idx))
#define sk_PKCS12_SAFEBAG_set(sk, idx, ptr) ((PKCS12_SAFEBAG
*)OPENSSL_sk_set(ossl_check_PKCS12_SAFEBAG_sk_type(sk), (idx),
ossl_check_PKCS12_SAFEBAG_type(ptr)))
#define sk_PKCS12_SAFEBAG_find(sk, ptr) OPENSSL_sk_find(ossl_check_PKCS12_SAFEBAG_sk_type(sk),
ossl_check_PKCS12_SAFEBAG_type(ptr))
#define sk_PKCS12_SAFEBAG_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_PKCS12_SAFEBAG_sk_type(sk), ossl_check_PKCS12_SAFEBAG_type(ptr))
#define sk_PKCS12_SAFEBAG_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_PKCS12_SAFEBAG_sk_type(sk), ossl_check_PKCS12_SAFEBAG_type(ptr),
pnum)
#define
 sk_PKCS12_SAFEBAG_sort(sk) OPENSSL_sk_sort(ossl_check_PKCS12_SAFEBAG_sk_type(sk))
#define sk_PKCS12_SAFEBAG_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_PKCS12_SAFEBAG_sk_type(sk))
#define sk_PKCS12_SAFEBAG_dup(sk) ((STACK_OF(PKCS12_SAFEBAG)
*)OPENSSL_sk_dup(ossl_check_const_PKCS12_SAFEBAG_sk_type(sk)))
#define sk_PKCS12_SAFEBAG_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(PKCS12_SAFEBAG)
*)OPENSSL_sk_deep_copy(ossl_check_const_PKCS12_SAFEBAG_sk_type(sk),
ossl_check_PKCS12_SAFEBAG_copyfunc_type(copyfunc),
ossl_check_PKCS12_SAFEBAG_freefunc_type(freefunc)))
#define sk_PKCS12_SAFEBAG_set_cmp_func(sk, cmp)
((sk_PKCS12_SAFEBAG_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_PKCS12_SAFEBAG_sk_type(sk),
ossl_check_PKCS12_SAFEBAG_compfunc_type(cmp)))


typedef struct pkcs12_bag_st PKCS12_BAGS;

# define PKCS12_ERROR    0
# define PKCS12_OK       1

/* Compatibility macros */

#ifndef OPENSSL_NO_DEPRECATED_1_1_0

# define M_PKCS12_bag_type PKCS12_bag_type
# define M_PKCS12_cert_bag_type
 PKCS12_cert_bag_type
# define M_PKCS12_crl_bag_type PKCS12_cert_bag_type
```

```
# define PKCS12_certbag2x509 PKCS12_SAFEBAG_get1_cert
# define PKCS12_certbag2scrl PKCS12_SAFEBAG_get1_crl
# define PKCS12_bag_type PKCS12_SAFEBAG_get_nid
# define PKCS12_cert_bag_type PKCS12_SAFEBAG_get_bag_nid
# define PKCS12_x5092certbag PKCS12_SAFEBAG_create_cert
# define PKCS12_x509crl2certbag PKCS12_SAFEBAG_create_crl
# define PKCS12_MAKE_KEYBAG PKCS12_SAFEBAG_create0_p8inf
# define PKCS12_MAKE_SHKEYBAG PKCS12_SAFEBAG_create_pkcs8_encrypt

#endif
#ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 ASN1_TYPE *PKCS12_get_attr(const PKCS12_SAFEBAG *bag,
                                   int attr_nid);
#endif

ASN1_TYPE *PKCS8_get_attr(PKCS8_PRIV_KEY_INFO *p8, int attr_nid);
int PKCS12_mac_present(const PKCS12 *p12);
void PKCS12_get0_mac(const ASN1_OCTET_STRING **pmac,
             const X509_ALGOR **pmacalg,
             const ASN1_OCTET_STRING **psalt,

     const ASN1_INTEGER **piter,
             const PKCS12 *p12);

const ASN1_TYPE *PKCS12_SAFEBAG_get0_attr(const PKCS12_SAFEBAG *bag,
                               int attr_nid);
const ASN1_OBJECT *PKCS12_SAFEBAG_get0_type(const PKCS12_SAFEBAG *bag);
int PKCS12_SAFEBAG_get_nid(const PKCS12_SAFEBAG *bag);
int PKCS12_SAFEBAG_get_bag_nid(const PKCS12_SAFEBAG *bag);
const ASN1_TYPE *PKCS12_SAFEBAG_get0_bag_obj(const PKCS12_SAFEBAG *bag);
const ASN1_OBJECT *PKCS12_SAFEBAG_get0_bag_type(const PKCS12_SAFEBAG *bag);

X509 *PKCS12_SAFEBAG_get1_cert(const PKCS12_SAFEBAG *bag);
X509_CRL *PKCS12_SAFEBAG_get1_crl(const PKCS12_SAFEBAG *bag);
const STACK_OF(PKCS12_SAFEBAG) *
PKCS12_SAFEBAG_get0_safes(const PKCS12_SAFEBAG *bag);
const PKCS8_PRIV_KEY_INFO *PKCS12_SAFEBAG_get0_p8inf(const PKCS12_SAFEBAG *bag);
const X509_SIG *PKCS12_SAFEBAG_get0_pkcs8(const PKCS12_SAFEBAG *bag);

PKCS12_SAFEBAG *PKCS12_SAFEBAG_create_cert(X509 *x509);
PKCS12_SAFEBAG *PKCS12_SAFEBAG_create_crl(X509_CRL
 *crl);
PKCS12_SAFEBAG *PKCS12_SAFEBAG_create_secret(int type, int vtype, const unsigned char *value, int len);
PKCS12_SAFEBAG *PKCS12_SAFEBAG_create0_p8inf(PKCS8_PRIV_KEY_INFO *p8);
PKCS12_SAFEBAG *PKCS12_SAFEBAG_create0_pkcs8(X509_SIG *p8);
PKCS12_SAFEBAG *PKCS12_SAFEBAG_create_pkcs8_encrypt(int pbe_nid,
                                    const char *pass,
                                    int passlen,
```

```
                                unsigned char *salt,
                                int saltlen, int iter,
                                PKCS8_PRIV_KEY_INFO *p8inf);
PKCS12_SAFEBAG *PKCS12_SAFEBAG_create_pkcs8_encrypt_ex(int pbe_nid,
                                  const char *pass,
                                  int passlen,
                                  unsigned char *salt,

        int saltlen, int iter,
                                  PKCS8_PRIV_KEY_INFO *p8inf,
                                  OSSL_LIB_CTX *ctx,
                                  const char *propq);

PKCS12_SAFEBAG *PKCS12_item_pack_safebag(void *obj, const ASN1_ITEM *it,
                           int nid1, int nid2);
PKCS8_PRIV_KEY_INFO *PKCS8_decrypt(const X509_SIG *p8, const char *pass,
                         int passlen);
PKCS8_PRIV_KEY_INFO *PKCS8_decrypt_ex(const X509_SIG *p8, const char *pass,
                           int passlen, OSSL_LIB_CTX *ctx,
                           const char *propq);
PKCS8_PRIV_KEY_INFO *PKCS12_decrypt_skey(const PKCS12_SAFEBAG *bag,
                           const char *pass, int passlen);
PKCS8_PRIV_KEY_INFO *PKCS12_decrypt_skey_ex(const PKCS12_SAFEBAG *bag,
                             const char *pass,
 int passlen,
                             OSSL_LIB_CTX *ctx,
                             const char *propq);
X509_SIG *PKCS8_encrypt(int pbe_nid, const EVP_CIPHER *cipher,
                const char *pass, int passlen, unsigned char *salt,
                int saltlen, int iter, PKCS8_PRIV_KEY_INFO *p8);
X509_SIG *PKCS8_encrypt_ex(int pbe_nid, const EVP_CIPHER *cipher,
                  const char *pass, int passlen, unsigned char *salt,
                  int saltlen, int iter, PKCS8_PRIV_KEY_INFO *p8,
                  OSSL_LIB_CTX *ctx, const char *propq);
X509_SIG *PKCS8_set0_pbe(const char *pass, int passlen,
                PKCS8_PRIV_KEY_INFO *p8inf, X509_ALGOR *pbe);
X509_SIG *PKCS8_set0_pbe_ex(const char *pass, int passlen,
                   PKCS8_PRIV_KEY_INFO *p8inf, X509_ALGOR *pbe,
                   OSSL_LIB_CTX *ctx, const char *propq);
PKCS7 *PKCS12_pack_p7data(STACK_OF(PKCS12_SAFEBAG)
 *sk);
STACK_OF(PKCS12_SAFEBAG) *PKCS12_unpack_p7data(PKCS7 *p7);
PKCS7 *PKCS12_pack_p7encdata(int pbe_nid, const char *pass, int passlen,
                   unsigned char *salt, int saltlen, int iter,
                   STACK_OF(PKCS12_SAFEBAG) *bags);
PKCS7 *PKCS12_pack_p7encdata_ex(int pbe_nid, const char *pass, int passlen,
                     unsigned char *salt, int saltlen, int iter,
                     STACK_OF(PKCS12_SAFEBAG) *bags,
```

```
                        OSSL_LIB_CTX *ctx, const char *propq);

STACK_OF(PKCS12_SAFEBAG) *PKCS12_unpack_p7encdata(PKCS7 *p7, const char *pass,
                                  int passlen);

int PKCS12_pack_authsafes(PKCS12 *p12, STACK_OF(PKCS7) *safes);
STACK_OF(PKCS7) *PKCS12_unpack_authsafes(const PKCS12 *p12);

int PKCS12_add_localkeyid(PKCS12_SAFEBAG *bag, unsigned char *name,
                          int namelen);
int PKCS12_add_friendlyname_asc(PKCS12_SAFEBAG
 *bag, const char *name,
                           int namelen);
int PKCS12_add_friendlyname_utf8(PKCS12_SAFEBAG *bag, const char *name,
                            int namelen);
int PKCS12_add_CSPName_asc(PKCS12_SAFEBAG *bag, const char *name,
                          int namelen);
int PKCS12_add_friendlyname_uni(PKCS12_SAFEBAG *bag,
                           const unsigned char *name, int namelen);
int PKCS12_add1_attr_by_NID(PKCS12_SAFEBAG *bag, int nid, int type,
                         const unsigned char *bytes, int len);
int PKCS12_add1_attr_by_txt(PKCS12_SAFEBAG *bag, const char *attrname, int type,
                         const unsigned char *bytes, int len);
int PKCS8_add_keyusage(PKCS8_PRIV_KEY_INFO *p8, int usage);
ASN1_TYPE *PKCS12_get_attr_gen(const STACK_OF(X509_ATTRIBUTE) *attrs,
                           int attr_nid);
char *PKCS12_get_friendlyname(PKCS12_SAFEBAG *bag);
const STACK_OF(X509_ATTRIBUTE) *
PKCS12_SAFEBAG_get0_attrs(const
 PKCS12_SAFEBAG *bag);
unsigned char *PKCS12_pbe_crypt(const X509_ALGOR *algor,
                           const char *pass, int passlen,
                           const unsigned char *in, int inlen,
                           unsigned char **data, int *datalen,
                           int en_de);
unsigned char *PKCS12_pbe_crypt_ex(const X509_ALGOR *algor,
                              const char *pass, int passlen,
                              const unsigned char *in, int inlen,
                              unsigned char **data, int *datalen,
                              int en_de, OSSL_LIB_CTX *libctx,
                              const char *propq);
void *PKCS12_item_decrypt_d2i(const X509_ALGOR *algor, const ASN1_ITEM *it,
                          const char *pass, int passlen,
                          const ASN1_OCTET_STRING *oct, int zbuf);
void *PKCS12_item_decrypt_d2i_ex(const X509_ALGOR *algor, const ASN1_ITEM *it,
                            const char *pass, int passlen,
                            const ASN1_OCTET_STRING *oct, int zbuf,
                            OSSL_LIB_CTX *libctx,
```

```
                        const char *propq);
ASN1_OCTET_STRING *PKCS12_item_i2d_encrypt(X509_ALGOR *algor,
                                const ASN1_ITEM *it,
                                const char *pass, int passlen,
                                void *obj, int zbuf);
ASN1_OCTET_STRING *PKCS12_item_i2d_encrypt_ex(X509_ALGOR *algor,
                                  const ASN1_ITEM *it,
                                  const char *pass, int passlen,
                                  void *obj, int zbuf,
                                  OSSL_LIB_CTX *ctx,
                                  const char *propq);
PKCS12 *PKCS12_init(int mode);
PKCS12 *PKCS12_init_ex(int mode, OSSL_LIB_CTX *ctx,
 const char *propq);

int PKCS12_key_gen_asc(const char *pass, int passlen, unsigned char *salt,
                       int saltlen, int id, int iter, int n,
                       unsigned char *out, const EVP_MD *md_type);
int PKCS12_key_gen_asc_ex(const char *pass, int passlen, unsigned char *salt,
                          int saltlen, int id, int iter, int n,
                          unsigned char *out, const EVP_MD *md_type,
                          OSSL_LIB_CTX *ctx, const char *propq);
int PKCS12_key_gen_uni(unsigned char *pass, int passlen, unsigned char *salt,
                       int saltlen, int id, int iter, int n,
                       unsigned char *out, const EVP_MD *md_type);
int PKCS12_key_gen_uni_ex(unsigned char *pass, int passlen, unsigned char *salt,
                          int saltlen, int id, int iter, int n,
                          unsigned char *out, const EVP_MD *md_type,
                          OSSL_LIB_CTX *ctx, const char *propq);
int PKCS12_key_gen_utf8(const
 char *pass, int passlen, unsigned char *salt,
                        int saltlen, int id, int iter, int n,
                        unsigned char *out, const EVP_MD *md_type);
int PKCS12_key_gen_utf8_ex(const char *pass, int passlen, unsigned char *salt,
                           int saltlen, int id, int iter, int n,
                           unsigned char *out, const EVP_MD *md_type,
                           OSSL_LIB_CTX *ctx, const char *propq);

int PKCS12_PBE_keyivgen(EVP_CIPHER_CTX *ctx, const char *pass, int passlen,
                        ASN1_TYPE *param, const EVP_CIPHER *cipher,
                        const EVP_MD *md_type, int en_de);
int PKCS12_PBE_keyivgen_ex(EVP_CIPHER_CTX *ctx, const char *pass, int passlen,
                           ASN1_TYPE *param, const EVP_CIPHER *cipher,
                           const EVP_MD *md_type, int en_de,
                           OSSL_LIB_CTX *libctx, const char *propq);
int PKCS12_gen_mac(PKCS12 *p12, const char
 *pass, int passlen,
                   unsigned char *mac, unsigned int *maclen);
```

```
int PKCS12_verify_mac(PKCS12 *p12, const char *pass, int passlen);
int PKCS12_set_mac(PKCS12 *p12, const char *pass, int passlen,
                   unsigned char *salt, int saltlen, int iter,
                   const EVP_MD *md_type);
int PKCS12_setup_mac(PKCS12 *p12, int iter, unsigned char *salt,
                     int saltlen, const EVP_MD *md_type);
unsigned char *OPENSSL_asc2uni(const char *asc, int asclen,
                               unsigned char **uni, int *unilen);
char *OPENSSL_uni2asc(const unsigned char *uni, int unilen);
unsigned char *OPENSSL_utf82uni(const char *asc, int asclen,
                                unsigned char **uni, int *unilen);
char *OPENSSL_uni2utf8(const unsigned char *uni, int unilen);

DECLARE_ASN1_FUNCTIONS(PKCS12)
DECLARE_ASN1_FUNCTIONS(PKCS12_MAC_DATA)
DECLARE_ASN1_FUNCTIONS(PKCS12_SAFEBAG)
DECLARE_ASN1_FUNCTIONS(PKCS12_BAGS)

DECLARE_ASN1_ITEM(PKCS12_SAFEBAGS)
DECLARE_ASN1_ITEM(PKCS12_AUTHSAFES)

void
 PKCS12_PBE_add(void);
int PKCS12_parse(PKCS12 *p12, const char *pass, EVP_PKEY **pkey, X509 **cert,
                 STACK_OF(X509) **ca);
PKCS12 *PKCS12_create(const char *pass, const char *name, EVP_PKEY *pkey,
                      X509 *cert, STACK_OF(X509) *ca, int nid_key, int nid_cert,
                      int iter, int mac_iter, int keytype);
PKCS12 *PKCS12_create_ex(const char *pass, const char *name, EVP_PKEY *pkey,
                         X509 *cert, STACK_OF(X509) *ca, int nid_key, int nid_cert,
                         int iter, int mac_iter, int keytype,
                         OSSL_LIB_CTX *ctx, const char *propq);

PKCS12_SAFEBAG *PKCS12_add_cert(STACK_OF(PKCS12_SAFEBAG) **pbags, X509 *cert);
PKCS12_SAFEBAG *PKCS12_add_key(STACK_OF(PKCS12_SAFEBAG) **pbags,
                               EVP_PKEY *key, int key_usage, int iter,
                               int key_nid, const char *pass);
PKCS12_SAFEBAG *PKCS12_add_key_ex(STACK_OF(PKCS12_SAFEBAG)
 **pbags,
                                  EVP_PKEY *key, int key_usage, int iter,
                                  int key_nid, const char *pass,
                                  OSSL_LIB_CTX *ctx, const char *propq);

PKCS12_SAFEBAG *PKCS12_add_secret(STACK_OF(PKCS12_SAFEBAG) **pbags,
                                  int nid_type, const unsigned char *value, int len);
int PKCS12_add_safe(STACK_OF(PKCS7) **psafes, STACK_OF(PKCS12_SAFEBAG) *bags,
                    int safe_nid, int iter, const char *pass);
int PKCS12_add_safe_ex(STACK_OF(PKCS7) **psafes, STACK_OF(PKCS12_SAFEBAG) *bags,
```

```
                int safe_nid, int iter, const char *pass,
                OSSL_LIB_CTX *ctx, const char *propq);

PKCS12 *PKCS12_add_safes(STACK_OF(PKCS7) *safes, int p7_nid);
PKCS12 *PKCS12_add_safes_ex(STACK_OF(PKCS7) *safes, int p7_nid,
                    OSSL_LIB_CTX *ctx, const char *propq);

int i2d_PKCS12_bio(BIO *bp, const PKCS12 *p12);
# ifndef
 OPENSSL_NO_STDIO
int i2d_PKCS12_fp(FILE *fp, const PKCS12 *p12);
# endif
PKCS12 *d2i_PKCS12_bio(BIO *bp, PKCS12 **p12);
# ifndef OPENSSL_NO_STDIO
PKCS12 *d2i_PKCS12_fp(FILE *fp, PKCS12 **p12);
# endif
int PKCS12_newpass(PKCS12 *p12, const char *oldpass, const char *newpass);

# ifdef  __cplusplus
}
# endif
#endif
```

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/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/ocsp.h.in
*
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*
* Licensed under the Apache License 2.0 (the "License"). You may not use
* this file except in compliance with the License. You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

```
#ifndef OPENSSL_OCSP_H
# define OPENSSL_OCSP_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_OCSP_H
# endif

# include <openssl/opensslconf.h>
# include <openssl/http.h>
# include <openssl/asn1.h>

/*
* These definitions are outside the OPENSSL_NO_OCSP guard because although for
* historical reasons they have OCSP_* names, they can actually be used
* independently of OCSP. E.g. see RFC5280
*/
/*-
*   CRLReason ::= ENUMERATED {
*       unspecified             (0),
*       keyCompromise           (1),
*       cACompromise
          (2),
*       affiliationChanged      (3),
*       superseded              (4),
*       cessationOfOperation    (5),
*       certificateHold         (6),
*       -- value 7 is not used
*       removeFromCRL           (8),
*       privilegeWithdrawn      (9),
*       aACompromise            (10) }
*/
# define OCSP_REVOKED_STATUS_NOSTATUS               -1
# define OCSP_REVOKED_STATUS_UNSPECIFIED            0
# define OCSP_REVOKED_STATUS_KEYCOMPROMISE          1
# define OCSP_REVOKED_STATUS_CACOMPROMISE           2
# define OCSP_REVOKED_STATUS_AFFILIATIONCHANGED     3
# define OCSP_REVOKED_STATUS_SUPERSEDED             4
# define OCSP_REVOKED_STATUS_CESSATIONOFOPERATION   5
# define OCSP_REVOKED_STATUS_CERTIFICATEHOLD        6
# define OCSP_REVOKED_STATUS_REMOVEFROMCRL          8
# define OCSP_REVOKED_STATUS_PRIVILEGEWITHDRAWN     9
# define OCSP_REVOKED_STATUS_AACOMPROMISE           10
```

```
# ifndef OPENSSL_NO_OCSP

#  include <openssl/x509.h>
#
  include <openssl/x509v3.h>
#  include <openssl/safestack.h>
#  include <openssl/ocsperr.h>

#  ifdef __cplusplus
extern "C" {
#  endif

/* Various flags and values */

#  define OCSP_DEFAULT_NONCE_LENGTH       16

#  define OCSP_NOCERTS                0x1
#  define OCSP_NOINTERN               0x2
#  define OCSP_NOSIGS                0x4
#  define OCSP_NOCHAIN                0x8
#  define OCSP_NOVERIFY               0x10
#  define OCSP_NOEXPLICIT             0x20
#  define OCSP_NOCASIGN               0x40
#  define OCSP_NODELEGATED            0x80
#  define OCSP_NOCHECKS               0x100
#  define OCSP_TRUSTOTHER             0x200
#  define OCSP_RESPID_KEY             0x400
#  define OCSP_NOTIME                0x800
#  define OCSP_PARTIAL_CHAIN          0x1000

typedef struct ocsp_cert_id_st OCSP_CERTID;
typedef struct ocsp_one_request_st OCSP_ONEREQ;
typedef struct ocsp_req_info_st OCSP_REQINFO;
typedef struct ocsp_signature_st
 OCSP_SIGNATURE;
typedef struct ocsp_request_st OCSP_REQUEST;

SKM_DEFINE_STACK_OF_INTERNAL(OCSP_CERTID, OCSP_CERTID, OCSP_CERTID)
#define sk_OCSP_CERTID_num(sk) OPENSSL_sk_num(ossl_check_const_OCSP_CERTID_sk_type(sk))
#define sk_OCSP_CERTID_value(sk, idx) ((OCSP_CERTID
*)OPENSSL_sk_value(ossl_check_const_OCSP_CERTID_sk_type(sk), (idx)))
#define sk_OCSP_CERTID_new(cmp) ((STACK_OF(OCSP_CERTID)
*)OPENSSL_sk_new(ossl_check_OCSP_CERTID_compfunc_type(cmp)))
#define sk_OCSP_CERTID_new_null() ((STACK_OF(OCSP_CERTID) *)OPENSSL_sk_new_null())
#define sk_OCSP_CERTID_new_reserve(cmp, n) ((STACK_OF(OCSP_CERTID)
*)OPENSSL_sk_new_reserve(ossl_check_OCSP_CERTID_compfunc_type(cmp), (n)))
#define sk_OCSP_CERTID_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_OCSP_CERTID_sk_type(sk), (n))
```

```
#define sk_OCSP_CERTID_free(sk) OPENSSL_sk_free(ossl_check_OCSP_CERTID_sk_type(sk))
#define sk_OCSP_CERTID_zero(sk) OPENSSL_sk_zero(ossl_check_OCSP_CERTID_sk_type(sk))
#define sk_OCSP_CERTID_delete(sk, i) ((OCSP_CERTID
*)OPENSSL_sk_delete(ossl_check_OCSP_CERTID_sk_type(sk),
 (i)))
#define sk_OCSP_CERTID_delete_ptr(sk, ptr) ((OCSP_CERTID
*)OPENSSL_sk_delete_ptr(ossl_check_OCSP_CERTID_sk_type(sk), ossl_check_OCSP_CERTID_type(ptr)))
#define sk_OCSP_CERTID_push(sk, ptr) OPENSSL_sk_push(ossl_check_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_type(ptr))
#define sk_OCSP_CERTID_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_type(ptr))
#define sk_OCSP_CERTID_pop(sk) ((OCSP_CERTID
*)OPENSSL_sk_pop(ossl_check_OCSP_CERTID_sk_type(sk)))
#define sk_OCSP_CERTID_shift(sk) ((OCSP_CERTID
*)OPENSSL_sk_shift(ossl_check_OCSP_CERTID_sk_type(sk)))
#define sk_OCSP_CERTID_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OCSP_CERTID_sk_type(sk),ossl_check_OCSP_CERTID_freefunc_type(freef
unc))
#define sk_OCSP_CERTID_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_type(ptr), (idx))
#define sk_OCSP_CERTID_set(sk, idx, ptr) ((OCSP_CERTID
 *)OPENSSL_sk_set(ossl_check_OCSP_CERTID_sk_type(sk), (idx), ossl_check_OCSP_CERTID_type(ptr)))
#define sk_OCSP_CERTID_find(sk, ptr) OPENSSL_sk_find(ossl_check_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_type(ptr))
#define sk_OCSP_CERTID_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_type(ptr))
#define sk_OCSP_CERTID_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OCSP_CERTID_sk_type(sk), ossl_check_OCSP_CERTID_type(ptr), pnum)
#define sk_OCSP_CERTID_sort(sk) OPENSSL_sk_sort(ossl_check_OCSP_CERTID_sk_type(sk))
#define sk_OCSP_CERTID_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OCSP_CERTID_sk_type(sk))
#define sk_OCSP_CERTID_dup(sk) ((STACK_OF(OCSP_CERTID)
*)OPENSSL_sk_dup(ossl_check_const_OCSP_CERTID_sk_type(sk)))
#define sk_OCSP_CERTID_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OCSP_CERTID)
*)OPENSSL_sk_deep_copy(ossl_check_const_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_copyfunc_type(copyfunc), ossl_check_OCSP_CERTID_freefunc_type(freefunc)))
#define
 sk_OCSP_CERTID_set_cmp_func(sk, cmp)
((sk_OCSP_CERTID_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OCSP_CERTID_sk_type(sk),
ossl_check_OCSP_CERTID_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(OCSP_ONEREQ, OCSP_ONEREQ, OCSP_ONEREQ)
#define sk_OCSP_ONEREQ_num(sk) OPENSSL_sk_num(ossl_check_const_OCSP_ONEREQ_sk_type(sk))
#define sk_OCSP_ONEREQ_value(sk, idx) ((OCSP_ONEREQ
*)OPENSSL_sk_value(ossl_check_const_OCSP_ONEREQ_sk_type(sk), (idx)))
#define sk_OCSP_ONEREQ_new(cmp) ((STACK_OF(OCSP_ONEREQ)
*)OPENSSL_sk_new(ossl_check_OCSP_ONEREQ_compfunc_type(cmp)))
#define sk_OCSP_ONEREQ_new_null() ((STACK_OF(OCSP_ONEREQ) *)OPENSSL_sk_new_null())
#define sk_OCSP_ONEREQ_new_reserve(cmp, n) ((STACK_OF(OCSP_ONEREQ)
```

*)OPENSSL_sk_new_reserve(ossl_check_OCSP_ONEREQ_compfunc_type(cmp), (n)))
#define sk_OCSP_ONEREQ_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_OCSP_ONEREQ_sk_type(sk), (n))
#define sk_OCSP_ONEREQ_free(sk) OPENSSL_sk_free(ossl_check_OCSP_ONEREQ_sk_type(sk))
#define
sk_OCSP_ONEREQ_zero(sk) OPENSSL_sk_zero(ossl_check_OCSP_ONEREQ_sk_type(sk))
#define sk_OCSP_ONEREQ_delete(sk, i) ((OCSP_ONEREQ
*)OPENSSL_sk_delete(ossl_check_OCSP_ONEREQ_sk_type(sk), (i)))
#define sk_OCSP_ONEREQ_delete_ptr(sk, ptr) ((OCSP_ONEREQ
*)OPENSSL_sk_delete_ptr(ossl_check_OCSP_ONEREQ_sk_type(sk), ossl_check_OCSP_ONEREQ_type(ptr)))
#define sk_OCSP_ONEREQ_push(sk, ptr) OPENSSL_sk_push(ossl_check_OCSP_ONEREQ_sk_type(sk),
ossl_check_OCSP_ONEREQ_type(ptr))
#define sk_OCSP_ONEREQ_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_OCSP_ONEREQ_sk_type(sk),
ossl_check_OCSP_ONEREQ_type(ptr))
#define sk_OCSP_ONEREQ_pop(sk) ((OCSP_ONEREQ
*)OPENSSL_sk_pop(ossl_check_OCSP_ONEREQ_sk_type(sk)))
#define sk_OCSP_ONEREQ_shift(sk) ((OCSP_ONEREQ
*)OPENSSL_sk_shift(ossl_check_OCSP_ONEREQ_sk_type(sk)))
#define sk_OCSP_ONEREQ_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OCSP_ONEREQ_sk_type(sk),ossl_check_OCSP_ONEREQ_freefunc_type(fr
eefunc))
#define sk_OCSP_ONEREQ_insert(sk,
ptr, idx) OPENSSL_sk_insert(ossl_check_OCSP_ONEREQ_sk_type(sk), ossl_check_OCSP_ONEREQ_type(ptr),
(idx))
#define sk_OCSP_ONEREQ_set(sk, idx, ptr) ((OCSP_ONEREQ
*)OPENSSL_sk_set(ossl_check_OCSP_ONEREQ_sk_type(sk), (idx), ossl_check_OCSP_ONEREQ_type(ptr)))
#define sk_OCSP_ONEREQ_find(sk, ptr) OPENSSL_sk_find(ossl_check_OCSP_ONEREQ_sk_type(sk),
ossl_check_OCSP_ONEREQ_type(ptr))
#define sk_OCSP_ONEREQ_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_OCSP_ONEREQ_sk_type(sk),
ossl_check_OCSP_ONEREQ_type(ptr))
#define sk_OCSP_ONEREQ_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OCSP_ONEREQ_sk_type(sk), ossl_check_OCSP_ONEREQ_type(ptr), pnum)
#define sk_OCSP_ONEREQ_sort(sk) OPENSSL_sk_sort(ossl_check_OCSP_ONEREQ_sk_type(sk))
#define sk_OCSP_ONEREQ_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OCSP_ONEREQ_sk_type(sk))
#define sk_OCSP_ONEREQ_dup(sk) ((STACK_OF(OCSP_ONEREQ)
*)OPENSSL_sk_dup(ossl_check_const_OCSP_ONEREQ_sk_type(sk)))
#define sk_OCSP_ONEREQ_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(OCSP_ONEREQ) *)OPENSSL_sk_deep_copy(ossl_check_const_OCSP_ONEREQ_sk_type(sk),
ossl_check_OCSP_ONEREQ_copyfunc_type(copyfunc), ossl_check_OCSP_ONEREQ_freefunc_type(freefunc)))
#define sk_OCSP_ONEREQ_set_cmp_func(sk, cmp)
((sk_OCSP_ONEREQ_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OCSP_ONEREQ_sk_type(sk),
ossl_check_OCSP_ONEREQ_compfunc_type(cmp)))

define OCSP_RESPONSE_STATUS_SUCCESSFUL 0
define OCSP_RESPONSE_STATUS_MALFORMEDREQUEST 1
define OCSP_RESPONSE_STATUS_INTERNALERROR 2
define OCSP_RESPONSE_STATUS_TRYLATER 3

```
# define OCSP_RESPONSE_STATUS_SIGREQUIRED         5
# define OCSP_RESPONSE_STATUS_UNAUTHORIZED        6

typedef struct ocsp_resp_bytes_st OCSP_RESPBYTES;

# define V_OCSP_RESPID_NAME 0
# define V_OCSP_RESPID_KEY  1

SKM_DEFINE_STACK_OF_INTERNAL(OCSP_RESPID, OCSP_RESPID, OCSP_RESPID)
#define sk_OCSP_RESPID_num(sk) OPENSSL_sk_num(ossl_check_const_OCSP_RESPID_sk_type(sk))
#define sk_OCSP_RESPID_value(sk, idx)
 ((OCSP_RESPID *)OPENSSL_sk_value(ossl_check_const_OCSP_RESPID_sk_type(sk), (idx)))
#define sk_OCSP_RESPID_new(cmp) ((STACK_OF(OCSP_RESPID)
*)OPENSSL_sk_new(ossl_check_OCSP_RESPID_compfunc_type(cmp)))
#define sk_OCSP_RESPID_new_null() ((STACK_OF(OCSP_RESPID) *)OPENSSL_sk_new_null())
#define sk_OCSP_RESPID_new_reserve(cmp, n) ((STACK_OF(OCSP_RESPID)
*)OPENSSL_sk_new_reserve(ossl_check_OCSP_RESPID_compfunc_type(cmp), (n)))
#define sk_OCSP_RESPID_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_OCSP_RESPID_sk_type(sk), (n))
#define sk_OCSP_RESPID_free(sk) OPENSSL_sk_free(ossl_check_OCSP_RESPID_sk_type(sk))
#define sk_OCSP_RESPID_zero(sk) OPENSSL_sk_zero(ossl_check_OCSP_RESPID_sk_type(sk))
#define sk_OCSP_RESPID_delete(sk, i) ((OCSP_RESPID
*)OPENSSL_sk_delete(ossl_check_OCSP_RESPID_sk_type(sk), (i)))
#define sk_OCSP_RESPID_delete_ptr(sk, ptr) ((OCSP_RESPID
*)OPENSSL_sk_delete_ptr(ossl_check_OCSP_RESPID_sk_type(sk), ossl_check_OCSP_RESPID_type(ptr)))
#define sk_OCSP_RESPID_push(sk, ptr) OPENSSL_sk_push(ossl_check_OCSP_RESPID_sk_type(sk),
 ossl_check_OCSP_RESPID_type(ptr))
#define sk_OCSP_RESPID_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_OCSP_RESPID_sk_type(sk),
ossl_check_OCSP_RESPID_type(ptr))
#define sk_OCSP_RESPID_pop(sk) ((OCSP_RESPID
*)OPENSSL_sk_pop(ossl_check_OCSP_RESPID_sk_type(sk)))
#define sk_OCSP_RESPID_shift(sk) ((OCSP_RESPID
*)OPENSSL_sk_shift(ossl_check_OCSP_RESPID_sk_type(sk)))
#define sk_OCSP_RESPID_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OCSP_RESPID_sk_type(sk),ossl_check_OCSP_RESPID_freefunc_type(freef
unc))
#define sk_OCSP_RESPID_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_OCSP_RESPID_sk_type(sk),
ossl_check_OCSP_RESPID_type(ptr), (idx))
#define sk_OCSP_RESPID_set(sk, idx, ptr) ((OCSP_RESPID
*)OPENSSL_sk_set(ossl_check_OCSP_RESPID_sk_type(sk), (idx), ossl_check_OCSP_RESPID_type(ptr)))
#define sk_OCSP_RESPID_find(sk, ptr) OPENSSL_sk_find(ossl_check_OCSP_RESPID_sk_type(sk),
ossl_check_OCSP_RESPID_type(ptr))
#define sk_OCSP_RESPID_find_ex(sk,
 ptr) OPENSSL_sk_find_ex(ossl_check_OCSP_RESPID_sk_type(sk), ossl_check_OCSP_RESPID_type(ptr))
#define sk_OCSP_RESPID_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OCSP_RESPID_sk_type(sk), ossl_check_OCSP_RESPID_type(ptr), pnum)
#define sk_OCSP_RESPID_sort(sk) OPENSSL_sk_sort(ossl_check_OCSP_RESPID_sk_type(sk))
#define sk_OCSP_RESPID_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_OCSP_RESPID_sk_type(sk))
#define sk_OCSP_RESPID_dup(sk) ((STACK_OF(OCSP_RESPID)
```

```
*)OPENSSL_sk_dup(ossl_check_const_OCSP_RESPID_sk_type(sk)))
#define sk_OCSP_RESPID_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OCSP_RESPID)
*)OPENSSL_sk_deep_copy(ossl_check_const_OCSP_RESPID_sk_type(sk),
ossl_check_OCSP_RESPID_copyfunc_type(copyfunc), ossl_check_OCSP_RESPID_freefunc_type(freefunc)))
#define sk_OCSP_RESPID_set_cmp_func(sk, cmp)
((sk_OCSP_RESPID_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OCSP_RESPID_sk_type(sk),
ossl_check_OCSP_RESPID_compfunc_type(cmp)))


typedef struct ocsp_revoked_info_st
 OCSP_REVOKEDINFO;

#  define V_OCSP_CERTSTATUS_GOOD    0
#  define V_OCSP_CERTSTATUS_REVOKED 1
#  define V_OCSP_CERTSTATUS_UNKNOWN 2

typedef struct ocsp_cert_status_st OCSP_CERTSTATUS;
typedef struct ocsp_single_response_st OCSP_SINGLERESP;

SKM_DEFINE_STACK_OF_INTERNAL(OCSP_SINGLERESP, OCSP_SINGLERESP, OCSP_SINGLERESP)
#define sk_OCSP_SINGLERESP_num(sk)
OPENSSL_sk_num(ossl_check_const_OCSP_SINGLERESP_sk_type(sk))
#define sk_OCSP_SINGLERESP_value(sk, idx) ((OCSP_SINGLERESP
*)OPENSSL_sk_value(ossl_check_const_OCSP_SINGLERESP_sk_type(sk), (idx)))
#define sk_OCSP_SINGLERESP_new(cmp) ((STACK_OF(OCSP_SINGLERESP)
*)OPENSSL_sk_new(ossl_check_OCSP_SINGLERESP_compfunc_type(cmp)))
#define sk_OCSP_SINGLERESP_new_null() ((STACK_OF(OCSP_SINGLERESP) *)OPENSSL_sk_new_null())
#define sk_OCSP_SINGLERESP_new_reserve(cmp, n) ((STACK_OF(OCSP_SINGLERESP)
*)OPENSSL_sk_new_reserve(ossl_check_OCSP_SINGLERESP_compfunc_type(cmp), (n)))
#define sk_OCSP_SINGLERESP_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OCSP_SINGLERESP_sk_type(sk),
 (n))
#define sk_OCSP_SINGLERESP_free(sk) OPENSSL_sk_free(ossl_check_OCSP_SINGLERESP_sk_type(sk))
#define sk_OCSP_SINGLERESP_zero(sk) OPENSSL_sk_zero(ossl_check_OCSP_SINGLERESP_sk_type(sk))
#define sk_OCSP_SINGLERESP_delete(sk, i) ((OCSP_SINGLERESP
*)OPENSSL_sk_delete(ossl_check_OCSP_SINGLERESP_sk_type(sk), (i)))
#define sk_OCSP_SINGLERESP_delete_ptr(sk, ptr) ((OCSP_SINGLERESP
*)OPENSSL_sk_delete_ptr(ossl_check_OCSP_SINGLERESP_sk_type(sk),
ossl_check_OCSP_SINGLERESP_type(ptr)))
#define sk_OCSP_SINGLERESP_push(sk, ptr)
OPENSSL_sk_push(ossl_check_OCSP_SINGLERESP_sk_type(sk), ossl_check_OCSP_SINGLERESP_type(ptr))
#define sk_OCSP_SINGLERESP_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OCSP_SINGLERESP_sk_type(sk),
ossl_check_OCSP_SINGLERESP_type(ptr))
#define sk_OCSP_SINGLERESP_pop(sk) ((OCSP_SINGLERESP
*)OPENSSL_sk_pop(ossl_check_OCSP_SINGLERESP_sk_type(sk)))
#define sk_OCSP_SINGLERESP_shift(sk) ((OCSP_SINGLERESP
*)OPENSSL_sk_shift(ossl_check_OCSP_SINGLERESP_sk_type(sk)))
```

```
#define
 sk_OCSP_SINGLERESP_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OCSP_SINGLERESP_sk_type(sk),ossl_check_OCSP_SINGLERESP_freefun
c_type(freefunc))
#define sk_OCSP_SINGLERESP_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OCSP_SINGLERESP_sk_type(sk), ossl_check_OCSP_SINGLERESP_type(ptr),
(idx))
#define sk_OCSP_SINGLERESP_set(sk, idx, ptr) ((OCSP_SINGLERESP
*)OPENSSL_sk_set(ossl_check_OCSP_SINGLERESP_sk_type(sk), (idx),
ossl_check_OCSP_SINGLERESP_type(ptr)))
#define sk_OCSP_SINGLERESP_find(sk, ptr) OPENSSL_sk_find(ossl_check_OCSP_SINGLERESP_sk_type(sk),
ossl_check_OCSP_SINGLERESP_type(ptr))
#define sk_OCSP_SINGLERESP_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OCSP_SINGLERESP_sk_type(sk),
ossl_check_OCSP_SINGLERESP_type(ptr))
#define sk_OCSP_SINGLERESP_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OCSP_SINGLERESP_sk_type(sk),
ossl_check_OCSP_SINGLERESP_type(ptr), pnum)
#define sk_OCSP_SINGLERESP_sort(sk) OPENSSL_sk_sort(ossl_check_OCSP_SINGLERESP_sk_type(sk))
#define
 sk_OCSP_SINGLERESP_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OCSP_SINGLERESP_sk_type(sk))
#define sk_OCSP_SINGLERESP_dup(sk) ((STACK_OF(OCSP_SINGLERESP)
*)OPENSSL_sk_dup(ossl_check_const_OCSP_SINGLERESP_sk_type(sk)))
#define sk_OCSP_SINGLERESP_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OCSP_SINGLERESP)
*)OPENSSL_sk_deep_copy(ossl_check_const_OCSP_SINGLERESP_sk_type(sk),
ossl_check_OCSP_SINGLERESP_copyfunc_type(copyfunc),
ossl_check_OCSP_SINGLERESP_freefunc_type(freefunc)))
#define sk_OCSP_SINGLERESP_set_cmp_func(sk, cmp)
((sk_OCSP_SINGLERESP_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OCSP_SINGLERESP_sk_type(sk
), ossl_check_OCSP_SINGLERESP_compfunc_type(cmp)))


typedef struct ocsp_response_data_st OCSP_RESPDATA;

typedef struct ocsp_basic_response_st OCSP_BASICRESP;

typedef struct ocsp_crl_id_st OCSP_CRLID;
typedef struct ocsp_service_locator_st OCSP_SERVICELOC;

#  define PEM_STRING_OCSP_REQUEST "OCSP REQUEST"
#  define PEM_STRING_OCSP_RESPONSE "OCSP
 RESPONSE"

#  define d2i_OCSP_REQUEST_bio(bp,p)
ASN1_d2i_bio_of(OCSP_REQUEST,OCSP_REQUEST_new,d2i_OCSP_REQUEST,bp,p)

#  define d2i_OCSP_RESPONSE_bio(bp,p)
```

```
ASN1_d2i_bio_of(OCSP_RESPONSE,OCSP_RESPONSE_new,d2i_OCSP_RESPONSE,bp,p)

# define PEM_read_bio_OCSP_REQUEST(bp,x,cb) (OCSP_REQUEST *)PEM_ASN1_read_bio( \
   (char *(*)())d2i_OCSP_REQUEST,PEM_STRING_OCSP_REQUEST, \
   bp,(char **)(x),cb,NULL)

# define PEM_read_bio_OCSP_RESPONSE(bp,x,cb) (OCSP_RESPONSE *)PEM_ASN1_read_bio(\
   (char *(*)())d2i_OCSP_RESPONSE,PEM_STRING_OCSP_RESPONSE, \
   bp,(char **)(x),cb,NULL)

# define PEM_write_bio_OCSP_REQUEST(bp,o) \
  PEM_ASN1_write_bio((int (*)())i2d_OCSP_REQUEST,PEM_STRING_OCSP_REQUEST,\
                bp,(char *)(o), NULL,NULL,0,NULL,NULL)

# define PEM_write_bio_OCSP_RESPONSE(bp,o) \
  PEM_ASN1_write_bio((int (*)())i2d_OCSP_RESPONSE,PEM_STRING_OCSP_RESPONSE,\
                bp,(char *)(o), NULL,NULL,0,NULL,NULL)

# define i2d_OCSP_RESPONSE_bio(bp,o) ASN1_i2d_bio_of(OCSP_RESPONSE,i2d_OCSP_RESPONSE,bp,o)

#
 define i2d_OCSP_REQUEST_bio(bp,o) ASN1_i2d_bio_of(OCSP_REQUEST,i2d_OCSP_REQUEST,bp,o)

# define ASN1_BIT_STRING_digest(data,type,md,len) \
     ASN1_item_digest(ASN1_ITEM_rptr(ASN1_BIT_STRING),type,data,md,len)

# define OCSP_CERTSTATUS_dup(cs)\
           (OCSP_CERTSTATUS*)ASN1_dup((i2d_of_void *)i2d_OCSP_CERTSTATUS,\
           (d2i_of_void *)d2i_OCSP_CERTSTATUS,(char *)(cs))

DECLARE_ASN1_DUP_FUNCTION(OCSP_CERTID)

OSSL_HTTP_REQ_CTX *OCSP_sendreq_new(BIO *io, const char *path,
                            const OCSP_REQUEST *req, int buf_size);
OCSP_RESPONSE *OCSP_sendreq_bio(BIO *b, const char *path, OCSP_REQUEST *req);

# ifndef OPENSSL_NO_DEPRECATED_3_0
typedef OSSL_HTTP_REQ_CTX OCSP_REQ_CTX;
#  define OCSP_REQ_CTX_new(io, buf_size) \
     OSSL_HTTP_REQ_CTX_new(io, io, buf_size)
#  define OCSP_REQ_CTX_free OSSL_HTTP_REQ_CTX_free
#  define OCSP_REQ_CTX_http(rctx, op, path) \
     (OSSL_HTTP_REQ_CTX_set_expected(rctx,
 NULL, 1 /* asn1 */, 0, 0) && \
      OSSL_HTTP_REQ_CTX_set_request_line(rctx, strcmp(op, "POST") == 0, \
                                NULL, NULL, path))
#  define OCSP_REQ_CTX_add1_header OSSL_HTTP_REQ_CTX_add1_header
#  define OCSP_REQ_CTX_i2d(r, it, req) \
```

```
     OSSL_HTTP_REQ_CTX_set1_req(r, "application/ocsp-request", it, req)
#   define OCSP_REQ_CTX_set1_req(r, req) \
     OCSP_REQ_CTX_i2d(r, ASN1_ITEM_rptr(OCSP_REQUEST), (ASN1_VALUE *)(req))
#   define OCSP_REQ_CTX_nbio OSSL_HTTP_REQ_CTX_nbio
#   define OCSP_REQ_CTX_nbio_d2i OSSL_HTTP_REQ_CTX_nbio_d2i
#   define OCSP_sendreq_nbio(p, r) \
     OSSL_HTTP_REQ_CTX_nbio_d2i(r, (ASN1_VALUE **)(p), \
                        ASN1_ITEM_rptr(OCSP_RESPONSE))
#   define OCSP_REQ_CTX_get0_mem_bio OSSL_HTTP_REQ_CTX_get0_mem_bio
#   define OCSP_set_max_response_length OSSL_HTTP_REQ_CTX_set_max_response_length
#  endif

OCSP_CERTID *OCSP_cert_to_id(const EVP_MD *dgst, const X509 *subject,
                     const X509 *issuer);

OCSP_CERTID *OCSP_cert_id_new(const EVP_MD *dgst,
                     const X509_NAME *issuerName,
                     const ASN1_BIT_STRING *issuerKey,
                     const ASN1_INTEGER *serialNumber);

OCSP_ONEREQ *OCSP_request_add0_id(OCSP_REQUEST *req, OCSP_CERTID *cid);

int OCSP_request_add1_nonce(OCSP_REQUEST *req, unsigned char *val, int len);
int OCSP_basic_add1_nonce(OCSP_BASICRESP *resp, unsigned char *val, int len);
int OCSP_check_nonce(OCSP_REQUEST *req, OCSP_BASICRESP *bs);
int OCSP_copy_nonce(OCSP_BASICRESP *resp, OCSP_REQUEST *req);

int OCSP_request_set1_name(OCSP_REQUEST *req, const X509_NAME *nm);
int OCSP_request_add1_cert(OCSP_REQUEST *req, X509 *cert);

int OCSP_request_sign(OCSP_REQUEST *req,
                X509 *signer,
                EVP_PKEY *key,
                const EVP_MD *dgst,
                STACK_OF(X509) *certs, unsigned long flags);

int
 OCSP_response_status(OCSP_RESPONSE *resp);
OCSP_BASICRESP *OCSP_response_get1_basic(OCSP_RESPONSE *resp);

const ASN1_OCTET_STRING *OCSP_resp_get0_signature(const OCSP_BASICRESP *bs);
const X509_ALGOR *OCSP_resp_get0_tbs_sigalg(const OCSP_BASICRESP *bs);
const OCSP_RESPDATA *OCSP_resp_get0_respdata(const OCSP_BASICRESP *bs);
int OCSP_resp_get0_signer(OCSP_BASICRESP *bs, X509 **signer,
                  STACK_OF(X509) *extra_certs);

int OCSP_resp_count(OCSP_BASICRESP *bs);
OCSP_SINGLERESP *OCSP_resp_get0(OCSP_BASICRESP *bs, int idx);
```

```
const ASN1_GENERALIZEDTIME *OCSP_resp_get0_produced_at(const OCSP_BASICRESP* bs);
const STACK_OF(X509) *OCSP_resp_get0_certs(const OCSP_BASICRESP *bs);
int OCSP_resp_get0_id(const OCSP_BASICRESP *bs,
                      const ASN1_OCTET_STRING **pid,
                      const X509_NAME **pname);
int OCSP_resp_get1_id(const OCSP_BASICRESP *bs,
                      ASN1_OCTET_STRING **pid,
                      X509_NAME **pname);

int OCSP_resp_find(OCSP_BASICRESP
 *bs, OCSP_CERTID *id, int last);
int OCSP_single_get0_status(OCSP_SINGLERESP *single, int *reason,
                            ASN1_GENERALIZEDTIME **revtime,
                            ASN1_GENERALIZEDTIME **thisupd,
                            ASN1_GENERALIZEDTIME **nextupd);
int OCSP_resp_find_status(OCSP_BASICRESP *bs, OCSP_CERTID *id, int *status,
                          int *reason,
                          ASN1_GENERALIZEDTIME **revtime,
                          ASN1_GENERALIZEDTIME **thisupd,
                          ASN1_GENERALIZEDTIME **nextupd);
int OCSP_check_validity(ASN1_GENERALIZEDTIME *thisupd,
                        ASN1_GENERALIZEDTIME *nextupd, long sec, long maxsec);

int OCSP_request_verify(OCSP_REQUEST *req, STACK_OF(X509) *certs,
                        X509_STORE *store, unsigned long flags);

#  define OCSP_parse_url(url, host, port, path, ssl) \
   OSSL_HTTP_parse_url(url, ssl, NULL, host, port, NULL, path, NULL, NULL)

int OCSP_id_issuer_cmp(const
 OCSP_CERTID *a, const OCSP_CERTID *b);
int OCSP_id_cmp(const OCSP_CERTID *a, const OCSP_CERTID *b);

int OCSP_request_onereq_count(OCSP_REQUEST *req);
OCSP_ONEREQ *OCSP_request_onereq_get0(OCSP_REQUEST *req, int i);
OCSP_CERTID *OCSP_onereq_get0_id(OCSP_ONEREQ *one);
int OCSP_id_get0_info(ASN1_OCTET_STRING **piNameHash, ASN1_OBJECT **pmd,
                      ASN1_OCTET_STRING **pikeyHash,
                      ASN1_INTEGER **pserial, OCSP_CERTID *cid);
int OCSP_request_is_signed(OCSP_REQUEST *req);
OCSP_RESPONSE *OCSP_response_create(int status, OCSP_BASICRESP *bs);
OCSP_SINGLERESP *OCSP_basic_add1_status(OCSP_BASICRESP *rsp,
                                        OCSP_CERTID *cid,
                                        int status, int reason,
                                        ASN1_TIME *revtime,
                                        ASN1_TIME *thisupd,
                                        ASN1_TIME *nextupd);
int OCSP_basic_add1_cert(OCSP_BASICRESP *resp,
```

```
 X509 *cert);
int OCSP_basic_sign(OCSP_BASICRESP *brsp,
                X509 *signer, EVP_PKEY *key, const EVP_MD *dgst,
                STACK_OF(X509) *certs, unsigned long flags);
int OCSP_basic_sign_ctx(OCSP_BASICRESP *brsp,
                  X509 *signer, EVP_MD_CTX *ctx,
                  STACK_OF(X509) *certs, unsigned long flags);
int OCSP_RESPID_set_by_name(OCSP_RESPID *respid, X509 *cert);
int OCSP_RESPID_set_by_key_ex(OCSP_RESPID *respid, X509 *cert,
                      OSSL_LIB_CTX *libctx, const char *propq);
int OCSP_RESPID_set_by_key(OCSP_RESPID *respid, X509 *cert);
int OCSP_RESPID_match_ex(OCSP_RESPID *respid, X509 *cert, OSSL_LIB_CTX *libctx,
                 const char *propq);
int OCSP_RESPID_match(OCSP_RESPID *respid, X509 *cert);

X509_EXTENSION *OCSP_crlID_new(const char *url, long *n, char *tim);

X509_EXTENSION *OCSP_accept_responses_new(char **oids);

X509_EXTENSION *OCSP_archive_cutoff_new(char *tim);

X509_EXTENSION *OCSP_url_svcloc_new(const
 X509_NAME *issuer, const char **urls);

int OCSP_REQUEST_get_ext_count(OCSP_REQUEST *x);
int OCSP_REQUEST_get_ext_by_NID(OCSP_REQUEST *x, int nid, int lastpos);
int OCSP_REQUEST_get_ext_by_OBJ(OCSP_REQUEST *x, const ASN1_OBJECT *obj,
                        int lastpos);
int OCSP_REQUEST_get_ext_by_critical(OCSP_REQUEST *x, int crit, int lastpos);
X509_EXTENSION *OCSP_REQUEST_get_ext(OCSP_REQUEST *x, int loc);
X509_EXTENSION *OCSP_REQUEST_delete_ext(OCSP_REQUEST *x, int loc);
void *OCSP_REQUEST_get1_ext_d2i(OCSP_REQUEST *x, int nid, int *crit,
                        int *idx);
int OCSP_REQUEST_add1_ext_i2d(OCSP_REQUEST *x, int nid, void *value, int crit,
                      unsigned long flags);
int OCSP_REQUEST_add_ext(OCSP_REQUEST *x, X509_EXTENSION *ex, int loc);

int OCSP_ONEREQ_get_ext_count(OCSP_ONEREQ *x);
int OCSP_ONEREQ_get_ext_by_NID(OCSP_ONEREQ *x, int nid, int lastpos);
int OCSP_ONEREQ_get_ext_by_OBJ(OCSP_ONEREQ *x, const
 ASN1_OBJECT *obj, int lastpos);
int OCSP_ONEREQ_get_ext_by_critical(OCSP_ONEREQ *x, int crit, int lastpos);
X509_EXTENSION *OCSP_ONEREQ_get_ext(OCSP_ONEREQ *x, int loc);
X509_EXTENSION *OCSP_ONEREQ_delete_ext(OCSP_ONEREQ *x, int loc);
void *OCSP_ONEREQ_get1_ext_d2i(OCSP_ONEREQ *x, int nid, int *crit, int *idx);
int OCSP_ONEREQ_add1_ext_i2d(OCSP_ONEREQ *x, int nid, void *value, int crit,
                      unsigned long flags);
int OCSP_ONEREQ_add_ext(OCSP_ONEREQ *x, X509_EXTENSION *ex, int loc);
```

```
int OCSP_BASICRESP_get_ext_count(OCSP_BASICRESP *x);
int OCSP_BASICRESP_get_ext_by_NID(OCSP_BASICRESP *x, int nid, int lastpos);
int OCSP_BASICRESP_get_ext_by_OBJ(OCSP_BASICRESP *x, const ASN1_OBJECT *obj,
                                  int lastpos);
int OCSP_BASICRESP_get_ext_by_critical(OCSP_BASICRESP *x, int crit,
                                       int lastpos);
X509_EXTENSION *OCSP_BASICRESP_get_ext(OCSP_BASICRESP *x, int loc);
X509_EXTENSION *OCSP_BASICRESP_delete_ext(OCSP_BASICRESP
 *x, int loc);
void *OCSP_BASICRESP_get1_ext_d2i(OCSP_BASICRESP *x, int nid, int *crit,
                                  int *idx);
int OCSP_BASICRESP_add1_ext_i2d(OCSP_BASICRESP *x, int nid, void *value,
                                int crit, unsigned long flags);
int OCSP_BASICRESP_add_ext(OCSP_BASICRESP *x, X509_EXTENSION *ex, int loc);

int OCSP_SINGLERESP_get_ext_count(OCSP_SINGLERESP *x);
int OCSP_SINGLERESP_get_ext_by_NID(OCSP_SINGLERESP *x, int nid, int lastpos);
int OCSP_SINGLERESP_get_ext_by_OBJ(OCSP_SINGLERESP *x, const ASN1_OBJECT *obj,
                                   int lastpos);
int OCSP_SINGLERESP_get_ext_by_critical(OCSP_SINGLERESP *x, int crit,
                                        int lastpos);
X509_EXTENSION *OCSP_SINGLERESP_get_ext(OCSP_SINGLERESP *x, int loc);
X509_EXTENSION *OCSP_SINGLERESP_delete_ext(OCSP_SINGLERESP *x, int loc);
void *OCSP_SINGLERESP_get1_ext_d2i(OCSP_SINGLERESP *x, int nid, int *crit,
                                   int
 *idx);
int OCSP_SINGLERESP_add1_ext_i2d(OCSP_SINGLERESP *x, int nid, void *value,
                                 int crit, unsigned long flags);
int OCSP_SINGLERESP_add_ext(OCSP_SINGLERESP *x, X509_EXTENSION *ex, int loc);
const OCSP_CERTID *OCSP_SINGLERESP_get0_id(const OCSP_SINGLERESP *x);

DECLARE_ASN1_FUNCTIONS(OCSP_SINGLERESP)
DECLARE_ASN1_FUNCTIONS(OCSP_CERTSTATUS)
DECLARE_ASN1_FUNCTIONS(OCSP_REVOKEDINFO)
DECLARE_ASN1_FUNCTIONS(OCSP_BASICRESP)
DECLARE_ASN1_FUNCTIONS(OCSP_RESPDATA)
DECLARE_ASN1_FUNCTIONS(OCSP_RESPID)
DECLARE_ASN1_FUNCTIONS(OCSP_RESPONSE)
DECLARE_ASN1_FUNCTIONS(OCSP_RESPBYTES)
DECLARE_ASN1_FUNCTIONS(OCSP_ONEREQ)
DECLARE_ASN1_FUNCTIONS(OCSP_CERTID)
DECLARE_ASN1_FUNCTIONS(OCSP_REQUEST)
DECLARE_ASN1_FUNCTIONS(OCSP_SIGNATURE)
DECLARE_ASN1_FUNCTIONS(OCSP_REQINFO)
DECLARE_ASN1_FUNCTIONS(OCSP_CRLID)
DECLARE_ASN1_FUNCTIONS(OCSP_SERVICELOC)
```

```
const char *OCSP_response_status_str(long s);
const char *OCSP_cert_status_str(long s);
const char *OCSP_crl_reason_str(long s);

int
 OCSP_REQUEST_print(BIO *bp, OCSP_REQUEST *a, unsigned long flags);
int OCSP_RESPONSE_print(BIO *bp, OCSP_RESPONSE *o, unsigned long flags);

int OCSP_basic_verify(OCSP_BASICRESP *bs, STACK_OF(X509) *certs,
                      X509_STORE *st, unsigned long flags);


# ifdef __cplusplus
}
# endif
# endif /* !defined(OPENSSL_NO_OCSP) */
#endif
```

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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/pkcs7.h.in
*
```

```
* Copyright 1995-2023 The OpenSSL Project Authors. All Rights Reserved.
*
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_PKCS7_H
# define OPENSSL_PKCS7_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_PKCS7_H
# endif

# include <openssl/asn1.h>
# include <openssl/bio.h>
# include <openssl/e_os2.h>

# include <openssl/symhacks.h>
# include <openssl/types.h>
# include <openssl/pkcs7err.h>

#ifdef  __cplusplus
extern "C" {
#endif


/*-
Encryption_ID          DES-CBC
Digest_ID              MD5
Digest_Encryption_ID    rsaEncryption
Key_Encryption_ID       rsaEncryption
*/

typedef struct PKCS7_CTX_st {
  OSSL_LIB_CTX *libctx;
   char *propq;
} PKCS7_CTX;

typedef struct pkcs7_issuer_and_serial_st {
  X509_NAME *issuer;
  ASN1_INTEGER *serial;
} PKCS7_ISSUER_AND_SERIAL;
```

```
typedef struct pkcs7_signer_info_st {
  ASN1_INTEGER *version;      /* version 1 */
  PKCS7_ISSUER_AND_SERIAL *issuer_and_serial;
  X509_ALGOR *digest_alg;
  STACK_OF(X509_ATTRIBUTE) *auth_attr; /* [ 0 ] */
  X509_ALGOR *digest_enc_alg; /* confusing name, actually used for signing */
  ASN1_OCTET_STRING *enc_digest; /* confusing name, actually signature */
  STACK_OF(X509_ATTRIBUTE) *unauth_attr; /* [ 1 ] */
  /* The private key to sign with */
  EVP_PKEY *pkey;
  const PKCS7_CTX *ctx;
} PKCS7_SIGNER_INFO;
SKM_DEFINE_STACK_OF_INTERNAL(PKCS7_SIGNER_INFO, PKCS7_SIGNER_INFO,
PKCS7_SIGNER_INFO)
#define sk_PKCS7_SIGNER_INFO_num(sk)
OPENSSL_sk_num(ossl_check_const_PKCS7_SIGNER_INFO_sk_type(sk))
#define sk_PKCS7_SIGNER_INFO_value(sk, idx) ((PKCS7_SIGNER_INFO
*)OPENSSL_sk_value(ossl_check_const_PKCS7_SIGNER_INFO_sk_type(sk),
 (idx)))
#define sk_PKCS7_SIGNER_INFO_new(cmp) ((STACK_OF(PKCS7_SIGNER_INFO)
*)OPENSSL_sk_new(ossl_check_PKCS7_SIGNER_INFO_compfunc_type(cmp)))
#define sk_PKCS7_SIGNER_INFO_new_null() ((STACK_OF(PKCS7_SIGNER_INFO)
*)OPENSSL_sk_new_null())
#define sk_PKCS7_SIGNER_INFO_new_reserve(cmp, n) ((STACK_OF(PKCS7_SIGNER_INFO)
*)OPENSSL_sk_new_reserve(ossl_check_PKCS7_SIGNER_INFO_compfunc_type(cmp), (n)))
#define sk_PKCS7_SIGNER_INFO_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk), (n))
#define sk_PKCS7_SIGNER_INFO_free(sk)
OPENSSL_sk_free(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk))
#define sk_PKCS7_SIGNER_INFO_zero(sk)
OPENSSL_sk_zero(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk))
#define sk_PKCS7_SIGNER_INFO_delete(sk, i) ((PKCS7_SIGNER_INFO
*)OPENSSL_sk_delete(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk), (i)))
#define sk_PKCS7_SIGNER_INFO_delete_ptr(sk, ptr) ((PKCS7_SIGNER_INFO
*)OPENSSL_sk_delete_ptr(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr)))
#define
 sk_PKCS7_SIGNER_INFO_push(sk, ptr) OPENSSL_sk_push(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr))
#define sk_PKCS7_SIGNER_INFO_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr))
#define sk_PKCS7_SIGNER_INFO_pop(sk) ((PKCS7_SIGNER_INFO
*)OPENSSL_sk_pop(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk)))
#define sk_PKCS7_SIGNER_INFO_shift(sk) ((PKCS7_SIGNER_INFO
*)OPENSSL_sk_shift(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk)))
#define sk_PKCS7_SIGNER_INFO_pop_free(sk, freefunc)
```

```
OPENSSL_sk_pop_free(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),ossl_check_PKCS7_SIGNER_INFO_fr
eefunc_type(freefunc))
#define sk_PKCS7_SIGNER_INFO_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr), (idx))
#define sk_PKCS7_SIGNER_INFO_set(sk, idx, ptr) ((PKCS7_SIGNER_INFO
*)OPENSSL_sk_set(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk), (idx),
ossl_check_PKCS7_SIGNER_INFO_type(ptr)))
#define
 sk_PKCS7_SIGNER_INFO_find(sk, ptr) OPENSSL_sk_find(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr))
#define sk_PKCS7_SIGNER_INFO_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr))
#define sk_PKCS7_SIGNER_INFO_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_type(ptr), pnum)
#define sk_PKCS7_SIGNER_INFO_sort(sk) OPENSSL_sk_sort(ossl_check_PKCS7_SIGNER_INFO_sk_type(sk))
#define sk_PKCS7_SIGNER_INFO_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_PKCS7_SIGNER_INFO_sk_type(sk))
#define sk_PKCS7_SIGNER_INFO_dup(sk) ((STACK_OF(PKCS7_SIGNER_INFO)
*)OPENSSL_sk_dup(ossl_check_const_PKCS7_SIGNER_INFO_sk_type(sk)))
#define sk_PKCS7_SIGNER_INFO_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(PKCS7_SIGNER_INFO)
*)OPENSSL_sk_deep_copy(ossl_check_const_PKCS7_SIGNER_INFO_sk_type(sk),
ossl_check_PKCS7_SIGNER_INFO_copyfunc_type(copyfunc),
 ossl_check_PKCS7_SIGNER_INFO_freefunc_type(freefunc)))
#define sk_PKCS7_SIGNER_INFO_set_cmp_func(sk, cmp)
((sk_PKCS7_SIGNER_INFO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_PKCS7_SIGNER_INFO_sk_ty
pe(sk), ossl_check_PKCS7_SIGNER_INFO_compfunc_type(cmp)))


typedef struct pkcs7_recip_info_st {
  ASN1_INTEGER *version;      /* version 0 */
  PKCS7_ISSUER_AND_SERIAL *issuer_and_serial;
  X509_ALGOR *key_enc_algor;
  ASN1_OCTET_STRING *enc_key;
  X509 *cert;                 /* get the pub-key from this */
  const PKCS7_CTX *ctx;
} PKCS7_RECIP_INFO;
SKM_DEFINE_STACK_OF_INTERNAL(PKCS7_RECIP_INFO, PKCS7_RECIP_INFO, PKCS7_RECIP_INFO)
#define sk_PKCS7_RECIP_INFO_num(sk)
OPENSSL_sk_num(ossl_check_const_PKCS7_RECIP_INFO_sk_type(sk))
#define sk_PKCS7_RECIP_INFO_value(sk, idx) ((PKCS7_RECIP_INFO
*)OPENSSL_sk_value(ossl_check_const_PKCS7_RECIP_INFO_sk_type(sk), (idx)))
#define sk_PKCS7_RECIP_INFO_new(cmp) ((STACK_OF(PKCS7_RECIP_INFO)
*)OPENSSL_sk_new(ossl_check_PKCS7_RECIP_INFO_compfunc_type(cmp)))
#define
```

sk_PKCS7_RECIP_INFO_new_null() ((STACK_OF(PKCS7_RECIP_INFO) *)OPENSSL_sk_new_null())
#define sk_PKCS7_RECIP_INFO_new_reserve(cmp, n) ((STACK_OF(PKCS7_RECIP_INFO)
*)OPENSSL_sk_new_reserve(ossl_check_PKCS7_RECIP_INFO_compfunc_type(cmp), (n)))
#define sk_PKCS7_RECIP_INFO_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_PKCS7_RECIP_INFO_sk_type(sk), (n))
#define sk_PKCS7_RECIP_INFO_free(sk) OPENSSL_sk_free(ossl_check_PKCS7_RECIP_INFO_sk_type(sk))
#define sk_PKCS7_RECIP_INFO_zero(sk) OPENSSL_sk_zero(ossl_check_PKCS7_RECIP_INFO_sk_type(sk))
#define sk_PKCS7_RECIP_INFO_delete(sk, i) ((PKCS7_RECIP_INFO
*)OPENSSL_sk_delete(ossl_check_PKCS7_RECIP_INFO_sk_type(sk), (i)))
#define sk_PKCS7_RECIP_INFO_delete_ptr(sk, ptr) ((PKCS7_RECIP_INFO
*)OPENSSL_sk_delete_ptr(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),
ossl_check_PKCS7_RECIP_INFO_type(ptr)))
#define sk_PKCS7_RECIP_INFO_push(sk, ptr)
OPENSSL_sk_push(ossl_check_PKCS7_RECIP_INFO_sk_type(sk), ossl_check_PKCS7_RECIP_INFO_type(ptr))
#define
sk_PKCS7_RECIP_INFO_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),
ossl_check_PKCS7_RECIP_INFO_type(ptr))
#define sk_PKCS7_RECIP_INFO_pop(sk) ((PKCS7_RECIP_INFO
*)OPENSSL_sk_pop(ossl_check_PKCS7_RECIP_INFO_sk_type(sk)))
#define sk_PKCS7_RECIP_INFO_shift(sk) ((PKCS7_RECIP_INFO
*)OPENSSL_sk_shift(ossl_check_PKCS7_RECIP_INFO_sk_type(sk)))
#define sk_PKCS7_RECIP_INFO_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),ossl_check_PKCS7_RECIP_INFO_freefu
nc_type(freefunc))
#define sk_PKCS7_RECIP_INFO_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),
ossl_check_PKCS7_RECIP_INFO_type(ptr), (idx))
#define sk_PKCS7_RECIP_INFO_set(sk, idx, ptr) ((PKCS7_RECIP_INFO
*)OPENSSL_sk_set(ossl_check_PKCS7_RECIP_INFO_sk_type(sk), (idx),
ossl_check_PKCS7_RECIP_INFO_type(ptr)))
#define sk_PKCS7_RECIP_INFO_find(sk, ptr)
OPENSSL_sk_find(ossl_check_PKCS7_RECIP_INFO_sk_type(sk), ossl_check_PKCS7_RECIP_INFO_type(ptr))
#define
sk_PKCS7_RECIP_INFO_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),
ossl_check_PKCS7_RECIP_INFO_type(ptr))
#define sk_PKCS7_RECIP_INFO_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),
ossl_check_PKCS7_RECIP_INFO_type(ptr), pnum)
#define sk_PKCS7_RECIP_INFO_sort(sk) OPENSSL_sk_sort(ossl_check_PKCS7_RECIP_INFO_sk_type(sk))
#define sk_PKCS7_RECIP_INFO_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_PKCS7_RECIP_INFO_sk_type(sk))
#define sk_PKCS7_RECIP_INFO_dup(sk) ((STACK_OF(PKCS7_RECIP_INFO)
*)OPENSSL_sk_dup(ossl_check_const_PKCS7_RECIP_INFO_sk_type(sk)))
#define sk_PKCS7_RECIP_INFO_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(PKCS7_RECIP_INFO)
*)OPENSSL_sk_deep_copy(ossl_check_const_PKCS7_RECIP_INFO_sk_type(sk),
ossl_check_PKCS7_RECIP_INFO_copyfunc_type(copyfunc),
ossl_check_PKCS7_RECIP_INFO_freefunc_type(freefunc)))

```
#define sk_PKCS7_RECIP_INFO_set_cmp_func(sk, cmp)
((sk_PKCS7_RECIP_INFO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_PKCS7_RECIP_INFO_sk_type(sk),
 ossl_check_PKCS7_RECIP_INFO_compfunc_type(cmp)))



typedef struct pkcs7_signed_st {
  ASN1_INTEGER *version;      /* version 1 */
  STACK_OF(X509_ALGOR) *md_algs; /* md used */
  STACK_OF(X509) *cert;       /* [ 0 ] */
  STACK_OF(X509_CRL) *crl;    /* [ 1 ] */
  STACK_OF(PKCS7_SIGNER_INFO) *signer_info;
  struct pkcs7_st *contents;
} PKCS7_SIGNED;
/*
* The above structure is very very similar to PKCS7_SIGN_ENVELOPE. How about
* merging the two
*/

typedef struct pkcs7_enc_content_st {
  ASN1_OBJECT *content_type;
  X509_ALGOR *algorithm;
  ASN1_OCTET_STRING *enc_data; /* [ 0 ] */
  const EVP_CIPHER *cipher;
  const PKCS7_CTX *ctx;
} PKCS7_ENC_CONTENT;

typedef struct pkcs7_enveloped_st {
  ASN1_INTEGER *version;      /* version 0 */
  STACK_OF(PKCS7_RECIP_INFO) *recipientinfo;
  PKCS7_ENC_CONTENT *enc_data;
} PKCS7_ENVELOPE;

typedef struct pkcs7_signedandenveloped_st {
   ASN1_INTEGER *version;      /* version 1 */
  STACK_OF(X509_ALGOR) *md_algs; /* md used */
  STACK_OF(X509) *cert;       /* [ 0 ] */
  STACK_OF(X509_CRL) *crl;    /* [ 1 ] */
  STACK_OF(PKCS7_SIGNER_INFO) *signer_info;
  PKCS7_ENC_CONTENT *enc_data;
  STACK_OF(PKCS7_RECIP_INFO) *recipientinfo;
} PKCS7_SIGN_ENVELOPE;

typedef struct pkcs7_digest_st {
  ASN1_INTEGER *version;      /* version 0 */
  X509_ALGOR *md;             /* md used */
  struct pkcs7_st *contents;
```

```
  ASN1_OCTET_STRING *digest;
} PKCS7_DIGEST;

typedef struct pkcs7_encrypted_st {
  ASN1_INTEGER *version;      /* version 0 */
  PKCS7_ENC_CONTENT *enc_data;
} PKCS7_ENCRYPT;

typedef struct pkcs7_st {
  /*
   * The following is non NULL if it contains ASN1 encoding of this
   * structure
   */
  unsigned char *asn1;
  long length;
# define PKCS7_S_HEADER  0
# define PKCS7_S_BODY    1
# define PKCS7_S_TAIL    2
  int state;                /* used during processing */
  int detached;
   ASN1_OBJECT *type;
  /* content as defined by the type */
  /*
   * all encryption/message digests are applied to the 'contents', leaving
   * out the 'type' field.
   */
  union {
     char *ptr;
     /* NID_pkcs7_data */
     ASN1_OCTET_STRING *data;
     /* NID_pkcs7_signed */
     PKCS7_SIGNED *sign;
     /* NID_pkcs7_enveloped */
     PKCS7_ENVELOPE *enveloped;
     /* NID_pkcs7_signedAndEnveloped */
     PKCS7_SIGN_ENVELOPE *signed_and_enveloped;
     /* NID_pkcs7_digest */
     PKCS7_DIGEST *digest;
     /* NID_pkcs7_encrypted */
     PKCS7_ENCRYPT *encrypted;
     /* Anything else */
     ASN1_TYPE *other;
  } d;
  PKCS7_CTX ctx;
} PKCS7;
SKM_DEFINE_STACK_OF_INTERNAL(PKCS7, PKCS7, PKCS7)
#define sk_PKCS7_num(sk) OPENSSL_sk_num(ossl_check_const_PKCS7_sk_type(sk))
#define sk_PKCS7_value(sk, idx) ((PKCS7 *)OPENSSL_sk_value(ossl_check_const_PKCS7_sk_type(sk), (idx)))
```

```
#define sk_PKCS7_new(cmp) ((STACK_OF(PKCS7)
*)OPENSSL_sk_new(ossl_check_PKCS7_compfunc_type(cmp)))
#define
 sk_PKCS7_new_null() ((STACK_OF(PKCS7) *)OPENSSL_sk_new_null())
#define sk_PKCS7_new_reserve(cmp, n) ((STACK_OF(PKCS7)
*)OPENSSL_sk_new_reserve(ossl_check_PKCS7_compfunc_type(cmp), (n)))
#define sk_PKCS7_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_PKCS7_sk_type(sk), (n))
#define sk_PKCS7_free(sk) OPENSSL_sk_free(ossl_check_PKCS7_sk_type(sk))
#define sk_PKCS7_zero(sk) OPENSSL_sk_zero(ossl_check_PKCS7_sk_type(sk))
#define sk_PKCS7_delete(sk, i) ((PKCS7 *)OPENSSL_sk_delete(ossl_check_PKCS7_sk_type(sk), (i)))
#define sk_PKCS7_delete_ptr(sk, ptr) ((PKCS7 *)OPENSSL_sk_delete_ptr(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr)))
#define sk_PKCS7_push(sk, ptr) OPENSSL_sk_push(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr))
#define sk_PKCS7_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr))
#define sk_PKCS7_pop(sk) ((PKCS7 *)OPENSSL_sk_pop(ossl_check_PKCS7_sk_type(sk)))
#define
 sk_PKCS7_shift(sk) ((PKCS7 *)OPENSSL_sk_shift(ossl_check_PKCS7_sk_type(sk)))
#define sk_PKCS7_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_PKCS7_sk_type(sk),ossl_check_PKCS7_freefunc_type(freefunc))
#define sk_PKCS7_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr), (idx))
#define sk_PKCS7_set(sk, idx, ptr) ((PKCS7 *)OPENSSL_sk_set(ossl_check_PKCS7_sk_type(sk), (idx),
ossl_check_PKCS7_type(ptr)))
#define sk_PKCS7_find(sk, ptr) OPENSSL_sk_find(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr))
#define sk_PKCS7_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr))
#define sk_PKCS7_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_type(ptr), pnum)
#define sk_PKCS7_sort(sk) OPENSSL_sk_sort(ossl_check_PKCS7_sk_type(sk))
#define sk_PKCS7_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_PKCS7_sk_type(sk))
#define sk_PKCS7_dup(sk) ((STACK_OF(PKCS7)
 *)OPENSSL_sk_dup(ossl_check_const_PKCS7_sk_type(sk)))
#define sk_PKCS7_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(PKCS7)
*)OPENSSL_sk_deep_copy(ossl_check_const_PKCS7_sk_type(sk),
ossl_check_PKCS7_copyfunc_type(copyfunc), ossl_check_PKCS7_freefunc_type(freefunc)))
#define sk_PKCS7_set_cmp_func(sk, cmp)
((sk_PKCS7_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_PKCS7_sk_type(sk),
ossl_check_PKCS7_compfunc_type(cmp)))



# define PKCS7_OP_SET_DETACHED_SIGNATURE 1
# define PKCS7_OP_GET_DETACHED_SIGNATURE 2

# define PKCS7_get_signed_attributes(si) ((si)->auth_attr)
```

```
# define PKCS7_get_attributes(si)        ((si)->unauth_attr)

# define PKCS7_type_is_signed(a) (OBJ_obj2nid((a)->type) == NID_pkcs7_signed)
# define PKCS7_type_is_encrypted(a) (OBJ_obj2nid((a)->type) == NID_pkcs7_encrypted)
# define PKCS7_type_is_enveloped(a) (OBJ_obj2nid((a)->type) == NID_pkcs7_enveloped)
# define PKCS7_type_is_signedAndEnveloped(a) \
            (OBJ_obj2nid((a)->type) == NID_pkcs7_signedAndEnveloped)
#
 define PKCS7_type_is_data(a)   (OBJ_obj2nid((a)->type) == NID_pkcs7_data)
# define PKCS7_type_is_digest(a)   (OBJ_obj2nid((a)->type) == NID_pkcs7_digest)

# define PKCS7_set_detached(p,v) \
            PKCS7_ctrl(p,PKCS7_OP_SET_DETACHED_SIGNATURE,v,NULL)
# define PKCS7_get_detached(p) \
            PKCS7_ctrl(p,PKCS7_OP_GET_DETACHED_SIGNATURE,0,NULL)

# define PKCS7_is_detached(p7) (PKCS7_type_is_signed(p7) && PKCS7_get_detached(p7))

/* S/MIME related flags */

# define PKCS7_TEXT             0x1
# define PKCS7_NOCERTS          0x2
# define PKCS7_NOSIGS           0x4
# define PKCS7_NOCHAIN          0x8
# define PKCS7_NOINTERN         0x10
# define PKCS7_NOVERIFY         0x20
# define PKCS7_DETACHED         0x40
# define PKCS7_BINARY           0x80
# define PKCS7_NOATTR           0x100
# define PKCS7_NOSMIMECAP       0x200
# define PKCS7_NOOLDMIMETYPE    0x400
# define PKCS7_CRLFEOL          0x800
# define PKCS7_STREAM           0x1000
# define PKCS7_NOCRL
     0x2000
# define PKCS7_PARTIAL          0x4000
# define PKCS7_REUSE_DIGEST     0x8000
# define PKCS7_NO_DUAL_CONTENT  0x10000

/* Flags: for compatibility with older code */

# define SMIME_TEXT     PKCS7_TEXT
# define SMIME_NOCERTS  PKCS7_NOCERTS
# define SMIME_NOSIGS   PKCS7_NOSIGS
# define SMIME_NOCHAIN  PKCS7_NOCHAIN
# define SMIME_NOINTERN PKCS7_NOINTERN
# define SMIME_NOVERIFY PKCS7_NOVERIFY
# define SMIME_DETACHED PKCS7_DETACHED
```

```
# define SMIME_BINARY    PKCS7_BINARY
# define SMIME_NOATTR    PKCS7_NOATTR

/* CRLF ASCII canonicalisation */
# define SMIME_ASCIICRLF        0x80000

DECLARE_ASN1_FUNCTIONS(PKCS7_ISSUER_AND_SERIAL)

int PKCS7_ISSUER_AND_SERIAL_digest(PKCS7_ISSUER_AND_SERIAL *data,
                                   const EVP_MD *type, unsigned char *md,
                                   unsigned int *len);
# ifndef OPENSSL_NO_STDIO
PKCS7 *d2i_PKCS7_fp(FILE *fp, PKCS7 **p7);
int i2d_PKCS7_fp(FILE *fp, const PKCS7 *p7);
# endif
DECLARE_ASN1_DUP_FUNCTION(PKCS7)
PKCS7
 *d2i_PKCS7_bio(BIO *bp, PKCS7 **p7);
int i2d_PKCS7_bio(BIO *bp, const PKCS7 *p7);
int i2d_PKCS7_bio_stream(BIO *out, PKCS7 *p7, BIO *in, int flags);
int PEM_write_bio_PKCS7_stream(BIO *out, PKCS7 *p7, BIO *in, int flags);

DECLARE_ASN1_FUNCTIONS(PKCS7_SIGNER_INFO)
DECLARE_ASN1_FUNCTIONS(PKCS7_RECIP_INFO)
DECLARE_ASN1_FUNCTIONS(PKCS7_SIGNED)
DECLARE_ASN1_FUNCTIONS(PKCS7_ENC_CONTENT)
DECLARE_ASN1_FUNCTIONS(PKCS7_ENVELOPE)
DECLARE_ASN1_FUNCTIONS(PKCS7_SIGN_ENVELOPE)
DECLARE_ASN1_FUNCTIONS(PKCS7_DIGEST)
DECLARE_ASN1_FUNCTIONS(PKCS7_ENCRYPT)
DECLARE_ASN1_FUNCTIONS(PKCS7)
PKCS7 *PKCS7_new_ex(OSSL_LIB_CTX *libctx, const char *propq);

DECLARE_ASN1_ITEM(PKCS7_ATTR_SIGN)
DECLARE_ASN1_ITEM(PKCS7_ATTR_VERIFY)

DECLARE_ASN1_NDEF_FUNCTION(PKCS7)
DECLARE_ASN1_PRINT_FUNCTION(PKCS7)

long PKCS7_ctrl(PKCS7 *p7, int cmd, long larg, char *parg);

int PKCS7_type_is_other(PKCS7 *p7);
int PKCS7_set_type(PKCS7 *p7, int type);
int PKCS7_set0_type_other(PKCS7 *p7, int type, ASN1_TYPE *other);
int
 PKCS7_set_content(PKCS7 *p7, PKCS7 *p7_data);
int PKCS7_SIGNER_INFO_set(PKCS7_SIGNER_INFO *p7i, X509 *x509, EVP_PKEY *pkey,
                          const EVP_MD *dgst);
```

```
int PKCS7_SIGNER_INFO_sign(PKCS7_SIGNER_INFO *si);
int PKCS7_add_signer(PKCS7 *p7, PKCS7_SIGNER_INFO *p7i);
int PKCS7_add_certificate(PKCS7 *p7, X509 *x509);
int PKCS7_add_crl(PKCS7 *p7, X509_CRL *x509);
int PKCS7_content_new(PKCS7 *p7, int nid);
int PKCS7_dataVerify(X509_STORE *cert_store, X509_STORE_CTX *ctx,
                BIO *bio, PKCS7 *p7, PKCS7_SIGNER_INFO *si);
int PKCS7_signatureVerify(BIO *bio, PKCS7 *p7, PKCS7_SIGNER_INFO *si,
                    X509 *x509);

BIO *PKCS7_dataInit(PKCS7 *p7, BIO *bio);
int PKCS7_dataFinal(PKCS7 *p7, BIO *bio);
BIO *PKCS7_dataDecode(PKCS7 *p7, EVP_PKEY *pkey, BIO *in_bio, X509 *pcert);

PKCS7_SIGNER_INFO *PKCS7_add_signature(PKCS7 *p7, X509 *x509,
                            EVP_PKEY *pkey, const EVP_MD *dgst);
X509 *PKCS7_cert_from_signer_info(PKCS7 *p7,
 PKCS7_SIGNER_INFO *si);
int PKCS7_set_digest(PKCS7 *p7, const EVP_MD *md);
STACK_OF(PKCS7_SIGNER_INFO) *PKCS7_get_signer_info(PKCS7 *p7);

PKCS7_RECIP_INFO *PKCS7_add_recipient(PKCS7 *p7, X509 *x509);
void PKCS7_SIGNER_INFO_get0_algs(PKCS7_SIGNER_INFO *si, EVP_PKEY **pk,
                        X509_ALGOR **pdig, X509_ALGOR **psig);
void PKCS7_RECIP_INFO_get0_alg(PKCS7_RECIP_INFO *ri, X509_ALGOR **penc);
int PKCS7_add_recipient_info(PKCS7 *p7, PKCS7_RECIP_INFO *ri);
int PKCS7_RECIP_INFO_set(PKCS7_RECIP_INFO *p7i, X509 *x509);
int PKCS7_set_cipher(PKCS7 *p7, const EVP_CIPHER *cipher);
int PKCS7_stream(unsigned char ***boundary, PKCS7 *p7);

PKCS7_ISSUER_AND_SERIAL *PKCS7_get_issuer_and_serial(PKCS7 *p7, int idx);
ASN1_OCTET_STRING *PKCS7_get_octet_string(PKCS7 *p7);
ASN1_OCTET_STRING *PKCS7_digest_from_attributes(STACK_OF(X509_ATTRIBUTE) *sk);
int PKCS7_add_signed_attribute(PKCS7_SIGNER_INFO *p7si, int nid, int type,
                        void *data);
int PKCS7_add_attribute(PKCS7_SIGNER_INFO
 *p7si, int nid, int atrtype,
                    void *value);
ASN1_TYPE *PKCS7_get_attribute(const PKCS7_SIGNER_INFO *si, int nid);
ASN1_TYPE *PKCS7_get_signed_attribute(const PKCS7_SIGNER_INFO *si, int nid);
int PKCS7_set_signed_attributes(PKCS7_SIGNER_INFO *p7si,
                        STACK_OF(X509_ATTRIBUTE) *sk);
int PKCS7_set_attributes(PKCS7_SIGNER_INFO *p7si,
                    STACK_OF(X509_ATTRIBUTE) *sk);

PKCS7 *PKCS7_sign(X509 *signcert, EVP_PKEY *pkey, STACK_OF(X509) *certs,
                BIO *data, int flags);
PKCS7 *PKCS7_sign_ex(X509 *signcert, EVP_PKEY *pkey, STACK_OF(X509) *certs,
```

```
                BIO *data, int flags, OSSL_LIB_CTX *libctx,
                const char *propq);

PKCS7_SIGNER_INFO *PKCS7_sign_add_signer(PKCS7 *p7,
                                X509 *signcert, EVP_PKEY *pkey,
                                const EVP_MD *md, int flags);

int PKCS7_final(PKCS7 *p7, BIO *data,
 int flags);
int PKCS7_verify(PKCS7 *p7, STACK_OF(X509) *certs, X509_STORE *store,
            BIO *indata, BIO *out, int flags);
STACK_OF(X509) *PKCS7_get0_signers(PKCS7 *p7, STACK_OF(X509) *certs,
                           int flags);
PKCS7 *PKCS7_encrypt(STACK_OF(X509) *certs, BIO *in, const EVP_CIPHER *cipher,
                int flags);
PKCS7 *PKCS7_encrypt_ex(STACK_OF(X509) *certs, BIO *in,
                  const EVP_CIPHER *cipher, int flags,
                  OSSL_LIB_CTX *libctx, const char *propq);
int PKCS7_decrypt(PKCS7 *p7, EVP_PKEY *pkey, X509 *cert, BIO *data,
             int flags);

int PKCS7_add_attrib_smimecap(PKCS7_SIGNER_INFO *si,
                        STACK_OF(X509_ALGOR) *cap);
STACK_OF(X509_ALGOR) *PKCS7_get_smimecap(PKCS7_SIGNER_INFO *si);
int PKCS7_simple_smimecap(STACK_OF(X509_ALGOR) *sk, int nid, int arg);

int PKCS7_add_attrib_content_type(PKCS7_SIGNER_INFO *si, ASN1_OBJECT *coid);
int PKCS7_add0_attrib_signing_time(PKCS7_SIGNER_INFO
 *si, ASN1_TIME *t);
int PKCS7_add1_attrib_digest(PKCS7_SIGNER_INFO *si,
                        const unsigned char *md, int mdlen);

int SMIME_write_PKCS7(BIO *bio, PKCS7 *p7, BIO *data, int flags);
PKCS7 *SMIME_read_PKCS7_ex(BIO *bio, BIO **bcont, PKCS7 **p7);
PKCS7 *SMIME_read_PKCS7(BIO *bio, BIO **bcont);

BIO *BIO_new_PKCS7(BIO *out, PKCS7 *p7);

# ifdef  __cplusplus
}
# endif
#endif
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```

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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/safestack.h.in
*
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*
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* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_SAFESTACK_H
# define OPENSSL_SAFESTACK_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_SAFESTACK_H
# endif

# include <openssl/stack.h>
# include <openssl/e_os2.h>

#ifdef __cplusplus
extern "C" {
#endif

# define STACK_OF(type) struct stack_st_##type

/* Helper macro for internal use */
# define SKM_DEFINE_STACK_OF_INTERNAL(t1, t2, t3) \
   STACK_OF(t1); \
```

```
  typedef int (*sk_##t1##_compfunc)(const t3 * const *a, const t3 *const *b); \
  typedef void (*sk_##t1##_freefunc)(t3 *a); \
  typedef t3
 * (*sk_##t1##_copyfunc)(const t3 *a); \
  static ossl_unused ossl_inline t2 *ossl_check_##t1##_type(t2 *ptr) \
  { \
      return ptr; \
  } \
  static ossl_unused ossl_inline const OPENSSL_STACK *ossl_check_const_##t1##_sk_type(const
STACK_OF(t1) *sk) \
  { \
      return (const OPENSSL_STACK *)sk; \
  } \
  static ossl_unused ossl_inline OPENSSL_STACK *ossl_check_##t1##_sk_type(STACK_OF(t1) *sk) \
  { \
      return (OPENSSL_STACK *)sk; \
  } \
  static ossl_unused ossl_inline OPENSSL_sk_compfunc ossl_check_##t1##_compfunc_type(sk_##t1##_compfunc
cmp) \
  { \
      return (OPENSSL_sk_compfunc)cmp; \
  } \
  static ossl_unused ossl_inline OPENSSL_sk_copyfunc ossl_check_##t1##_copyfunc_type(sk_##t1##_copyfunc
cpy) \
  { \
      return (OPENSSL_sk_copyfunc)cpy; \
  } \
  static ossl_unused ossl_inline OPENSSL_sk_freefunc ossl_check_##t1##_freefunc_type(sk_##t1##_freefunc fr) \
  { \
      return (OPENSSL_sk_freefunc)fr; \
  }

# define SKM_DEFINE_STACK_OF(t1,
 t2, t3) \
  STACK_OF(t1); \
  typedef int (*sk_##t1##_compfunc)(const t3 * const *a, const t3 *const *b); \
  typedef void (*sk_##t1##_freefunc)(t3 *a); \
  typedef t3 * (*sk_##t1##_copyfunc)(const t3 *a); \
  static ossl_unused ossl_inline int sk_##t1##_num(const STACK_OF(t1) *sk) \
  { \
      return OPENSSL_sk_num((const OPENSSL_STACK *)sk); \
  } \
  static ossl_unused ossl_inline t2 *sk_##t1##_value(const STACK_OF(t1) *sk, int idx) \
  { \
      return (t2 *)OPENSSL_sk_value((const OPENSSL_STACK *)sk, idx); \
  } \
  static ossl_unused ossl_inline STACK_OF(t1) *sk_##t1##_new(sk_##t1##_compfunc compare) \
  { \
```

```
    return (STACK_OF(t1) *)OPENSSL_sk_new((OPENSSL_sk_compfunc)compare); \
  } \
  static ossl_unused ossl_inline STACK_OF(t1) *sk_##t1##_new_null(void) \
  { \
    return (STACK_OF(t1) *)OPENSSL_sk_new_null(); \
  } \
  static ossl_unused ossl_inline STACK_OF(t1) *sk_##t1##_new_reserve(sk_##t1##_compfunc compare,
int n) \
  { \
    return (STACK_OF(t1) *)OPENSSL_sk_new_reserve((OPENSSL_sk_compfunc)compare, n); \
  } \
  static ossl_unused ossl_inline int sk_##t1##_reserve(STACK_OF(t1) *sk, int n) \
  { \
    return OPENSSL_sk_reserve((OPENSSL_STACK *)sk, n); \
  } \
  static ossl_unused ossl_inline void sk_##t1##_free(STACK_OF(t1) *sk) \
  { \
    OPENSSL_sk_free((OPENSSL_STACK *)sk); \
  } \
  static ossl_unused ossl_inline void sk_##t1##_zero(STACK_OF(t1) *sk) \
  { \
    OPENSSL_sk_zero((OPENSSL_STACK *)sk); \
  } \
  static ossl_unused ossl_inline t2 *sk_##t1##_delete(STACK_OF(t1) *sk, int i) \
  { \
    return (t2 *)OPENSSL_sk_delete((OPENSSL_STACK *)sk, i); \
  } \
  static ossl_unused ossl_inline t2 *sk_##t1##_delete_ptr(STACK_OF(t1) *sk, t2 *ptr) \
  { \
    return (t2 *)OPENSSL_sk_delete_ptr((OPENSSL_STACK *)sk, \
                                       (const void *)ptr); \
  } \
  static ossl_unused ossl_inline int
sk_##t1##_push(STACK_OF(t1) *sk, t2 *ptr) \
  { \
    return OPENSSL_sk_push((OPENSSL_STACK *)sk, (const void *)ptr); \
  } \
  static ossl_unused ossl_inline int sk_##t1##_unshift(STACK_OF(t1) *sk, t2 *ptr) \
  { \
    return OPENSSL_sk_unshift((OPENSSL_STACK *)sk, (const void *)ptr); \
  } \
  static ossl_unused ossl_inline t2 *sk_##t1##_pop(STACK_OF(t1) *sk) \
  { \
    return (t2 *)OPENSSL_sk_pop((OPENSSL_STACK *)sk); \
  } \
  static ossl_unused ossl_inline t2 *sk_##t1##_shift(STACK_OF(t1) *sk) \
  { \
    return (t2 *)OPENSSL_sk_shift((OPENSSL_STACK *)sk); \
```

```
 } \
 static ossl_unused ossl_inline void sk_##t1##_pop_free(STACK_OF(t1) *sk, sk_##t1##_freefunc freefunc) \
 { \
    OPENSSL_sk_pop_free((OPENSSL_STACK *)sk, (OPENSSL_sk_freefunc)freefunc); \
 } \
 static ossl_unused ossl_inline int sk_##t1##_insert(STACK_OF(t1) *sk, t2 *ptr, int idx) \
 { \
    return OPENSSL_sk_insert((OPENSSL_STACK *)sk, (const void *)ptr, idx);
\
 } \
 static ossl_unused ossl_inline t2 *sk_##t1##_set(STACK_OF(t1) *sk, int idx, t2 *ptr) \
 { \
    return (t2 *)OPENSSL_sk_set((OPENSSL_STACK *)sk, idx, (const void *)ptr); \
 } \
 static ossl_unused ossl_inline int sk_##t1##_find(STACK_OF(t1) *sk, t2 *ptr) \
 { \
    return OPENSSL_sk_find((OPENSSL_STACK *)sk, (const void *)ptr); \
 } \
 static ossl_unused ossl_inline int sk_##t1##_find_ex(STACK_OF(t1) *sk, t2 *ptr) \
 { \
    return OPENSSL_sk_find_ex((OPENSSL_STACK *)sk, (const void *)ptr); \
 } \
 static ossl_unused ossl_inline int sk_##t1##_find_all(STACK_OF(t1) *sk, t2 *ptr, int *pnum) \
 { \
    return OPENSSL_sk_find_all((OPENSSL_STACK *)sk, (const void *)ptr, pnum); \
 } \
 static ossl_unused ossl_inline void sk_##t1##_sort(STACK_OF(t1) *sk) \
 { \
    OPENSSL_sk_sort((OPENSSL_STACK *)sk); \
 } \
 static ossl_unused ossl_inline int sk_##t1##_is_sorted(const STACK_OF(t1) *sk) \
 { \
    return
OPENSSL_sk_is_sorted((const OPENSSL_STACK *)sk); \
 } \
 static ossl_unused ossl_inline STACK_OF(t1) * sk_##t1##_dup(const STACK_OF(t1) *sk) \
 { \
    return (STACK_OF(t1) *)OPENSSL_sk_dup((const OPENSSL_STACK *)sk); \
 } \
 static ossl_unused ossl_inline STACK_OF(t1) *sk_##t1##_deep_copy(const STACK_OF(t1) *sk, \
                                 sk_##t1##_copyfunc copyfunc, \
                                 sk_##t1##_freefunc freefunc) \
 { \
    return (STACK_OF(t1) *)OPENSSL_sk_deep_copy((const OPENSSL_STACK *)sk, \
                           (OPENSSL_sk_copyfunc)copyfunc, \
                           (OPENSSL_sk_freefunc)freefunc); \
 } \
 static ossl_unused ossl_inline sk_##t1##_compfunc sk_##t1##_set_cmp_func(STACK_OF(t1) *sk,
```

```
sk_##t1##_compfunc compare) \
  { \
     return (sk_##t1##_compfunc)OPENSSL_sk_set_cmp_func((OPENSSL_STACK *)sk,
(OPENSSL_sk_compfunc)compare); \
   }

# define DEFINE_STACK_OF(t) SKM_DEFINE_STACK_OF(t, t, t)
# define DEFINE_STACK_OF_CONST(t) SKM_DEFINE_STACK_OF(t, const t, t)
# define DEFINE_SPECIAL_STACK_OF(t1, t2) SKM_DEFINE_STACK_OF(t1, t2, t2)
# define DEFINE_SPECIAL_STACK_OF_CONST(t1, t2) \
        SKM_DEFINE_STACK_OF(t1, const t2, t2)

/*-
* Strings are special: normally an lhash entry will point to a single
* (somewhat) mutable object. In the case of strings:
*
* a) Instead of a single char, there is an array of chars, NUL-terminated.
* b) The string may have be immutable.
*
* So, they need their own declarations. Especially important for
* type-checking tools, such as Deputy.
*
* In practice, however, it appears to be hard to have a const
* string. For now, I'm settling for dealing with the fact it is a
* string at all.
*/
typedef char *OPENSSL_STRING;
typedef const char *OPENSSL_CSTRING;

/*-
* Confusingly, LHASH_OF(STRING) deals with char ** throughout, but
* STACK_OF(STRING) is really more like STACK_OF(char),
 only, as mentioned
* above, instead of a single char each entry is a NUL-terminated array of
* chars. So, we have to implement STRING specially for STACK_OF. This is
* dealt with in the autogenerated macros below.
*/
SKM_DEFINE_STACK_OF_INTERNAL(OPENSSL_STRING, char, char)
#define sk_OPENSSL_STRING_num(sk)
OPENSSL_sk_num(ossl_check_const_OPENSSL_STRING_sk_type(sk))
#define sk_OPENSSL_STRING_value(sk, idx) ((char
*)OPENSSL_sk_value(ossl_check_const_OPENSSL_STRING_sk_type(sk), (idx)))
#define sk_OPENSSL_STRING_new(cmp) ((STACK_OF(OPENSSL_STRING)
*)OPENSSL_sk_new(ossl_check_OPENSSL_STRING_compfunc_type(cmp)))
#define sk_OPENSSL_STRING_new_null() ((STACK_OF(OPENSSL_STRING) *)OPENSSL_sk_new_null())
#define sk_OPENSSL_STRING_new_reserve(cmp, n) ((STACK_OF(OPENSSL_STRING)
*)OPENSSL_sk_new_reserve(ossl_check_OPENSSL_STRING_compfunc_type(cmp), (n)))
#define sk_OPENSSL_STRING_reserve(sk, n)
```

```
OPENSSL_sk_reserve(ossl_check_OPENSSL_STRING_sk_type(sk), (n))
#define sk_OPENSSL_STRING_free(sk)
 OPENSSL_sk_free(ossl_check_OPENSSL_STRING_sk_type(sk))
#define sk_OPENSSL_STRING_zero(sk) OPENSSL_sk_zero(ossl_check_OPENSSL_STRING_sk_type(sk))
#define sk_OPENSSL_STRING_delete(sk, i) ((char
*)OPENSSL_sk_delete(ossl_check_OPENSSL_STRING_sk_type(sk), (i)))
#define sk_OPENSSL_STRING_delete_ptr(sk, ptr) ((char
*)OPENSSL_sk_delete_ptr(ossl_check_OPENSSL_STRING_sk_type(sk),
ossl_check_OPENSSL_STRING_type(ptr)))
#define sk_OPENSSL_STRING_push(sk, ptr) OPENSSL_sk_push(ossl_check_OPENSSL_STRING_sk_type(sk),
ossl_check_OPENSSL_STRING_type(ptr))
#define sk_OPENSSL_STRING_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OPENSSL_STRING_sk_type(sk), ossl_check_OPENSSL_STRING_type(ptr))
#define sk_OPENSSL_STRING_pop(sk) ((char
*)OPENSSL_sk_pop(ossl_check_OPENSSL_STRING_sk_type(sk)))
#define sk_OPENSSL_STRING_shift(sk) ((char
*)OPENSSL_sk_shift(ossl_check_OPENSSL_STRING_sk_type(sk)))
#define sk_OPENSSL_STRING_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OPENSSL_STRING_sk_type(sk),ossl_check_OPENSSL_STRING_freefunc_
type(freefunc))
#define
 sk_OPENSSL_STRING_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_OPENSSL_STRING_sk_type(sk),
ossl_check_OPENSSL_STRING_type(ptr), (idx))
#define sk_OPENSSL_STRING_set(sk, idx, ptr) ((char
*)OPENSSL_sk_set(ossl_check_OPENSSL_STRING_sk_type(sk), (idx),
ossl_check_OPENSSL_STRING_type(ptr)))
#define sk_OPENSSL_STRING_find(sk, ptr) OPENSSL_sk_find(ossl_check_OPENSSL_STRING_sk_type(sk),
ossl_check_OPENSSL_STRING_type(ptr))
#define sk_OPENSSL_STRING_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OPENSSL_STRING_sk_type(sk), ossl_check_OPENSSL_STRING_type(ptr))
#define sk_OPENSSL_STRING_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OPENSSL_STRING_sk_type(sk), ossl_check_OPENSSL_STRING_type(ptr),
pnum)
#define sk_OPENSSL_STRING_sort(sk) OPENSSL_sk_sort(ossl_check_OPENSSL_STRING_sk_type(sk))
#define sk_OPENSSL_STRING_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OPENSSL_STRING_sk_type(sk))
#define sk_OPENSSL_STRING_dup(sk)
 ((STACK_OF(OPENSSL_STRING) *)OPENSSL_sk_dup(ossl_check_const_OPENSSL_STRING_sk_type(sk)))
#define sk_OPENSSL_STRING_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OPENSSL_STRING)
*)OPENSSL_sk_deep_copy(ossl_check_const_OPENSSL_STRING_sk_type(sk),
ossl_check_OPENSSL_STRING_copyfunc_type(copyfunc),
ossl_check_OPENSSL_STRING_freefunc_type(freefunc)))
#define sk_OPENSSL_STRING_set_cmp_func(sk, cmp)
((sk_OPENSSL_STRING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OPENSSL_STRING_sk_type(sk),
ossl_check_OPENSSL_STRING_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(OPENSSL_CSTRING, const char, char)
#define sk_OPENSSL_CSTRING_num(sk)
OPENSSL_sk_num(ossl_check_const_OPENSSL_CSTRING_sk_type(sk))
```

```
#define sk_OPENSSL_CSTRING_value(sk, idx) ((const char
*)OPENSSL_sk_value(ossl_check_const_OPENSSL_CSTRING_sk_type(sk), (idx)))
#define sk_OPENSSL_CSTRING_new(cmp) ((STACK_OF(OPENSSL_CSTRING)
*)OPENSSL_sk_new(ossl_check_OPENSSL_CSTRING_compfunc_type(cmp)))
#define sk_OPENSSL_CSTRING_new_null() ((STACK_OF(OPENSSL_CSTRING)
 *)OPENSSL_sk_new_null())
#define sk_OPENSSL_CSTRING_new_reserve(cmp, n) ((STACK_OF(OPENSSL_CSTRING)
*)OPENSSL_sk_new_reserve(ossl_check_OPENSSL_CSTRING_compfunc_type(cmp), (n)))
#define sk_OPENSSL_CSTRING_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OPENSSL_CSTRING_sk_type(sk), (n))
#define sk_OPENSSL_CSTRING_free(sk) OPENSSL_sk_free(ossl_check_OPENSSL_CSTRING_sk_type(sk))
#define sk_OPENSSL_CSTRING_zero(sk) OPENSSL_sk_zero(ossl_check_OPENSSL_CSTRING_sk_type(sk))
#define sk_OPENSSL_CSTRING_delete(sk, i) ((const char
*)OPENSSL_sk_delete(ossl_check_OPENSSL_CSTRING_sk_type(sk), (i)))
#define sk_OPENSSL_CSTRING_delete_ptr(sk, ptr) ((const char
*)OPENSSL_sk_delete_ptr(ossl_check_OPENSSL_CSTRING_sk_type(sk),
ossl_check_OPENSSL_CSTRING_type(ptr)))
#define sk_OPENSSL_CSTRING_push(sk, ptr)
OPENSSL_sk_push(ossl_check_OPENSSL_CSTRING_sk_type(sk), ossl_check_OPENSSL_CSTRING_type(ptr))
#define sk_OPENSSL_CSTRING_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OPENSSL_CSTRING_sk_type(sk),
 ossl_check_OPENSSL_CSTRING_type(ptr))
#define sk_OPENSSL_CSTRING_pop(sk) ((const char
*)OPENSSL_sk_pop(ossl_check_OPENSSL_CSTRING_sk_type(sk)))
#define sk_OPENSSL_CSTRING_shift(sk) ((const char
*)OPENSSL_sk_shift(ossl_check_OPENSSL_CSTRING_sk_type(sk)))
#define sk_OPENSSL_CSTRING_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OPENSSL_CSTRING_sk_type(sk),ossl_check_OPENSSL_CSTRING_freefu
nc_type(freefunc))
#define sk_OPENSSL_CSTRING_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OPENSSL_CSTRING_sk_type(sk), ossl_check_OPENSSL_CSTRING_type(ptr),
(idx))
#define sk_OPENSSL_CSTRING_set(sk, idx, ptr) ((const char
*)OPENSSL_sk_set(ossl_check_OPENSSL_CSTRING_sk_type(sk), (idx),
ossl_check_OPENSSL_CSTRING_type(ptr)))
#define sk_OPENSSL_CSTRING_find(sk, ptr)
OPENSSL_sk_find(ossl_check_OPENSSL_CSTRING_sk_type(sk), ossl_check_OPENSSL_CSTRING_type(ptr))
#define sk_OPENSSL_CSTRING_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OPENSSL_CSTRING_sk_type(sk),
ossl_check_OPENSSL_CSTRING_type(ptr))
#define
 sk_OPENSSL_CSTRING_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OPENSSL_CSTRING_sk_type(sk),
ossl_check_OPENSSL_CSTRING_type(ptr), pnum)
#define sk_OPENSSL_CSTRING_sort(sk) OPENSSL_sk_sort(ossl_check_OPENSSL_CSTRING_sk_type(sk))
#define sk_OPENSSL_CSTRING_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OPENSSL_CSTRING_sk_type(sk))
#define sk_OPENSSL_CSTRING_dup(sk) ((STACK_OF(OPENSSL_CSTRING)
```

*)OPENSSL_sk_dup(ossl_check_const_OPENSSL_CSTRING_sk_type(sk)))
#define sk_OPENSSL_CSTRING_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OPENSSL_CSTRING)
*)OPENSSL_sk_deep_copy(ossl_check_const_OPENSSL_CSTRING_sk_type(sk),
ossl_check_OPENSSL_CSTRING_copyfunc_type(copyfunc),
ossl_check_OPENSSL_CSTRING_freefunc_type(freefunc)))
#define sk_OPENSSL_CSTRING_set_cmp_func(sk, cmp)
((sk_OPENSSL_CSTRING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OPENSSL_CSTRING_sk_type(sk), ossl_check_OPENSSL_CSTRING_compfunc_type(cmp)))

#if !defined(OPENSSL_NO_DEPRECATED_3_0)
/*
* This
is not used by OpenSSL. A block of bytes, NOT nul-terminated.
* These should also be distinguished from "normal" stacks.
*/
typedef void *OPENSSL_BLOCK;
SKM_DEFINE_STACK_OF_INTERNAL(OPENSSL_BLOCK, void, void)
#define sk_OPENSSL_BLOCK_num(sk) OPENSSL_sk_num(ossl_check_const_OPENSSL_BLOCK_sk_type(sk))
#define sk_OPENSSL_BLOCK_value(sk, idx) ((void
*)OPENSSL_sk_value(ossl_check_const_OPENSSL_BLOCK_sk_type(sk), (idx)))
#define sk_OPENSSL_BLOCK_new(cmp) ((STACK_OF(OPENSSL_BLOCK)
*)OPENSSL_sk_new(ossl_check_OPENSSL_BLOCK_compfunc_type(cmp)))
#define sk_OPENSSL_BLOCK_new_null() ((STACK_OF(OPENSSL_BLOCK) *)OPENSSL_sk_new_null())
#define sk_OPENSSL_BLOCK_new_reserve(cmp, n) ((STACK_OF(OPENSSL_BLOCK)
*)OPENSSL_sk_new_reserve(ossl_check_OPENSSL_BLOCK_compfunc_type(cmp), (n)))
#define sk_OPENSSL_BLOCK_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OPENSSL_BLOCK_sk_type(sk), (n))
#define sk_OPENSSL_BLOCK_free(sk) OPENSSL_sk_free(ossl_check_OPENSSL_BLOCK_sk_type(sk))
#define sk_OPENSSL_BLOCK_zero(sk)
OPENSSL_sk_zero(ossl_check_OPENSSL_BLOCK_sk_type(sk))
#define sk_OPENSSL_BLOCK_delete(sk, i) ((void
*)OPENSSL_sk_delete(ossl_check_OPENSSL_BLOCK_sk_type(sk), (i)))
#define sk_OPENSSL_BLOCK_delete_ptr(sk, ptr) ((void
*)OPENSSL_sk_delete_ptr(ossl_check_OPENSSL_BLOCK_sk_type(sk),
ossl_check_OPENSSL_BLOCK_type(ptr)))
#define sk_OPENSSL_BLOCK_push(sk, ptr) OPENSSL_sk_push(ossl_check_OPENSSL_BLOCK_sk_type(sk),
ossl_check_OPENSSL_BLOCK_type(ptr))
#define sk_OPENSSL_BLOCK_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OPENSSL_BLOCK_sk_type(sk), ossl_check_OPENSSL_BLOCK_type(ptr))
#define sk_OPENSSL_BLOCK_pop(sk) ((void
*)OPENSSL_sk_pop(ossl_check_OPENSSL_BLOCK_sk_type(sk)))
#define sk_OPENSSL_BLOCK_shift(sk) ((void
*)OPENSSL_sk_shift(ossl_check_OPENSSL_BLOCK_sk_type(sk)))
#define sk_OPENSSL_BLOCK_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OPENSSL_BLOCK_sk_type(sk),ossl_check_OPENSSL_BLOCK_freefunc_type(freefunc))
#define sk_OPENSSL_BLOCK_insert(sk, ptr, idx)

```
OPENSSL_sk_insert(ossl_check_OPENSSL_BLOCK_sk_type(sk),
 ossl_check_OPENSSL_BLOCK_type(ptr), (idx))
#define sk_OPENSSL_BLOCK_set(sk, idx, ptr) ((void
*)OPENSSL_sk_set(ossl_check_OPENSSL_BLOCK_sk_type(sk), (idx),
ossl_check_OPENSSL_BLOCK_type(ptr)))
#define sk_OPENSSL_BLOCK_find(sk, ptr) OPENSSL_sk_find(ossl_check_OPENSSL_BLOCK_sk_type(sk),
ossl_check_OPENSSL_BLOCK_type(ptr))
#define sk_OPENSSL_BLOCK_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OPENSSL_BLOCK_sk_type(sk), ossl_check_OPENSSL_BLOCK_type(ptr))
#define sk_OPENSSL_BLOCK_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OPENSSL_BLOCK_sk_type(sk), ossl_check_OPENSSL_BLOCK_type(ptr),
pnum)
#define sk_OPENSSL_BLOCK_sort(sk) OPENSSL_sk_sort(ossl_check_OPENSSL_BLOCK_sk_type(sk))
#define sk_OPENSSL_BLOCK_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OPENSSL_BLOCK_sk_type(sk))
#define sk_OPENSSL_BLOCK_dup(sk) ((STACK_OF(OPENSSL_BLOCK)
*)OPENSSL_sk_dup(ossl_check_const_OPENSSL_BLOCK_sk_type(sk)))
#define sk_OPENSSL_BLOCK_deep_copy(sk, copyfunc,
 freefunc) ((STACK_OF(OPENSSL_BLOCK)
*)OPENSSL_sk_deep_copy(ossl_check_const_OPENSSL_BLOCK_sk_type(sk),
ossl_check_OPENSSL_BLOCK_copyfunc_type(copyfunc),
ossl_check_OPENSSL_BLOCK_freefunc_type(freefunc)))
#define sk_OPENSSL_BLOCK_set_cmp_func(sk, cmp)
((sk_OPENSSL_BLOCK_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OPENSSL_BLOCK_sk_type(sk),
ossl_check_OPENSSL_BLOCK_compfunc_type(cmp)))

#endif

# ifdef  __cplusplus
}
# endif
#endif
```

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"TTWL",
"TTYP0",
"TU-Berlin-1.0",
"TU-Berlin-2.0",
"TermReadKey",
"UCAR",
"UCL-1.0",
"UMich-Merit",
"UPL-1.0",
"URT-RLE",
"Unicode-3.0",
"Unicode-DFS-2015",
"Unicode-DFS-2016",
"Unicode-TOU",
"UnixCrypt",
"Unlicense",
"VOSTROM",
"VSL-1.0",
"Vim",
"W3C",
"W3C-19980720",
"W3C-20150513",
"WTFPL",
"Watcom-1.0",
"Widget-Workshop",
"Wsuipa",
"X11",
"X11-distribute-modifications-variant",
"XFree86-1.1",
"XSkat",
"Xdebug-1.03",
"Xerox",

"Xfig",
"Xnet",
"YPL-1.0",
"YPL-1.1",
"ZPL-1.1",
"ZPL-2.0",
"ZPL-2.1",
"Zed",
"Zeeff",
"Zend-2.0",
"Zimbra-1.3",
"Zimbra-1.4",
"Zlib",
"any-OSI",
"bcrypt-Solar-Designer",
"blessing",
"bzip2-1.0.6",
"check-cvs",
"checkmk",
"copyleft-next-0.3.0",
"copyleft-next-0.3.1",
"curl",
"cve-tou",
"diffmark",
"dtoa",
"dvipdfm",
"eGenix",
"etalab-2.0",
"fwlw",
"gSOAP-1.3b",
"gnuplot",
"gtkbook",
"hdparm",
"iMatix",
"libpng-2.0",
"libselinux-1.0",
"libtiff",
"libutil-David-Nugent",
"lsof",
"magaz",
"mailprio",
"metamail",
"mpi-permissive",
"mpich2",
"mplus",
"pkgconf",
"pnmstitch",
"psfrag",

"psutils",
"python-ldap",
"radvd",
"snprintf",
"softSurfer",
"ssh-keyscan",
"swrule",
"threeparttable",
"ulem",
"w3m",
"xinetd",
"xkeyboard-config-Zinoviev",
"xlock",
"xpp",
"xzoom",
"zlib-acknowledgement"
]
MIT
/*-
* WARNING: do not edit!
* Generated by Makefile from include/openssl/crmf.h.in
*
* Copyright 2007-2021 The OpenSSL Project Authors. All Rights Reserved.
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* Copyright Siemens AG 2015-2019
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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*
* CRMF (RFC 4211) implementation by M. Peylo, M. Viljanen, and D. von Oheimb.
*/

#ifndef OPENSSL_CRMF_H
define OPENSSL_CRMF_H

include <openssl/opensslconf.h>

ifndef OPENSSL_NO_CRMF
include <openssl/opensslv.h>
include <openssl/safestack.h>
include <openssl/crmferr.h>
include <openssl/x509v3.h> /* for GENERAL_NAME etc. */

/* explicit #includes not strictly needed since implied by the above: */

```
# include <openssl/types.h>
# include <openssl/x509.h>

# ifdef __cplusplus
extern "C" {
# endif

#
 define OSSL_CRMF_POPOPRIVKEY_THISMESSAGE         0
# define OSSL_CRMF_POPOPRIVKEY_SUBSEQUENTMESSAGE    1
# define OSSL_CRMF_POPOPRIVKEY_DHMAC              2
# define OSSL_CRMF_POPOPRIVKEY_AGREEMAC           3
# define OSSL_CRMF_POPOPRIVKEY_ENCRYPTEDKEY        4

# define OSSL_CRMF_SUBSEQUENTMESSAGE_ENCRCERT       0
# define OSSL_CRMF_SUBSEQUENTMESSAGE_CHALLENGERESP  1

typedef struct ossl_crmf_encryptedvalue_st OSSL_CRMF_ENCRYPTEDVALUE;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_ENCRYPTEDVALUE)
typedef struct ossl_crmf_msg_st OSSL_CRMF_MSG;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_MSG)
DECLARE_ASN1_DUP_FUNCTION(OSSL_CRMF_MSG)
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CRMF_MSG, OSSL_CRMF_MSG, OSSL_CRMF_MSG)
#define sk_OSSL_CRMF_MSG_num(sk)
OPENSSL_sk_num(ossl_check_const_OSSL_CRMF_MSG_sk_type(sk))
#define sk_OSSL_CRMF_MSG_value(sk, idx) ((OSSL_CRMF_MSG
*)OPENSSL_sk_value(ossl_check_const_OSSL_CRMF_MSG_sk_type(sk), (idx)))
#define sk_OSSL_CRMF_MSG_new(cmp) ((STACK_OF(OSSL_CRMF_MSG)
*)OPENSSL_sk_new(ossl_check_OSSL_CRMF_MSG_compfunc_type(cmp)))
#define
 sk_OSSL_CRMF_MSG_new_null() ((STACK_OF(OSSL_CRMF_MSG) *)OPENSSL_sk_new_null())
#define sk_OSSL_CRMF_MSG_new_reserve(cmp, n) ((STACK_OF(OSSL_CRMF_MSG)
*)OPENSSL_sk_new_reserve(ossl_check_OSSL_CRMF_MSG_compfunc_type(cmp), (n)))
#define sk_OSSL_CRMF_MSG_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OSSL_CRMF_MSG_sk_type(sk), (n))
#define sk_OSSL_CRMF_MSG_free(sk) OPENSSL_sk_free(ossl_check_OSSL_CRMF_MSG_sk_type(sk))
#define sk_OSSL_CRMF_MSG_zero(sk) OPENSSL_sk_zero(ossl_check_OSSL_CRMF_MSG_sk_type(sk))
#define sk_OSSL_CRMF_MSG_delete(sk, i) ((OSSL_CRMF_MSG
*)OPENSSL_sk_delete(ossl_check_OSSL_CRMF_MSG_sk_type(sk), (i)))
#define sk_OSSL_CRMF_MSG_delete_ptr(sk, ptr) ((OSSL_CRMF_MSG
*)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CRMF_MSG_sk_type(sk),
ossl_check_OSSL_CRMF_MSG_type(ptr)))
#define sk_OSSL_CRMF_MSG_push(sk, ptr) OPENSSL_sk_push(ossl_check_OSSL_CRMF_MSG_sk_type(sk),
ossl_check_OSSL_CRMF_MSG_type(ptr))
#define sk_OSSL_CRMF_MSG_unshift(sk,
 ptr) OPENSSL_sk_unshift(ossl_check_OSSL_CRMF_MSG_sk_type(sk),
ossl_check_OSSL_CRMF_MSG_type(ptr))
#define sk_OSSL_CRMF_MSG_pop(sk) ((OSSL_CRMF_MSG
```

```
*)OPENSSL_sk_pop(ossl_check_OSSL_CRMF_MSG_sk_type(sk)))
#define sk_OSSL_CRMF_MSG_shift(sk) ((OSSL_CRMF_MSG
*)OPENSSL_sk_shift(ossl_check_OSSL_CRMF_MSG_sk_type(sk)))
#define sk_OSSL_CRMF_MSG_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CRMF_MSG_sk_type(sk),ossl_check_OSSL_CRMF_MSG_freefunc_t
ype(freefunc))
#define sk_OSSL_CRMF_MSG_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CRMF_MSG_sk_type(sk), ossl_check_OSSL_CRMF_MSG_type(ptr),
(idx))
#define sk_OSSL_CRMF_MSG_set(sk, idx, ptr) ((OSSL_CRMF_MSG
*)OPENSSL_sk_set(ossl_check_OSSL_CRMF_MSG_sk_type(sk), (idx),
ossl_check_OSSL_CRMF_MSG_type(ptr)))
#define sk_OSSL_CRMF_MSG_find(sk, ptr) OPENSSL_sk_find(ossl_check_OSSL_CRMF_MSG_sk_type(sk),
ossl_check_OSSL_CRMF_MSG_type(ptr))
#define sk_OSSL_CRMF_MSG_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CRMF_MSG_sk_type(sk),
 ossl_check_OSSL_CRMF_MSG_type(ptr))
#define sk_OSSL_CRMF_MSG_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OSSL_CRMF_MSG_sk_type(sk), ossl_check_OSSL_CRMF_MSG_type(ptr),
pnum)
#define sk_OSSL_CRMF_MSG_sort(sk) OPENSSL_sk_sort(ossl_check_OSSL_CRMF_MSG_sk_type(sk))
#define sk_OSSL_CRMF_MSG_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CRMF_MSG_sk_type(sk))
#define sk_OSSL_CRMF_MSG_dup(sk) ((STACK_OF(OSSL_CRMF_MSG)
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CRMF_MSG_sk_type(sk)))
#define sk_OSSL_CRMF_MSG_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OSSL_CRMF_MSG)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CRMF_MSG_sk_type(sk),
ossl_check_OSSL_CRMF_MSG_copyfunc_type(copyfunc),
ossl_check_OSSL_CRMF_MSG_freefunc_type(freefunc)))
#define sk_OSSL_CRMF_MSG_set_cmp_func(sk, cmp)
((sk_OSSL_CRMF_MSG_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CRMF_MSG_sk_type(sk),
ossl_check_OSSL_CRMF_MSG_compfunc_type(cmp)))

typedef struct ossl_crmf_attributetypeandvalue_st OSSL_CRMF_ATTRIBUTETYPEANDVALUE;
typedef
 struct ossl_crmf_pbmparameter_st OSSL_CRMF_PBMPARAMETER;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_PBMPARAMETER)
typedef struct ossl_crmf_poposigningkey_st OSSL_CRMF_POPOSIGNINGKEY;
typedef struct ossl_crmf_certrequest_st OSSL_CRMF_CERTREQUEST;
typedef struct ossl_crmf_certid_st OSSL_CRMF_CERTID;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_CERTID)
DECLARE_ASN1_DUP_FUNCTION(OSSL_CRMF_CERTID)
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CRMF_CERTID, OSSL_CRMF_CERTID,
OSSL_CRMF_CERTID)
#define sk_OSSL_CRMF_CERTID_num(sk)
OPENSSL_sk_num(ossl_check_const_OSSL_CRMF_CERTID_sk_type(sk))
#define sk_OSSL_CRMF_CERTID_value(sk, idx) ((OSSL_CRMF_CERTID
*)OPENSSL_sk_value(ossl_check_const_OSSL_CRMF_CERTID_sk_type(sk), (idx)))
```

```
#define sk_OSSL_CRMF_CERTID_new(cmp) ((STACK_OF(OSSL_CRMF_CERTID)
*)OPENSSL_sk_new(ossl_check_OSSL_CRMF_CERTID_compfunc_type(cmp)))
#define sk_OSSL_CRMF_CERTID_new_null() ((STACK_OF(OSSL_CRMF_CERTID)
*)OPENSSL_sk_new_null())
#define sk_OSSL_CRMF_CERTID_new_reserve(cmp, n) ((STACK_OF(OSSL_CRMF_CERTID)
 *)OPENSSL_sk_new_reserve(ossl_check_OSSL_CRMF_CERTID_compfunc_type(cmp), (n)))
#define sk_OSSL_CRMF_CERTID_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OSSL_CRMF_CERTID_sk_type(sk), (n))
#define sk_OSSL_CRMF_CERTID_free(sk) OPENSSL_sk_free(ossl_check_OSSL_CRMF_CERTID_sk_type(sk))
#define sk_OSSL_CRMF_CERTID_zero(sk)
OPENSSL_sk_zero(ossl_check_OSSL_CRMF_CERTID_sk_type(sk))
#define sk_OSSL_CRMF_CERTID_delete(sk, i) ((OSSL_CRMF_CERTID
*)OPENSSL_sk_delete(ossl_check_OSSL_CRMF_CERTID_sk_type(sk), (i)))
#define sk_OSSL_CRMF_CERTID_delete_ptr(sk, ptr) ((OSSL_CRMF_CERTID
*)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr)))
#define sk_OSSL_CRMF_CERTID_push(sk, ptr)
OPENSSL_sk_push(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr))
#define sk_OSSL_CRMF_CERTID_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr))
#define sk_OSSL_CRMF_CERTID_pop(sk)
 ((OSSL_CRMF_CERTID *)OPENSSL_sk_pop(ossl_check_OSSL_CRMF_CERTID_sk_type(sk)))
#define sk_OSSL_CRMF_CERTID_shift(sk) ((OSSL_CRMF_CERTID
*)OPENSSL_sk_shift(ossl_check_OSSL_CRMF_CERTID_sk_type(sk)))
#define sk_OSSL_CRMF_CERTID_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),ossl_check_OSSL_CRMF_CERTID_fre
efunc_type(freefunc))
#define sk_OSSL_CRMF_CERTID_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr), (idx))
#define sk_OSSL_CRMF_CERTID_set(sk, idx, ptr) ((OSSL_CRMF_CERTID
*)OPENSSL_sk_set(ossl_check_OSSL_CRMF_CERTID_sk_type(sk), (idx),
ossl_check_OSSL_CRMF_CERTID_type(ptr)))
#define sk_OSSL_CRMF_CERTID_find(sk, ptr)
OPENSSL_sk_find(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr))
#define sk_OSSL_CRMF_CERTID_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr))
#define sk_OSSL_CRMF_CERTID_find_all(sk,
 ptr, pnum) OPENSSL_sk_find_all(ossl_check_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_type(ptr), pnum)
#define sk_OSSL_CRMF_CERTID_sort(sk) OPENSSL_sk_sort(ossl_check_OSSL_CRMF_CERTID_sk_type(sk))
#define sk_OSSL_CRMF_CERTID_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CRMF_CERTID_sk_type(sk))
#define sk_OSSL_CRMF_CERTID_dup(sk) ((STACK_OF(OSSL_CRMF_CERTID)
```

```
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CRMF_CERTID_sk_type(sk)))
#define sk_OSSL_CRMF_CERTID_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OSSL_CRMF_CERTID)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CRMF_CERTID_sk_type(sk),
ossl_check_OSSL_CRMF_CERTID_copyfunc_type(copyfunc),
ossl_check_OSSL_CRMF_CERTID_freefunc_type(freefunc)))
#define sk_OSSL_CRMF_CERTID_set_cmp_func(sk, cmp)
((sk_OSSL_CRMF_CERTID_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CRMF_CERTID_sk_typ
e(sk), ossl_check_OSSL_CRMF_CERTID_compfunc_type(cmp)))


typedef struct ossl_crmf_pkipublicationinfo_st OSSL_CRMF_PKIPUBLICATIONINFO;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_PKIPUBLICATIONINFO)
typedef
 struct ossl_crmf_singlepubinfo_st OSSL_CRMF_SINGLEPUBINFO;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_SINGLEPUBINFO)
typedef struct ossl_crmf_certtemplate_st OSSL_CRMF_CERTTEMPLATE;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_CERTTEMPLATE)
typedef STACK_OF(OSSL_CRMF_MSG) OSSL_CRMF_MSGS;
DECLARE_ASN1_FUNCTIONS(OSSL_CRMF_MSGS)

typedef struct ossl_crmf_optionalvalidity_st OSSL_CRMF_OPTIONALVALIDITY;

/* crmf_pbm.c */
OSSL_CRMF_PBMPARAMETER *OSSL_CRMF_pbmp_new(OSSL_LIB_CTX *libctx, size_t slen,
                                           int owfnid, size_t itercnt,
                                           int macnid);
int OSSL_CRMF_pbm_new(OSSL_LIB_CTX *libctx, const char *propq,
                      const OSSL_CRMF_PBMPARAMETER *pbmp,
                      const unsigned char *msg, size_t msglen,
                      const unsigned char *sec, size_t seclen,
                      unsigned char **mac, size_t *maclen);

/* crmf_lib.c
 */
int OSSL_CRMF_MSG_set1_regCtrl_regToken(OSSL_CRMF_MSG *msg,
                                        const ASN1_UTF8STRING *tok);
ASN1_UTF8STRING
*OSSL_CRMF_MSG_get0_regCtrl_regToken(const OSSL_CRMF_MSG *msg);
int OSSL_CRMF_MSG_set1_regCtrl_authenticator(OSSL_CRMF_MSG *msg,
                                             const ASN1_UTF8STRING *auth);
ASN1_UTF8STRING
*OSSL_CRMF_MSG_get0_regCtrl_authenticator(const OSSL_CRMF_MSG *msg);
int
OSSL_CRMF_MSG_PKIPublicationInfo_push0_SinglePubInfo(OSSL_CRMF_PKIPUBLICATIONINFO *pi,
                                                     OSSL_CRMF_SINGLEPUBINFO *spi);
#  define OSSL_CRMF_PUB_METHOD_DONTCARE 0
#  define OSSL_CRMF_PUB_METHOD_X500     1
#  define OSSL_CRMF_PUB_METHOD_WEB      2
```

```
# define OSSL_CRMF_PUB_METHOD_LDAP     3
int OSSL_CRMF_MSG_set0_SinglePubInfo(OSSL_CRMF_SINGLEPUBINFO *spi,
                                     int method, GENERAL_NAME *nm);
# define OSSL_CRMF_PUB_ACTION_DONTPUBLISH   0
# define OSSL_CRMF_PUB_ACTION_PLEASEPUBLISH
 1
int OSSL_CRMF_MSG_set_PKIPublicationInfo_action(OSSL_CRMF_PKIPUBLICATIONINFO *pi,
                                                int action);
int OSSL_CRMF_MSG_set1_regCtrl_pkiPublicationInfo(OSSL_CRMF_MSG *msg,
                                                  const OSSL_CRMF_PKIPUBLICATIONINFO *pi);
OSSL_CRMF_PKIPUBLICATIONINFO
*OSSL_CRMF_MSG_get0_regCtrl_pkiPublicationInfo(const OSSL_CRMF_MSG *msg);
int OSSL_CRMF_MSG_set1_regCtrl_protocolEncrKey(OSSL_CRMF_MSG *msg,
                                               const X509_PUBKEY *pubkey);
X509_PUBKEY
*OSSL_CRMF_MSG_get0_regCtrl_protocolEncrKey(const OSSL_CRMF_MSG *msg);
int OSSL_CRMF_MSG_set1_regCtrl_oldCertID(OSSL_CRMF_MSG *msg,
                                         const OSSL_CRMF_CERTID *cid);
OSSL_CRMF_CERTID
*OSSL_CRMF_MSG_get0_regCtrl_oldCertID(const OSSL_CRMF_MSG *msg);
OSSL_CRMF_CERTID *OSSL_CRMF_CERTID_gen(const X509_NAME *issuer,
                                       const ASN1_INTEGER *serial);

int OSSL_CRMF_MSG_set1_regInfo_utf8Pairs(OSSL_CRMF_MSG
 *msg,
                                         const ASN1_UTF8STRING *utf8pairs);
ASN1_UTF8STRING
*OSSL_CRMF_MSG_get0_regInfo_utf8Pairs(const OSSL_CRMF_MSG *msg);
int OSSL_CRMF_MSG_set1_regInfo_certReq(OSSL_CRMF_MSG *msg,
                                       const OSSL_CRMF_CERTREQUEST *cr);
OSSL_CRMF_CERTREQUEST
*OSSL_CRMF_MSG_get0_regInfo_certReq(const OSSL_CRMF_MSG *msg);

int OSSL_CRMF_MSG_set0_validity(OSSL_CRMF_MSG *crm,
                                ASN1_TIME *notBefore, ASN1_TIME *notAfter);
int OSSL_CRMF_MSG_set_certReqId(OSSL_CRMF_MSG *crm, int rid);
int OSSL_CRMF_MSG_get_certReqId(const OSSL_CRMF_MSG *crm);
int OSSL_CRMF_MSG_set0_extensions(OSSL_CRMF_MSG *crm, X509_EXTENSIONS *exts);

int OSSL_CRMF_MSG_push0_extension(OSSL_CRMF_MSG *crm, X509_EXTENSION *ext);
# define OSSL_CRMF_POPO_NONE       -1
# define OSSL_CRMF_POPO_RAVERIFIED 0
# define OSSL_CRMF_POPO_SIGNATURE  1
# define OSSL_CRMF_POPO_KEYENC     2
# define OSSL_CRMF_POPO_KEYAGREE
  3
int OSSL_CRMF_MSG_create_popo(int meth, OSSL_CRMF_MSG *crm,
                              EVP_PKEY *pkey, const EVP_MD *digest,
```

```
                        OSSL_LIB_CTX *libctx, const char *propq);
int OSSL_CRMF_MSGS_verify_popo(const OSSL_CRMF_MSGS *reqs,
                        int rid, int acceptRAVerified,
                        OSSL_LIB_CTX *libctx, const char *propq);
OSSL_CRMF_CERTTEMPLATE *OSSL_CRMF_MSG_get0_tmpl(const OSSL_CRMF_MSG *crm);
const ASN1_INTEGER
*OSSL_CRMF_CERTTEMPLATE_get0_serialNumber(const OSSL_CRMF_CERTTEMPLATE *tmpl);
const X509_NAME
*OSSL_CRMF_CERTTEMPLATE_get0_subject(const OSSL_CRMF_CERTTEMPLATE *tmpl);
const X509_NAME
*OSSL_CRMF_CERTTEMPLATE_get0_issuer(const OSSL_CRMF_CERTTEMPLATE *tmpl);
X509_EXTENSIONS
*OSSL_CRMF_CERTTEMPLATE_get0_extensions(const OSSL_CRMF_CERTTEMPLATE *tmpl);
const X509_NAME
*OSSL_CRMF_CERTID_get0_issuer(const OSSL_CRMF_CERTID *cid);
const ASN1_INTEGER
*OSSL_CRMF_CERTID_get0_serialNumber(const
 OSSL_CRMF_CERTID *cid);
int OSSL_CRMF_CERTTEMPLATE_fill(OSSL_CRMF_CERTTEMPLATE *tmpl,
                        EVP_PKEY *pubkey,
                        const X509_NAME *subject,
                        const X509_NAME *issuer,
                        const ASN1_INTEGER *serial);
X509
*OSSL_CRMF_ENCRYPTEDVALUE_get1_encCert(const OSSL_CRMF_ENCRYPTEDVALUE *ecert,
                            OSSL_LIB_CTX *libctx, const char *propq,
                            EVP_PKEY *pkey);

#  ifdef __cplusplus
}
#  endif
# endif /* !defined(OPENSSL_NO_CRMF) */
#endif /* !defined(OPENSSL_CRMF_H) */
```

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```
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*/

#define PLATFORM "platform: BSD-x86"
#define DATE "built on: Wed Mar  5 20:59:15 2025 UTC"

/*
* Generate compiler_flags as an array of individual characters. This is a
* workaround for the situation where CFLAGS gets too long for a C90 string
* literal
*/
static const char compiler_flags[] = {
   'c','o','m','p','i','l','e','r',':',' ','.','.','/','c','o','n',
   'f','i','g','/','f','a','k','e','_','g','c','c','.','p','l',' ',
   '-','f','P','I','C',' ','-','p','t','h','r','e','a','d',' ','-',
   'W','a',',','-','-','n','o','e','x','e','c','s','t','a','c','k',
   ' ','-','W','a','l','l','
 ','-','O','3',' ','-','f','o','m','i',
   't','-','f','r','a','m','e','-','p','o','i','n','t','e','r',' ',
   '-','D','L','_','E','N','D','I','A','N',' ','-','D','O','P','E',
   'N','S','S','L','_','P','I','C',' ','-','D','_','T','H','R','E',
   'A','D','_','S','A','F','E',' ','-','D','_','R','E','E','N','T',
   'R','A','N','T',' ','-','D','O','P','E','N','S','S','L','_','B',
   'U','I','L','D','I','N','G','_','O','P','E','N','S','S','L',' ',
   '-','D','N','D','E','B','U','G','\0'
};
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```

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```
/*
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* https://www.openssl.org/source/license.html
*/

#include "internal/der.h"

/* Well known OIDs precompiled */

/*
* id-alg-CMS3DESwrap OBJECT IDENTIFIER ::= {
*     iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-9(9) smime(16) alg(3) 6
* }
*/
#define DER_OID_V_id_alg_CMS3DESwrap DER_P_OBJECT, 11, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01,
0x09, 0x10, 0x03, 0x06
#define DER_OID_SZ_id_alg_CMS3DESwrap 13
extern const unsigned char ossl_der_oid_id_alg_CMS3DESwrap[DER_OID_SZ_id_alg_CMS3DESwrap];

/*
* id-aes128-wrap OBJECT IDENTIFIER ::= { aes 5 }
*/
#define DER_OID_V_id_aes128_wrap DER_P_OBJECT,
 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x01, 0x05
#define DER_OID_SZ_id_aes128_wrap 11
extern const unsigned char ossl_der_oid_id_aes128_wrap[DER_OID_SZ_id_aes128_wrap];

/*
* id-aes192-wrap OBJECT IDENTIFIER ::= { aes 25 }
*/
#define DER_OID_V_id_aes192_wrap DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x01, 0x19
#define DER_OID_SZ_id_aes192_wrap 11
extern const unsigned char ossl_der_oid_id_aes192_wrap[DER_OID_SZ_id_aes192_wrap];

/*
* id-aes256-wrap OBJECT IDENTIFIER ::= { aes 45 }
*/
#define DER_OID_V_id_aes256_wrap DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x01,
0x2D
#define DER_OID_SZ_id_aes256_wrap 11
extern const unsigned char ossl_der_oid_id_aes256_wrap[DER_OID_SZ_id_aes256_wrap];
```

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* https://www.openssl.org/source/license.html
*/

#define PLATFORM "platform: BSD-x86"
#define DATE "built on: Wed Mar  5 20:59:02 2025 UTC"

/*
* Generate compiler_flags as an array of individual characters. This is a
* workaround for the situation where CFLAGS gets too long for a C90 string
* literal
*/
static const char compiler_flags[] = {
   'c','o','m','p','i','l','e','r',':',' ','g','c','c',' ','-','f',
   'P','I','C',' ','-','p','t','h','r','e','a','d',' ','-','W','a',
```

```
  ',','-','-','n','o','e','x','e','c','s','t','a','c','k',' ','-',
  'W','a','l','l',' ','-','O','3',' ','-','f','o','m','i','t','-',
  'f','r','a','m','e','-','p','o','i','n','t','e','r','
',','-','D',
  'L','_','E','N','D','I','A','N',' ','-','D','O','P','E','N','S',
  'S','L','_','P','I','C',' ','-','D','_','T','H','R','E','A','D',
  '_','S','A','F','E',' ','-','D','_','R','E','E','N','T','R','A',
  'N','T',' ','-','D','O','P','E','N','S','S','L','_','B','U','I',
  'L','D','I','N','G','_','O','P','E','N','S','S','L',' ','-','D',
  'N','D','E','B','U','G','\0'
};
```

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```
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* https://www.openssl.org/source/license.html
*/
```

```
#ifndef OPENSSL_ESS_H
# define OPENSSL_ESS_H
# pragma once

# include <openssl/opensslconf.h>

# include <openssl/safestack.h>
# include <openssl/x509.h>
# include <openssl/esserr.h>

# ifdef  __cplusplus
extern "C" {
# endif


typedef struct ESS_issuer_serial ESS_ISSUER_SERIAL;
typedef struct ESS_cert_id ESS_CERT_ID;
typedef struct ESS_signing_cert ESS_SIGNING_CERT;

SKM_DEFINE_STACK_OF_INTERNAL(ESS_CERT_ID, ESS_CERT_ID, ESS_CERT_ID)
#define sk_ESS_CERT_ID_num(sk) OPENSSL_sk_num(ossl_check_const_ESS_CERT_ID_sk_type(sk))
#define sk_ESS_CERT_ID_value(sk, idx) ((ESS_CERT_ID
 *)OPENSSL_sk_value(ossl_check_const_ESS_CERT_ID_sk_type(sk), (idx)))
#define sk_ESS_CERT_ID_new(cmp) ((STACK_OF(ESS_CERT_ID)
*)OPENSSL_sk_new(ossl_check_ESS_CERT_ID_compfunc_type(cmp)))
#define sk_ESS_CERT_ID_new_null() ((STACK_OF(ESS_CERT_ID) *)OPENSSL_sk_new_null())
#define sk_ESS_CERT_ID_new_reserve(cmp, n) ((STACK_OF(ESS_CERT_ID)
*)OPENSSL_sk_new_reserve(ossl_check_ESS_CERT_ID_compfunc_type(cmp), (n)))
#define sk_ESS_CERT_ID_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ESS_CERT_ID_sk_type(sk), (n))
#define sk_ESS_CERT_ID_free(sk) OPENSSL_sk_free(ossl_check_ESS_CERT_ID_sk_type(sk))
#define sk_ESS_CERT_ID_zero(sk) OPENSSL_sk_zero(ossl_check_ESS_CERT_ID_sk_type(sk))
#define sk_ESS_CERT_ID_delete(sk, i) ((ESS_CERT_ID
*)OPENSSL_sk_delete(ossl_check_ESS_CERT_ID_sk_type(sk), (i)))
#define sk_ESS_CERT_ID_delete_ptr(sk, ptr) ((ESS_CERT_ID
*)OPENSSL_sk_delete_ptr(ossl_check_ESS_CERT_ID_sk_type(sk), ossl_check_ESS_CERT_ID_type(ptr)))
#define sk_ESS_CERT_ID_push(sk, ptr) OPENSSL_sk_push(ossl_check_ESS_CERT_ID_sk_type(sk),
 ossl_check_ESS_CERT_ID_type(ptr))
#define sk_ESS_CERT_ID_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ESS_CERT_ID_sk_type(sk),
ossl_check_ESS_CERT_ID_type(ptr))
#define sk_ESS_CERT_ID_pop(sk) ((ESS_CERT_ID
*)OPENSSL_sk_pop(ossl_check_ESS_CERT_ID_sk_type(sk)))
#define sk_ESS_CERT_ID_shift(sk) ((ESS_CERT_ID
*)OPENSSL_sk_shift(ossl_check_ESS_CERT_ID_sk_type(sk)))
#define sk_ESS_CERT_ID_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ESS_CERT_ID_sk_type(sk),ossl_check_ESS_CERT_ID_freefunc_type(freefu
nc))
```

```
#define sk_ESS_CERT_ID_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ESS_CERT_ID_sk_type(sk),
ossl_check_ESS_CERT_ID_type(ptr), (idx))
#define sk_ESS_CERT_ID_set(sk, idx, ptr) ((ESS_CERT_ID
*)OPENSSL_sk_set(ossl_check_ESS_CERT_ID_sk_type(sk), (idx), ossl_check_ESS_CERT_ID_type(ptr)))
#define sk_ESS_CERT_ID_find(sk, ptr) OPENSSL_sk_find(ossl_check_ESS_CERT_ID_sk_type(sk),
ossl_check_ESS_CERT_ID_type(ptr))
#define sk_ESS_CERT_ID_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ESS_CERT_ID_sk_type(sk),
 ossl_check_ESS_CERT_ID_type(ptr))
#define sk_ESS_CERT_ID_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ESS_CERT_ID_sk_type(sk), ossl_check_ESS_CERT_ID_type(ptr), pnum)
#define sk_ESS_CERT_ID_sort(sk) OPENSSL_sk_sort(ossl_check_ESS_CERT_ID_sk_type(sk))
#define sk_ESS_CERT_ID_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_ESS_CERT_ID_sk_type(sk))
#define sk_ESS_CERT_ID_dup(sk) ((STACK_OF(ESS_CERT_ID)
*)OPENSSL_sk_dup(ossl_check_const_ESS_CERT_ID_sk_type(sk)))
#define sk_ESS_CERT_ID_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ESS_CERT_ID)
*)OPENSSL_sk_deep_copy(ossl_check_const_ESS_CERT_ID_sk_type(sk),
ossl_check_ESS_CERT_ID_copyfunc_type(copyfunc), ossl_check_ESS_CERT_ID_freefunc_type(freefunc)))
#define sk_ESS_CERT_ID_set_cmp_func(sk, cmp)
((sk_ESS_CERT_ID_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ESS_CERT_ID_sk_type(sk),
ossl_check_ESS_CERT_ID_compfunc_type(cmp)))



typedef struct ESS_signing_cert_v2_st ESS_SIGNING_CERT_V2;
typedef
 struct ESS_cert_id_v2_st ESS_CERT_ID_V2;

SKM_DEFINE_STACK_OF_INTERNAL(ESS_CERT_ID_V2, ESS_CERT_ID_V2, ESS_CERT_ID_V2)
#define sk_ESS_CERT_ID_V2_num(sk) OPENSSL_sk_num(ossl_check_const_ESS_CERT_ID_V2_sk_type(sk))
#define sk_ESS_CERT_ID_V2_value(sk, idx) ((ESS_CERT_ID_V2
*)OPENSSL_sk_value(ossl_check_const_ESS_CERT_ID_V2_sk_type(sk), (idx)))
#define sk_ESS_CERT_ID_V2_new(cmp) ((STACK_OF(ESS_CERT_ID_V2)
*)OPENSSL_sk_new(ossl_check_ESS_CERT_ID_V2_compfunc_type(cmp)))
#define sk_ESS_CERT_ID_V2_new_null() ((STACK_OF(ESS_CERT_ID_V2) *)OPENSSL_sk_new_null())
#define sk_ESS_CERT_ID_V2_new_reserve(cmp, n) ((STACK_OF(ESS_CERT_ID_V2)
*)OPENSSL_sk_new_reserve(ossl_check_ESS_CERT_ID_V2_compfunc_type(cmp), (n)))
#define sk_ESS_CERT_ID_V2_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ESS_CERT_ID_V2_sk_type(sk),
(n))
#define sk_ESS_CERT_ID_V2_free(sk) OPENSSL_sk_free(ossl_check_ESS_CERT_ID_V2_sk_type(sk))
#define sk_ESS_CERT_ID_V2_zero(sk) OPENSSL_sk_zero(ossl_check_ESS_CERT_ID_V2_sk_type(sk))
#define
 sk_ESS_CERT_ID_V2_delete(sk, i) ((ESS_CERT_ID_V2
*)OPENSSL_sk_delete(ossl_check_ESS_CERT_ID_V2_sk_type(sk), (i)))
#define sk_ESS_CERT_ID_V2_delete_ptr(sk, ptr) ((ESS_CERT_ID_V2
*)OPENSSL_sk_delete_ptr(ossl_check_ESS_CERT_ID_V2_sk_type(sk),
ossl_check_ESS_CERT_ID_V2_type(ptr)))
#define sk_ESS_CERT_ID_V2_push(sk, ptr) OPENSSL_sk_push(ossl_check_ESS_CERT_ID_V2_sk_type(sk),
ossl_check_ESS_CERT_ID_V2_type(ptr))
```

```
#define sk_ESS_CERT_ID_V2_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_ESS_CERT_ID_V2_sk_type(sk), ossl_check_ESS_CERT_ID_V2_type(ptr))
#define sk_ESS_CERT_ID_V2_pop(sk) ((ESS_CERT_ID_V2
*)OPENSSL_sk_pop(ossl_check_ESS_CERT_ID_V2_sk_type(sk)))
#define sk_ESS_CERT_ID_V2_shift(sk) ((ESS_CERT_ID_V2
*)OPENSSL_sk_shift(ossl_check_ESS_CERT_ID_V2_sk_type(sk)))
#define sk_ESS_CERT_ID_V2_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ESS_CERT_ID_V2_sk_type(sk),ossl_check_ESS_CERT_ID_V2_freefunc_ty
pe(freefunc))
#define sk_ESS_CERT_ID_V2_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_ESS_CERT_ID_V2_sk_type(sk),
 ossl_check_ESS_CERT_ID_V2_type(ptr), (idx))
#define sk_ESS_CERT_ID_V2_set(sk, idx, ptr) ((ESS_CERT_ID_V2
*)OPENSSL_sk_set(ossl_check_ESS_CERT_ID_V2_sk_type(sk), (idx),
ossl_check_ESS_CERT_ID_V2_type(ptr)))
#define sk_ESS_CERT_ID_V2_find(sk, ptr) OPENSSL_sk_find(ossl_check_ESS_CERT_ID_V2_sk_type(sk),
ossl_check_ESS_CERT_ID_V2_type(ptr))
#define sk_ESS_CERT_ID_V2_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_ESS_CERT_ID_V2_sk_type(sk), ossl_check_ESS_CERT_ID_V2_type(ptr))
#define sk_ESS_CERT_ID_V2_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ESS_CERT_ID_V2_sk_type(sk), ossl_check_ESS_CERT_ID_V2_type(ptr),
pnum)
#define sk_ESS_CERT_ID_V2_sort(sk) OPENSSL_sk_sort(ossl_check_ESS_CERT_ID_V2_sk_type(sk))
#define sk_ESS_CERT_ID_V2_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_ESS_CERT_ID_V2_sk_type(sk))
#define sk_ESS_CERT_ID_V2_dup(sk) ((STACK_OF(ESS_CERT_ID_V2)
*)OPENSSL_sk_dup(ossl_check_const_ESS_CERT_ID_V2_sk_type(sk)))
#define
 sk_ESS_CERT_ID_V2_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ESS_CERT_ID_V2)
*)OPENSSL_sk_deep_copy(ossl_check_const_ESS_CERT_ID_V2_sk_type(sk),
ossl_check_ESS_CERT_ID_V2_copyfunc_type(copyfunc),
ossl_check_ESS_CERT_ID_V2_freefunc_type(freefunc)))
#define sk_ESS_CERT_ID_V2_set_cmp_func(sk, cmp)
((sk_ESS_CERT_ID_V2_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ESS_CERT_ID_V2_sk_type(sk),
ossl_check_ESS_CERT_ID_V2_compfunc_type(cmp)))


DECLARE_ASN1_ALLOC_FUNCTIONS(ESS_ISSUER_SERIAL)
DECLARE_ASN1_ENCODE_FUNCTIONS_only(ESS_ISSUER_SERIAL, ESS_ISSUER_SERIAL)
DECLARE_ASN1_DUP_FUNCTION(ESS_ISSUER_SERIAL)

DECLARE_ASN1_ALLOC_FUNCTIONS(ESS_CERT_ID)
DECLARE_ASN1_ENCODE_FUNCTIONS_only(ESS_CERT_ID, ESS_CERT_ID)
DECLARE_ASN1_DUP_FUNCTION(ESS_CERT_ID)

DECLARE_ASN1_FUNCTIONS(ESS_SIGNING_CERT)
DECLARE_ASN1_DUP_FUNCTION(ESS_SIGNING_CERT)
```

```
DECLARE_ASN1_ALLOC_FUNCTIONS(ESS_CERT_ID_V2)
DECLARE_ASN1_ENCODE_FUNCTIONS_only(ESS_CERT_ID_V2, ESS_CERT_ID_V2)
DECLARE_ASN1_DUP_FUNCTION(ESS_CERT_ID_V2)

DECLARE_ASN1_FUNCTIONS(ESS_SIGNING_CERT_V2)
DECLARE_ASN1_DUP_FUNCTION(ESS_SIGNING_CERT_V2)

ESS_SIGNING_CERT
 *OSSL_ESS_signing_cert_new_init(const X509 *signcert,
                                 const STACK_OF(X509) *certs,
                                 int set_issuer_serial);
ESS_SIGNING_CERT_V2 *OSSL_ESS_signing_cert_v2_new_init(const EVP_MD *hash_alg,
                                    const X509 *signcert,
                                    const
                                    STACK_OF(X509) *certs,
                                    int set_issuer_serial);
int OSSL_ESS_check_signing_certs(const ESS_SIGNING_CERT *ss,
                     const ESS_SIGNING_CERT_V2 *ssv2,
                     const STACK_OF(X509) *chain,
                     int require_signing_cert);

# ifdef  __cplusplus
}
# endif
#endif
```

ISC

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* https://www.openssl.org/source/license.html
*/

```
#define PLATFORM "platform: BSD-x86"
#define DATE "built on: Wed Mar  5 20:59:28 2025 UTC"

/*
* Generate compiler_flags as an array of individual characters. This is a
* workaround for the situation where CFLAGS gets too long for a C90 string
* literal
*/
static const char compiler_flags[] = {
  'c','o','m','p','i','l','e','r',':',' ','c','c',' ','-','f','P',
  'I','C',' ','-','p','t','h','r','e','a','d',' ','-','W','a','l',
  'l',' ','-','O','3',' ','-','f','o','m','i','t','-','f','r','a',
  'm','e','-','p','o','i','n','t','e','r',' ','-','D','L','_','E',
  'N','D','I','A','N','
','-','D','O','P','E','N','S','S','L','_',
  'P','I','C',' ','-','D','_','T','H','R','E','A','D','_','S','A',
  'F','E',' ','-','D','_','R','E','E','N','T','R','A','N','T',' ',
  '-','D','O','P','E','N','S','S','L','_','B','U','I','L','D','I',
  'N','G','_','O','P','E','N','S','S','L',' ','-','D','N','D','E',
  'B','U','G','\0'
};
```

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```
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*/

#ifndef OPENSSL_CONFIGURATION_H
# define OPENSSL_CONFIGURATION_H
# pragma once

# ifdef  __cplusplus
extern "C" {
# endif

# ifdef OPENSSL_ALGORITHM_DEFINES
#  error OPENSSL_ALGORITHM_DEFINES no longer supported
# endif

/*
* OpenSSL was configured with the following options:
*/

# define OPENSSL_CONFIGURED_API 30000
# ifndef OPENSSL_RAND_SEED_OS
#  define OPENSSL_RAND_SEED_OS
# endif
# ifndef OPENSSL_THREADS
#  define OPENSSL_THREADS
# endif
# ifndef OPENSSL_NO_AFALGENG
#  define OPENSSL_NO_AFALGENG
```

```
# endif
# ifndef
 OPENSSL_NO_ASAN
#  define OPENSSL_NO_ASAN
# endif
# ifndef OPENSSL_NO_COMP
#  define OPENSSL_NO_COMP
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG
#  define OPENSSL_NO_CRYPTO_MDEBUG
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
#  define OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
# endif
# ifndef OPENSSL_NO_EC_NISTP_64_GCC_128
#  define OPENSSL_NO_EC_NISTP_64_GCC_128
# endif
# ifndef OPENSSL_NO_EGD
#  define OPENSSL_NO_EGD
# endif
# ifndef OPENSSL_NO_EXTERNAL_TESTS
#  define OPENSSL_NO_EXTERNAL_TESTS
# endif
# ifndef OPENSSL_NO_FUZZ_AFL
#  define OPENSSL_NO_FUZZ_AFL
# endif
# ifndef OPENSSL_NO_FUZZ_LIBFUZZER
#  define OPENSSL_NO_FUZZ_LIBFUZZER
# endif
# ifndef OPENSSL_NO_KTLS
#  define OPENSSL_NO_KTLS
# endif
# ifndef OPENSSL_NO_LOADERENG
#  define OPENSSL_NO_LOADERENG
# endif
# ifndef OPENSSL_NO_MD2
#  define OPENSSL_NO_MD2
# endif
# ifndef OPENSSL_NO_MSAN
#  define OPENSSL_NO_MSAN
# endif
# ifndef OPENSSL_NO_RC5
#  define OPENSSL_NO_RC5
# endif
# ifndef OPENSSL_NO_SCTP
#  define OPENSSL_NO_SCTP
#
```

```
 endif
# ifndef OPENSSL_NO_SSL3
#  define OPENSSL_NO_SSL3
# endif
# ifndef OPENSSL_NO_SSL3_METHOD
#  define OPENSSL_NO_SSL3_METHOD
# endif
# ifndef OPENSSL_NO_TRACE
#  define OPENSSL_NO_TRACE
# endif
# ifndef OPENSSL_NO_UBSAN
#  define OPENSSL_NO_UBSAN
# endif
# ifndef OPENSSL_NO_UNIT_TEST
#  define OPENSSL_NO_UNIT_TEST
# endif
# ifndef OPENSSL_NO_UPLINK
#  define OPENSSL_NO_UPLINK
# endif
# ifndef OPENSSL_NO_WEAK_SSL_CIPHERS
#  define OPENSSL_NO_WEAK_SSL_CIPHERS
# endif
# ifndef OPENSSL_NO_DYNAMIC_ENGINE
#  define OPENSSL_NO_DYNAMIC_ENGINE
# endif


/* Generate 80386 code? */
# undef I386_ONLY

/*
* The following are cipher-specific, but are part of the public API.
*/
# if !defined(OPENSSL_SYS_UEFI)
#  undef BN_LLONG
/* Only one for the following should be defined */
#  define SIXTY_FOUR_BIT_LONG
#  undef SIXTY_FOUR_BIT
#  undef THIRTY_TWO_BIT
# endif

# define RC4_INT unsigned int

# ifdef  __cplusplus
}
# endif

#endif                  /* OPENSSL_CONFIGURATION_H
```

*/
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*/

#ifndef UV_BSD_H
#define UV_BSD_H

```
#define UV_PLATFORM_FS_EVENT_FIELDS                                   \
 uv__io_t event_watcher;                                              \

#define UV_IO_PRIVATE_PLATFORM_FIELDS                                 \
 int rcount;                                                          \
 int wcount;                                                          \

#define UV_HAVE_KQUEUE 1

#endif /* UV_BSD_H */
```

```
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```

```
/*
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* Generated by Makefile from include/openssl/x509.h.in
*
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* https://www.openssl.org/source/license.html
*/
```

```
#ifndef OPENSSL_X509_H
# define OPENSSL_X509_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_X509_H
# endif

# include <openssl/e_os2.h>
# include <openssl/types.h>
# include <openssl/symhacks.h>
# include <openssl/buffer.h>
# include <openssl/evp.h>
# include <openssl/bio.h>
# include <openssl/asn1.h>
# include <openssl/safestack.h>
# include <openssl/ec.h>

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  include <openssl/rsa.h>
#  include <openssl/dsa.h>
#
  include <openssl/dh.h>
# endif

# include <openssl/sha.h>
# include <openssl/x509err.h>

#ifdef  __cplusplus
extern "C" {
#endif

/* Needed stacks for types defined in other headers */
SKM_DEFINE_STACK_OF_INTERNAL(X509_NAME, X509_NAME, X509_NAME)
#define sk_X509_NAME_num(sk) OPENSSL_sk_num(ossl_check_const_X509_NAME_sk_type(sk))
#define sk_X509_NAME_value(sk, idx) ((X509_NAME
*)OPENSSL_sk_value(ossl_check_const_X509_NAME_sk_type(sk), (idx)))
#define sk_X509_NAME_new(cmp) ((STACK_OF(X509_NAME)
*)OPENSSL_sk_new(ossl_check_X509_NAME_compfunc_type(cmp)))
#define sk_X509_NAME_new_null() ((STACK_OF(X509_NAME) *)OPENSSL_sk_new_null())
#define sk_X509_NAME_new_reserve(cmp, n) ((STACK_OF(X509_NAME)
*)OPENSSL_sk_new_reserve(ossl_check_X509_NAME_compfunc_type(cmp), (n)))
#define sk_X509_NAME_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_NAME_sk_type(sk), (n))
#define sk_X509_NAME_free(sk) OPENSSL_sk_free(ossl_check_X509_NAME_sk_type(sk))
#define sk_X509_NAME_zero(sk) OPENSSL_sk_zero(ossl_check_X509_NAME_sk_type(sk))
```

```
#define
 sk_X509_NAME_delete(sk, i) ((X509_NAME *)OPENSSL_sk_delete(ossl_check_X509_NAME_sk_type(sk),
(i)))
#define sk_X509_NAME_delete_ptr(sk, ptr) ((X509_NAME
*)OPENSSL_sk_delete_ptr(ossl_check_X509_NAME_sk_type(sk), ossl_check_X509_NAME_type(ptr)))
#define sk_X509_NAME_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_type(ptr))
#define sk_X509_NAME_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_type(ptr))
#define sk_X509_NAME_pop(sk) ((X509_NAME *)OPENSSL_sk_pop(ossl_check_X509_NAME_sk_type(sk)))
#define sk_X509_NAME_shift(sk) ((X509_NAME *)OPENSSL_sk_shift(ossl_check_X509_NAME_sk_type(sk)))
#define sk_X509_NAME_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_NAME_sk_type(sk),ossl_check_X509_NAME_freefunc_type(freefunc)
)
#define sk_X509_NAME_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_type(ptr), (idx))
#define sk_X509_NAME_set(sk,
 idx, ptr) ((X509_NAME *)OPENSSL_sk_set(ossl_check_X509_NAME_sk_type(sk), (idx),
ossl_check_X509_NAME_type(ptr)))
#define sk_X509_NAME_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_type(ptr))
#define sk_X509_NAME_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_type(ptr))
#define sk_X509_NAME_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_type(ptr), pnum)
#define sk_X509_NAME_sort(sk) OPENSSL_sk_sort(ossl_check_X509_NAME_sk_type(sk))
#define sk_X509_NAME_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_NAME_sk_type(sk))
#define sk_X509_NAME_dup(sk) ((STACK_OF(X509_NAME)
*)OPENSSL_sk_dup(ossl_check_const_X509_NAME_sk_type(sk)))
#define sk_X509_NAME_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_NAME)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_copyfunc_type(copyfunc), ossl_check_X509_NAME_freefunc_type(freefunc)))
#define
 sk_X509_NAME_set_cmp_func(sk, cmp)
((sk_X509_NAME_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_NAME_sk_type(sk),
ossl_check_X509_NAME_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(X509, X509, X509)
#define sk_X509_num(sk) OPENSSL_sk_num(ossl_check_const_X509_sk_type(sk))
#define sk_X509_value(sk, idx) ((X509 *)OPENSSL_sk_value(ossl_check_const_X509_sk_type(sk), (idx)))
#define sk_X509_new(cmp) ((STACK_OF(X509) *)OPENSSL_sk_new(ossl_check_X509_compfunc_type(cmp)))
#define sk_X509_new_null() ((STACK_OF(X509) *)OPENSSL_sk_new_null())
#define sk_X509_new_reserve(cmp, n) ((STACK_OF(X509)
*)OPENSSL_sk_new_reserve(ossl_check_X509_compfunc_type(cmp), (n)))
#define sk_X509_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_sk_type(sk), (n))
#define sk_X509_free(sk) OPENSSL_sk_free(ossl_check_X509_sk_type(sk))
#define sk_X509_zero(sk) OPENSSL_sk_zero(ossl_check_X509_sk_type(sk))
#define sk_X509_delete(sk, i) ((X509 *)OPENSSL_sk_delete(ossl_check_X509_sk_type(sk),
```

(i)))
#define sk_X509_delete_ptr(sk, ptr) ((X509 *)OPENSSL_sk_delete_ptr(ossl_check_X509_sk_type(sk),
ossl_check_X509_type(ptr)))
#define sk_X509_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_sk_type(sk), ossl_check_X509_type(ptr))
#define sk_X509_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_sk_type(sk),
ossl_check_X509_type(ptr))
#define sk_X509_pop(sk) ((X509 *)OPENSSL_sk_pop(ossl_check_X509_sk_type(sk)))
#define sk_X509_shift(sk) ((X509 *)OPENSSL_sk_shift(ossl_check_X509_sk_type(sk)))
#define sk_X509_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_sk_type(sk),ossl_check_X509_freefunc_type(freefunc))
#define sk_X509_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_sk_type(sk),
ossl_check_X509_type(ptr), (idx))
#define sk_X509_set(sk, idx, ptr) ((X509 *)OPENSSL_sk_set(ossl_check_X509_sk_type(sk), (idx),
ossl_check_X509_type(ptr)))
#define sk_X509_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_sk_type(sk), ossl_check_X509_type(ptr))
#define sk_X509_find_ex(sk,
ptr) OPENSSL_sk_find_ex(ossl_check_X509_sk_type(sk), ossl_check_X509_type(ptr))
#define sk_X509_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_X509_sk_type(sk),
ossl_check_X509_type(ptr), pnum)
#define sk_X509_sort(sk) OPENSSL_sk_sort(ossl_check_X509_sk_type(sk))
#define sk_X509_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_sk_type(sk))
#define sk_X509_dup(sk) ((STACK_OF(X509) *)OPENSSL_sk_dup(ossl_check_const_X509_sk_type(sk)))
#define sk_X509_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_sk_type(sk), ossl_check_X509_copyfunc_type(copyfunc),
ossl_check_X509_freefunc_type(freefunc)))
#define sk_X509_set_cmp_func(sk, cmp)
((sk_X509_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_sk_type(sk),
ossl_check_X509_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(X509_REVOKED, X509_REVOKED, X509_REVOKED)
#define sk_X509_REVOKED_num(sk) OPENSSL_sk_num(ossl_check_const_X509_REVOKED_sk_type(sk))
#define sk_X509_REVOKED_value(sk,
idx) ((X509_REVOKED *)OPENSSL_sk_value(ossl_check_const_X509_REVOKED_sk_type(sk), (idx)))
#define sk_X509_REVOKED_new(cmp) ((STACK_OF(X509_REVOKED)
*)OPENSSL_sk_new(ossl_check_X509_REVOKED_compfunc_type(cmp)))
#define sk_X509_REVOKED_new_null() ((STACK_OF(X509_REVOKED) *)OPENSSL_sk_new_null())
#define sk_X509_REVOKED_new_reserve(cmp, n) ((STACK_OF(X509_REVOKED)
*)OPENSSL_sk_new_reserve(ossl_check_X509_REVOKED_compfunc_type(cmp), (n)))
#define sk_X509_REVOKED_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_REVOKED_sk_type(sk),
(n))
#define sk_X509_REVOKED_free(sk) OPENSSL_sk_free(ossl_check_X509_REVOKED_sk_type(sk))
#define sk_X509_REVOKED_zero(sk) OPENSSL_sk_zero(ossl_check_X509_REVOKED_sk_type(sk))
#define sk_X509_REVOKED_delete(sk, i) ((X509_REVOKED
*)OPENSSL_sk_delete(ossl_check_X509_REVOKED_sk_type(sk), (i)))
#define sk_X509_REVOKED_delete_ptr(sk, ptr) ((X509_REVOKED
*)OPENSSL_sk_delete_ptr(ossl_check_X509_REVOKED_sk_type(sk), ossl_check_X509_REVOKED_type(ptr)))
#define sk_X509_REVOKED_push(sk,
ptr) OPENSSL_sk_push(ossl_check_X509_REVOKED_sk_type(sk), ossl_check_X509_REVOKED_type(ptr))
#define sk_X509_REVOKED_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_REVOKED_sk_type(sk),

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ossl_check_X509_REVOKED_type(ptr))
#define sk_X509_REVOKED_pop(sk) ((X509_REVOKED
*)OPENSSL_sk_pop(ossl_check_X509_REVOKED_sk_type(sk)))
#define sk_X509_REVOKED_shift(sk) ((X509_REVOKED
*)OPENSSL_sk_shift(ossl_check_X509_REVOKED_sk_type(sk)))
#define sk_X509_REVOKED_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_REVOKED_sk_type(sk),ossl_check_X509_REVOKED_freefunc_type(
freefunc))
#define sk_X509_REVOKED_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_REVOKED_sk_type(sk),
ossl_check_X509_REVOKED_type(ptr), (idx))
#define sk_X509_REVOKED_set(sk, idx, ptr) ((X509_REVOKED
*)OPENSSL_sk_set(ossl_check_X509_REVOKED_sk_type(sk), (idx), ossl_check_X509_REVOKED_type(ptr)))
#define sk_X509_REVOKED_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_REVOKED_sk_type(sk),
ossl_check_X509_REVOKED_type(ptr))
#define
 sk_X509_REVOKED_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_REVOKED_sk_type(sk),
ossl_check_X509_REVOKED_type(ptr))
#define sk_X509_REVOKED_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_REVOKED_sk_type(sk), ossl_check_X509_REVOKED_type(ptr),
pnum)
#define sk_X509_REVOKED_sort(sk) OPENSSL_sk_sort(ossl_check_X509_REVOKED_sk_type(sk))
#define sk_X509_REVOKED_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_REVOKED_sk_type(sk))
#define sk_X509_REVOKED_dup(sk) ((STACK_OF(X509_REVOKED)
*)OPENSSL_sk_dup(ossl_check_const_X509_REVOKED_sk_type(sk)))
#define sk_X509_REVOKED_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_REVOKED)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_REVOKED_sk_type(sk),
ossl_check_X509_REVOKED_copyfunc_type(copyfunc),
ossl_check_X509_REVOKED_freefunc_type(freefunc)))
#define sk_X509_REVOKED_set_cmp_func(sk, cmp)
((sk_X509_REVOKED_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_REVOKED_sk_type(sk),
ossl_check_X509_REVOKED_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(X509_CRL,
 X509_CRL, X509_CRL)
#define sk_X509_CRL_num(sk) OPENSSL_sk_num(ossl_check_const_X509_CRL_sk_type(sk))
#define sk_X509_CRL_value(sk, idx) ((X509_CRL
*)OPENSSL_sk_value(ossl_check_const_X509_CRL_sk_type(sk), (idx)))
#define sk_X509_CRL_new(cmp) ((STACK_OF(X509_CRL)
*)OPENSSL_sk_new(ossl_check_X509_CRL_compfunc_type(cmp)))
#define sk_X509_CRL_new_null() ((STACK_OF(X509_CRL) *)OPENSSL_sk_new_null())
#define sk_X509_CRL_new_reserve(cmp, n) ((STACK_OF(X509_CRL)
*)OPENSSL_sk_new_reserve(ossl_check_X509_CRL_compfunc_type(cmp), (n)))
#define sk_X509_CRL_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_CRL_sk_type(sk), (n))
#define sk_X509_CRL_free(sk) OPENSSL_sk_free(ossl_check_X509_CRL_sk_type(sk))
#define sk_X509_CRL_zero(sk) OPENSSL_sk_zero(ossl_check_X509_CRL_sk_type(sk))
#define sk_X509_CRL_delete(sk, i) ((X509_CRL *)OPENSSL_sk_delete(ossl_check_X509_CRL_sk_type(sk),
(i)))
#define sk_X509_CRL_delete_ptr(sk, ptr) ((X509_CRL
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 *)OPENSSL_sk_delete_ptr(ossl_check_X509_CRL_sk_type(sk), ossl_check_X509_CRL_type(ptr)))
#define sk_X509_CRL_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_type(ptr))
#define sk_X509_CRL_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_type(ptr))
#define sk_X509_CRL_pop(sk) ((X509_CRL *)OPENSSL_sk_pop(ossl_check_X509_CRL_sk_type(sk)))
#define sk_X509_CRL_shift(sk) ((X509_CRL *)OPENSSL_sk_shift(ossl_check_X509_CRL_sk_type(sk)))
#define sk_X509_CRL_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_CRL_sk_type(sk),ossl_check_X509_CRL_freefunc_type(freefunc))
#define sk_X509_CRL_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_type(ptr), (idx))
#define sk_X509_CRL_set(sk, idx, ptr) ((X509_CRL *)OPENSSL_sk_set(ossl_check_X509_CRL_sk_type(sk),
(idx), ossl_check_X509_CRL_type(ptr)))
#define sk_X509_CRL_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_CRL_sk_type(sk),
 ossl_check_X509_CRL_type(ptr))
#define sk_X509_CRL_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_type(ptr))
#define sk_X509_CRL_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_type(ptr), pnum)
#define sk_X509_CRL_sort(sk) OPENSSL_sk_sort(ossl_check_X509_CRL_sk_type(sk))
#define sk_X509_CRL_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_CRL_sk_type(sk))
#define sk_X509_CRL_dup(sk) ((STACK_OF(X509_CRL)
*)OPENSSL_sk_dup(ossl_check_const_X509_CRL_sk_type(sk)))
#define sk_X509_CRL_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_CRL)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_copyfunc_type(copyfunc), ossl_check_X509_CRL_freefunc_type(freefunc)))
#define sk_X509_CRL_set_cmp_func(sk, cmp)
((sk_X509_CRL_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_CRL_sk_type(sk),
ossl_check_X509_CRL_compfunc_type(cmp)))


/* Flags for X509_get_signature_info()
 */
/* Signature info is valid */
# define X509_SIG_INFO_VALID     0x1
/* Signature is suitable for TLS use */
# define X509_SIG_INFO_TLS       0x2

# define X509_FILETYPE_PEM       1
# define X509_FILETYPE_ASN1      2
# define X509_FILETYPE_DEFAULT   3

# define X509v3_KU_DIGITAL_SIGNATURE     0x0080
# define X509v3_KU_NON_REPUDIATION       0x0040
# define X509v3_KU_KEY_ENCIPHERMENT      0x0020
# define X509v3_KU_DATA_ENCIPHERMENT     0x0010
# define X509v3_KU_KEY_AGREEMENT         0x0008
# define X509v3_KU_KEY_CERT_SIGN         0x0004
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# define X509v3_KU_CRL_SIGN             0x0002
# define X509v3_KU_ENCIPHER_ONLY        0x0001
# define X509v3_KU_DECIPHER_ONLY        0x8000
# define X509v3_KU_UNDEF                0xffff

struct X509_algor_st {
  ASN1_OBJECT *algorithm;
  ASN1_TYPE *parameter;
} /* X509_ALGOR */ ;

typedef STACK_OF(X509_ALGOR) X509_ALGORS;

typedef struct X509_val_st {
  ASN1_TIME *notBefore;
  ASN1_TIME *notAfter;
} X509_VAL;

typedef struct X509_sig_st
 X509_SIG;

typedef struct X509_name_entry_st X509_NAME_ENTRY;

SKM_DEFINE_STACK_OF_INTERNAL(X509_NAME_ENTRY, X509_NAME_ENTRY,
X509_NAME_ENTRY)
#define sk_X509_NAME_ENTRY_num(sk)
OPENSSL_sk_num(ossl_check_const_X509_NAME_ENTRY_sk_type(sk))
#define sk_X509_NAME_ENTRY_value(sk, idx) ((X509_NAME_ENTRY
*)OPENSSL_sk_value(ossl_check_const_X509_NAME_ENTRY_sk_type(sk), (idx)))
#define sk_X509_NAME_ENTRY_new(cmp) ((STACK_OF(X509_NAME_ENTRY)
*)OPENSSL_sk_new(ossl_check_X509_NAME_ENTRY_compfunc_type(cmp)))
#define sk_X509_NAME_ENTRY_new_null() ((STACK_OF(X509_NAME_ENTRY)
*)OPENSSL_sk_new_null())
#define sk_X509_NAME_ENTRY_new_reserve(cmp, n) ((STACK_OF(X509_NAME_ENTRY)
*)OPENSSL_sk_new_reserve(ossl_check_X509_NAME_ENTRY_compfunc_type(cmp), (n)))
#define sk_X509_NAME_ENTRY_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_X509_NAME_ENTRY_sk_type(sk), (n))
#define sk_X509_NAME_ENTRY_free(sk) OPENSSL_sk_free(ossl_check_X509_NAME_ENTRY_sk_type(sk))
#define sk_X509_NAME_ENTRY_zero(sk) OPENSSL_sk_zero(ossl_check_X509_NAME_ENTRY_sk_type(sk))
#define
 sk_X509_NAME_ENTRY_delete(sk, i) ((X509_NAME_ENTRY
*)OPENSSL_sk_delete(ossl_check_X509_NAME_ENTRY_sk_type(sk), (i)))
#define sk_X509_NAME_ENTRY_delete_ptr(sk, ptr) ((X509_NAME_ENTRY
*)OPENSSL_sk_delete_ptr(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr)))
#define sk_X509_NAME_ENTRY_push(sk, ptr)
OPENSSL_sk_push(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr))
#define sk_X509_NAME_ENTRY_unshift(sk, ptr)
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OPENSSL_sk_unshift(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr))
#define sk_X509_NAME_ENTRY_pop(sk) ((X509_NAME_ENTRY
*)OPENSSL_sk_pop(ossl_check_X509_NAME_ENTRY_sk_type(sk)))
#define sk_X509_NAME_ENTRY_shift(sk) ((X509_NAME_ENTRY
*)OPENSSL_sk_shift(ossl_check_X509_NAME_ENTRY_sk_type(sk)))
#define sk_X509_NAME_ENTRY_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_NAME_ENTRY_sk_type(sk),ossl_check_X509_NAME_ENTRY_freef
unc_type(freefunc))
#define sk_X509_NAME_ENTRY_insert(sk,
 ptr, idx) OPENSSL_sk_insert(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr), (idx))
#define sk_X509_NAME_ENTRY_set(sk, idx, ptr) ((X509_NAME_ENTRY
*)OPENSSL_sk_set(ossl_check_X509_NAME_ENTRY_sk_type(sk), (idx),
ossl_check_X509_NAME_ENTRY_type(ptr)))
#define sk_X509_NAME_ENTRY_find(sk, ptr)
OPENSSL_sk_find(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr))
#define sk_X509_NAME_ENTRY_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr))
#define sk_X509_NAME_ENTRY_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_type(ptr), pnum)
#define sk_X509_NAME_ENTRY_sort(sk) OPENSSL_sk_sort(ossl_check_X509_NAME_ENTRY_sk_type(sk))
#define sk_X509_NAME_ENTRY_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_NAME_ENTRY_sk_type(sk))
#define sk_X509_NAME_ENTRY_dup(sk) ((STACK_OF(X509_NAME_ENTRY)
 *)OPENSSL_sk_dup(ossl_check_const_X509_NAME_ENTRY_sk_type(sk)))
#define sk_X509_NAME_ENTRY_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_NAME_ENTRY)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_NAME_ENTRY_sk_type(sk),
ossl_check_X509_NAME_ENTRY_copyfunc_type(copyfunc),
ossl_check_X509_NAME_ENTRY_freefunc_type(freefunc)))
#define sk_X509_NAME_ENTRY_set_cmp_func(sk, cmp)
((sk_X509_NAME_ENTRY_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_NAME_ENTRY_sk_type
(sk), ossl_check_X509_NAME_ENTRY_compfunc_type(cmp)))


# define X509_EX_V_NETSCAPE_HACK        0x8000
# define X509_EX_V_INIT                 0x0001
typedef struct X509_extension_st X509_EXTENSION;
SKM_DEFINE_STACK_OF_INTERNAL(X509_EXTENSION, X509_EXTENSION, X509_EXTENSION)
#define sk_X509_EXTENSION_num(sk) OPENSSL_sk_num(ossl_check_const_X509_EXTENSION_sk_type(sk))
#define sk_X509_EXTENSION_value(sk, idx) ((X509_EXTENSION
*)OPENSSL_sk_value(ossl_check_const_X509_EXTENSION_sk_type(sk), (idx)))
#define sk_X509_EXTENSION_new(cmp)
 ((STACK_OF(X509_EXTENSION)
*)OPENSSL_sk_new(ossl_check_X509_EXTENSION_compfunc_type(cmp)))
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#define sk_X509_EXTENSION_new_null() ((STACK_OF(X509_EXTENSION) *)OPENSSL_sk_new_null())
#define sk_X509_EXTENSION_new_reserve(cmp, n) ((STACK_OF(X509_EXTENSION)
*)OPENSSL_sk_new_reserve(ossl_check_X509_EXTENSION_compfunc_type(cmp), (n)))
#define sk_X509_EXTENSION_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_X509_EXTENSION_sk_type(sk), (n))
#define sk_X509_EXTENSION_free(sk) OPENSSL_sk_free(ossl_check_X509_EXTENSION_sk_type(sk))
#define sk_X509_EXTENSION_zero(sk) OPENSSL_sk_zero(ossl_check_X509_EXTENSION_sk_type(sk))
#define sk_X509_EXTENSION_delete(sk, i) ((X509_EXTENSION
*)OPENSSL_sk_delete(ossl_check_X509_EXTENSION_sk_type(sk), (i)))
#define sk_X509_EXTENSION_delete_ptr(sk, ptr) ((X509_EXTENSION
*)OPENSSL_sk_delete_ptr(ossl_check_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_type(ptr)))
#define sk_X509_EXTENSION_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_type(ptr))
#define
 sk_X509_EXTENSION_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_type(ptr))
#define sk_X509_EXTENSION_pop(sk) ((X509_EXTENSION
*)OPENSSL_sk_pop(ossl_check_X509_EXTENSION_sk_type(sk)))
#define sk_X509_EXTENSION_shift(sk) ((X509_EXTENSION
*)OPENSSL_sk_shift(ossl_check_X509_EXTENSION_sk_type(sk)))
#define sk_X509_EXTENSION_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_EXTENSION_sk_type(sk),ossl_check_X509_EXTENSION_freefunc_t
ype(freefunc))
#define sk_X509_EXTENSION_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_X509_EXTENSION_sk_type(sk), ossl_check_X509_EXTENSION_type(ptr),
(idx))
#define sk_X509_EXTENSION_set(sk, idx, ptr) ((X509_EXTENSION
*)OPENSSL_sk_set(ossl_check_X509_EXTENSION_sk_type(sk), (idx),
ossl_check_X509_EXTENSION_type(ptr)))
#define sk_X509_EXTENSION_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_type(ptr))
#define
 sk_X509_EXTENSION_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_type(ptr))
#define sk_X509_EXTENSION_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_EXTENSION_sk_type(sk), ossl_check_X509_EXTENSION_type(ptr),
pnum)
#define sk_X509_EXTENSION_sort(sk) OPENSSL_sk_sort(ossl_check_X509_EXTENSION_sk_type(sk))
#define sk_X509_EXTENSION_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_EXTENSION_sk_type(sk))
#define sk_X509_EXTENSION_dup(sk) ((STACK_OF(X509_EXTENSION)
*)OPENSSL_sk_dup(ossl_check_const_X509_EXTENSION_sk_type(sk)))
#define sk_X509_EXTENSION_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_EXTENSION)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_copyfunc_type(copyfunc),
ossl_check_X509_EXTENSION_freefunc_type(freefunc)))
#define sk_X509_EXTENSION_set_cmp_func(sk, cmp)
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((sk_X509_EXTENSION_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_EXTENSION_sk_type(sk),
ossl_check_X509_EXTENSION_compfunc_type(cmp)))

typedef STACK_OF(X509_EXTENSION) X509_EXTENSIONS;
typedef struct x509_attributes_st X509_ATTRIBUTE;
SKM_DEFINE_STACK_OF_INTERNAL(X509_ATTRIBUTE, X509_ATTRIBUTE, X509_ATTRIBUTE)
#define sk_X509_ATTRIBUTE_num(sk) OPENSSL_sk_num(ossl_check_const_X509_ATTRIBUTE_sk_type(sk))
#define sk_X509_ATTRIBUTE_value(sk, idx) ((X509_ATTRIBUTE
*)OPENSSL_sk_value(ossl_check_const_X509_ATTRIBUTE_sk_type(sk), (idx)))
#define sk_X509_ATTRIBUTE_new(cmp) ((STACK_OF(X509_ATTRIBUTE)
*)OPENSSL_sk_new(ossl_check_X509_ATTRIBUTE_compfunc_type(cmp)))
#define sk_X509_ATTRIBUTE_new_null() ((STACK_OF(X509_ATTRIBUTE) *)OPENSSL_sk_new_null())
#define sk_X509_ATTRIBUTE_new_reserve(cmp, n) ((STACK_OF(X509_ATTRIBUTE)
*)OPENSSL_sk_new_reserve(ossl_check_X509_ATTRIBUTE_compfunc_type(cmp), (n)))
#define sk_X509_ATTRIBUTE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_X509_ATTRIBUTE_sk_type(sk), (n))
#define sk_X509_ATTRIBUTE_free(sk) OPENSSL_sk_free(ossl_check_X509_ATTRIBUTE_sk_type(sk))
#define
sk_X509_ATTRIBUTE_zero(sk) OPENSSL_sk_zero(ossl_check_X509_ATTRIBUTE_sk_type(sk))
#define sk_X509_ATTRIBUTE_delete(sk, i) ((X509_ATTRIBUTE
*)OPENSSL_sk_delete(ossl_check_X509_ATTRIBUTE_sk_type(sk), (i)))
#define sk_X509_ATTRIBUTE_delete_ptr(sk, ptr) ((X509_ATTRIBUTE
*)OPENSSL_sk_delete_ptr(ossl_check_X509_ATTRIBUTE_sk_type(sk),
ossl_check_X509_ATTRIBUTE_type(ptr)))
#define sk_X509_ATTRIBUTE_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_ATTRIBUTE_sk_type(sk),
ossl_check_X509_ATTRIBUTE_type(ptr))
#define sk_X509_ATTRIBUTE_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_X509_ATTRIBUTE_sk_type(sk), ossl_check_X509_ATTRIBUTE_type(ptr))
#define sk_X509_ATTRIBUTE_pop(sk) ((X509_ATTRIBUTE
*)OPENSSL_sk_pop(ossl_check_X509_ATTRIBUTE_sk_type(sk)))
#define sk_X509_ATTRIBUTE_shift(sk) ((X509_ATTRIBUTE
*)OPENSSL_sk_shift(ossl_check_X509_ATTRIBUTE_sk_type(sk)))
#define sk_X509_ATTRIBUTE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_ATTRIBUTE_sk_type(sk),ossl_check_X509_ATTRIBUTE_freefunc_t
ype(freefunc))
#define
sk_X509_ATTRIBUTE_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_ATTRIBUTE_sk_type(sk),
ossl_check_X509_ATTRIBUTE_type(ptr), (idx))
#define sk_X509_ATTRIBUTE_set(sk, idx, ptr) ((X509_ATTRIBUTE
*)OPENSSL_sk_set(ossl_check_X509_ATTRIBUTE_sk_type(sk), (idx),
ossl_check_X509_ATTRIBUTE_type(ptr)))
#define sk_X509_ATTRIBUTE_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_ATTRIBUTE_sk_type(sk),
ossl_check_X509_ATTRIBUTE_type(ptr))
#define sk_X509_ATTRIBUTE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_X509_ATTRIBUTE_sk_type(sk), ossl_check_X509_ATTRIBUTE_type(ptr))
#define sk_X509_ATTRIBUTE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_ATTRIBUTE_sk_type(sk), ossl_check_X509_ATTRIBUTE_type(ptr),
pnum)

```
#define sk_X509_ATTRIBUTE_sort(sk) OPENSSL_sk_sort(ossl_check_X509_ATTRIBUTE_sk_type(sk))
#define sk_X509_ATTRIBUTE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_ATTRIBUTE_sk_type(sk))
#define sk_X509_ATTRIBUTE_dup(sk) ((STACK_OF(X509_ATTRIBUTE)
 *)OPENSSL_sk_dup(ossl_check_const_X509_ATTRIBUTE_sk_type(sk)))
#define sk_X509_ATTRIBUTE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_ATTRIBUTE)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_ATTRIBUTE_sk_type(sk),
ossl_check_X509_ATTRIBUTE_copyfunc_type(copyfunc),
ossl_check_X509_ATTRIBUTE_freefunc_type(freefunc)))
#define sk_X509_ATTRIBUTE_set_cmp_func(sk, cmp)
((sk_X509_ATTRIBUTE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_ATTRIBUTE_sk_type(sk),
ossl_check_X509_ATTRIBUTE_compfunc_type(cmp)))

typedef struct X509_req_info_st X509_REQ_INFO;
typedef struct X509_req_st X509_REQ;
typedef struct x509_cert_aux_st X509_CERT_AUX;
typedef struct x509_cinf_st X509_CINF;

/* Flags for X509_print_ex() */

# define X509_FLAG_COMPAT              0
# define X509_FLAG_NO_HEADER           1L
# define X509_FLAG_NO_VERSION          (1L << 1)
# define X509_FLAG_NO_SERIAL           (1L << 2)
# define X509_FLAG_NO_SIGNAME          (1L << 3)
# define X509_FLAG_NO_ISSUER
          (1L << 4)
# define X509_FLAG_NO_VALIDITY         (1L << 5)
# define X509_FLAG_NO_SUBJECT          (1L << 6)
# define X509_FLAG_NO_PUBKEY           (1L << 7)
# define X509_FLAG_NO_EXTENSIONS       (1L << 8)
# define X509_FLAG_NO_SIGDUMP          (1L << 9)
# define X509_FLAG_NO_AUX              (1L << 10)
# define X509_FLAG_NO_ATTRIBUTES       (1L << 11)
# define X509_FLAG_NO_IDS              (1L << 12)
# define X509_FLAG_EXTENSIONS_ONLY_KID   (1L << 13)

/* Flags specific to X509_NAME_print_ex() */

/* The field separator information */

# define XN_FLAG_SEP_MASK       (0xf << 16)

# define XN_FLAG_COMPAT         0/* Traditional; use old X509_NAME_print */
# define XN_FLAG_SEP_COMMA_PLUS  (1 << 16)/* RFC2253 ,+ */
# define XN_FLAG_SEP_CPLUS_SPC   (2 << 16)/* ,+ spaced: more readable */
# define XN_FLAG_SEP_SPLUS_SPC   (3 << 16)/* ;+ spaced */
# define XN_FLAG_SEP_MULTILINE   (4 << 16)/* One line per field */
```

```
# define XN_FLAG_DN_REV          (1 << 20)/*
 Reverse DN order */

/* How the field name is shown */

# define XN_FLAG_FN_MASK         (0x3 << 21)

# define XN_FLAG_FN_SN           0/* Object short name */
# define XN_FLAG_FN_LN           (1 << 21)/* Object long name */
# define XN_FLAG_FN_OID          (2 << 21)/* Always use OIDs */
# define XN_FLAG_FN_NONE         (3 << 21)/* No field names */

# define XN_FLAG_SPC_EQ          (1 << 23)/* Put spaces round '=' */

/*
* This determines if we dump fields we don't recognise: RFC2253 requires
* this.
*/

# define XN_FLAG_DUMP_UNKNOWN_FIELDS (1 << 24)

# define XN_FLAG_FN_ALIGN        (1 << 25)/* Align field names to 20
                                 * characters */

/* Complete set of RFC2253 flags */

# define XN_FLAG_RFC2253 (ASN1_STRFLGS_RFC2253 | \
                XN_FLAG_SEP_COMMA_PLUS | \
                XN_FLAG_DN_REV | \
                XN_FLAG_FN_SN | \
                XN_FLAG_DUMP_UNKNOWN_FIELDS)

/* readable oneline form */

#
 define XN_FLAG_ONELINE (ASN1_STRFLGS_RFC2253 | \
                ASN1_STRFLGS_ESC_QUOTE | \
                XN_FLAG_SEP_CPLUS_SPC | \
                XN_FLAG_SPC_EQ | \
                XN_FLAG_FN_SN)

/* readable multiline form */

# define XN_FLAG_MULTILINE (ASN1_STRFLGS_ESC_CTRL | \
                ASN1_STRFLGS_ESC_MSB | \
                XN_FLAG_SEP_MULTILINE | \
                XN_FLAG_SPC_EQ | \
```

```
                XN_FLAG_FN_LN | \
                XN_FLAG_FN_ALIGN)

typedef struct X509_crl_info_st X509_CRL_INFO;

typedef struct private_key_st {
  int version;
  /* The PKCS#8 data types */
  X509_ALGOR *enc_algor;
  ASN1_OCTET_STRING *enc_pkey; /* encrypted pub key */
  /* When decrypted, the following will not be NULL */
  EVP_PKEY *dec_pkey;
  /* used to encrypt and decrypt */
  int key_length;
  char *key_data;
  int key_free;             /* true if we should auto free key_data */
  /*
 expanded version of 'enc_algor' */
  EVP_CIPHER_INFO cipher;
} X509_PKEY;

typedef struct X509_info_st {
  X509 *x509;
  X509_CRL *crl;
  X509_PKEY *x_pkey;
  EVP_CIPHER_INFO enc_cipher;
  int enc_len;
  char *enc_data;
} X509_INFO;
SKM_DEFINE_STACK_OF_INTERNAL(X509_INFO, X509_INFO, X509_INFO)
#define sk_X509_INFO_num(sk) OPENSSL_sk_num(ossl_check_const_X509_INFO_sk_type(sk))
#define sk_X509_INFO_value(sk, idx) ((X509_INFO
*)OPENSSL_sk_value(ossl_check_const_X509_INFO_sk_type(sk), (idx)))
#define sk_X509_INFO_new(cmp) ((STACK_OF(X509_INFO)
*)OPENSSL_sk_new(ossl_check_X509_INFO_compfunc_type(cmp)))
#define sk_X509_INFO_new_null() ((STACK_OF(X509_INFO) *)OPENSSL_sk_new_null())
#define sk_X509_INFO_new_reserve(cmp, n) ((STACK_OF(X509_INFO)
*)OPENSSL_sk_new_reserve(ossl_check_X509_INFO_compfunc_type(cmp), (n)))
#define sk_X509_INFO_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_INFO_sk_type(sk), (n))
#define sk_X509_INFO_free(sk) OPENSSL_sk_free(ossl_check_X509_INFO_sk_type(sk))
#define
 sk_X509_INFO_zero(sk) OPENSSL_sk_zero(ossl_check_X509_INFO_sk_type(sk))
#define sk_X509_INFO_delete(sk, i) ((X509_INFO *)OPENSSL_sk_delete(ossl_check_X509_INFO_sk_type(sk),
(i)))
#define sk_X509_INFO_delete_ptr(sk, ptr) ((X509_INFO
*)OPENSSL_sk_delete_ptr(ossl_check_X509_INFO_sk_type(sk), ossl_check_X509_INFO_type(ptr)))
#define sk_X509_INFO_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_type(ptr))
```

```
#define sk_X509_INFO_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_type(ptr))
#define sk_X509_INFO_pop(sk) ((X509_INFO *)OPENSSL_sk_pop(ossl_check_X509_INFO_sk_type(sk)))
#define sk_X509_INFO_shift(sk) ((X509_INFO *)OPENSSL_sk_shift(ossl_check_X509_INFO_sk_type(sk)))
#define sk_X509_INFO_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_INFO_sk_type(sk),ossl_check_X509_INFO_freefunc_type(freefunc))
#define sk_X509_INFO_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_INFO_sk_type(sk),
 ossl_check_X509_INFO_type(ptr), (idx))
#define sk_X509_INFO_set(sk, idx, ptr) ((X509_INFO *)OPENSSL_sk_set(ossl_check_X509_INFO_sk_type(sk),
(idx), ossl_check_X509_INFO_type(ptr)))
#define sk_X509_INFO_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_type(ptr))
#define sk_X509_INFO_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_type(ptr))
#define sk_X509_INFO_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_type(ptr), pnum)
#define sk_X509_INFO_sort(sk) OPENSSL_sk_sort(ossl_check_X509_INFO_sk_type(sk))
#define sk_X509_INFO_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_INFO_sk_type(sk))
#define sk_X509_INFO_dup(sk) ((STACK_OF(X509_INFO)
*)OPENSSL_sk_dup(ossl_check_const_X509_INFO_sk_type(sk)))
#define sk_X509_INFO_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_INFO)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_copyfunc_type(copyfunc),
 ossl_check_X509_INFO_freefunc_type(freefunc)))
#define sk_X509_INFO_set_cmp_func(sk, cmp)
((sk_X509_INFO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_INFO_sk_type(sk),
ossl_check_X509_INFO_compfunc_type(cmp)))


/*
* The next 2 structures and their 8 routines are used to manipulate Netscape's
* spki structures - useful if you are writing a CA web page
*/
typedef struct Netscape_spkac_st {
  X509_PUBKEY *pubkey;
  ASN1_IA5STRING *challenge;  /* challenge sent in atlas >= PR2 */
} NETSCAPE_SPKAC;

typedef struct Netscape_spki_st {
  NETSCAPE_SPKAC *spkac;      /* signed public key and challenge */
  X509_ALGOR sig_algor;
  ASN1_BIT_STRING *signature;
} NETSCAPE_SPKI;

/* Netscape certificate sequence structure */
typedef struct Netscape_certificate_sequence {
  ASN1_OBJECT *type;
  STACK_OF(X509) *certs;
```

```
} NETSCAPE_CERT_SEQUENCE;

/*- Unused (and iv length is wrong)
typedef struct CBCParameter_st
      {
      unsigned char iv[8];
       } CBC_PARAM;
*/

/* Password based encryption structure */

typedef struct PBEPARAM_st {
  ASN1_OCTET_STRING *salt;
  ASN1_INTEGER *iter;
} PBEPARAM;

/* Password based encryption V2 structures */

typedef struct PBE2PARAM_st {
  X509_ALGOR *keyfunc;
  X509_ALGOR *encryption;
} PBE2PARAM;

typedef struct PBKDF2PARAM_st {
/* Usually OCTET STRING but could be anything */
  ASN1_TYPE *salt;
  ASN1_INTEGER *iter;
  ASN1_INTEGER *keylength;
  X509_ALGOR *prf;
} PBKDF2PARAM;

#ifndef OPENSSL_NO_SCRYPT
typedef struct SCRYPT_PARAMS_st {
  ASN1_OCTET_STRING *salt;
  ASN1_INTEGER *costParameter;
  ASN1_INTEGER *blockSize;
  ASN1_INTEGER *parallelizationParameter;
  ASN1_INTEGER *keyLength;
} SCRYPT_PARAMS;
#endif

#ifdef  __cplusplus
}
#endif

# include <openssl/x509_vfy.h>
# include <openssl/pkcs7.h>
```

```
#ifdef  __cplusplus
extern "C" {
#endif

# define X509_EXT_PACK_UNKNOWN   1
# define X509_EXT_PACK_STRING    2

# define        X509_extract_key(x)     X509_get_pubkey(x)/*****/
#
 define        X509_REQ_extract_key(a) X509_REQ_get_pubkey(a)
# define        X509_name_cmp(a,b)      X509_NAME_cmp((a),(b))

void X509_CRL_set_default_method(const X509_CRL_METHOD *meth);
X509_CRL_METHOD *X509_CRL_METHOD_new(int (*crl_init) (X509_CRL *crl),
                                     int (*crl_free) (X509_CRL *crl),
                                     int (*crl_lookup) (X509_CRL *crl,
                                                        X509_REVOKED **ret,
                                                        const
                                                        ASN1_INTEGER *serial,
                                                        const
                                                        X509_NAME *issuer),
                                     int (*crl_verify) (X509_CRL *crl,
                                                        EVP_PKEY *pk));
void X509_CRL_METHOD_free(X509_CRL_METHOD *m);

void X509_CRL_set_meth_data(X509_CRL
 *crl, void *dat);
void *X509_CRL_get_meth_data(X509_CRL *crl);

const char *X509_verify_cert_error_string(long n);

int X509_verify(X509 *a, EVP_PKEY *r);
int X509_self_signed(X509 *cert, int verify_signature);

int X509_REQ_verify_ex(X509_REQ *a, EVP_PKEY *r, OSSL_LIB_CTX *libctx,
                       const char *propq);
int X509_REQ_verify(X509_REQ *a, EVP_PKEY *r);
int X509_CRL_verify(X509_CRL *a, EVP_PKEY *r);
int NETSCAPE_SPKI_verify(NETSCAPE_SPKI *a, EVP_PKEY *r);

NETSCAPE_SPKI *NETSCAPE_SPKI_b64_decode(const char *str, int len);
char *NETSCAPE_SPKI_b64_encode(NETSCAPE_SPKI *x);
EVP_PKEY *NETSCAPE_SPKI_get_pubkey(NETSCAPE_SPKI *x);
int NETSCAPE_SPKI_set_pubkey(NETSCAPE_SPKI *x, EVP_PKEY *pkey);

int NETSCAPE_SPKI_print(BIO *out, NETSCAPE_SPKI *spki);

int X509_signature_dump(BIO *bp, const ASN1_STRING *sig, int indent);
```

```
int X509_signature_print(BIO *bp, const X509_ALGOR *alg,
                         const ASN1_STRING *sig);

int X509_sign(X509 *x, EVP_PKEY *pkey, const EVP_MD
 *md);
int X509_sign_ctx(X509 *x, EVP_MD_CTX *ctx);
int X509_REQ_sign(X509_REQ *x, EVP_PKEY *pkey, const EVP_MD *md);
int X509_REQ_sign_ctx(X509_REQ *x, EVP_MD_CTX *ctx);
int X509_CRL_sign(X509_CRL *x, EVP_PKEY *pkey, const EVP_MD *md);
int X509_CRL_sign_ctx(X509_CRL *x, EVP_MD_CTX *ctx);
int NETSCAPE_SPKI_sign(NETSCAPE_SPKI *x, EVP_PKEY *pkey, const EVP_MD *md);

int X509_pubkey_digest(const X509 *data, const EVP_MD *type,
                       unsigned char *md, unsigned int *len);
int X509_digest(const X509 *data, const EVP_MD *type,
                unsigned char *md, unsigned int *len);
ASN1_OCTET_STRING *X509_digest_sig(const X509 *cert,
                                   EVP_MD **md_used, int *md_is_fallback);
int X509_CRL_digest(const X509_CRL *data, const EVP_MD *type,
                    unsigned char *md, unsigned int *len);
int X509_REQ_digest(const X509_REQ *data, const EVP_MD *type,
                    unsigned char *md, unsigned int *len);
int X509_NAME_digest(const
 X509_NAME *data, const EVP_MD *type,
                     unsigned char *md, unsigned int *len);

X509 *X509_load_http(const char *url, BIO *bio, BIO *rbio, int timeout);
X509_CRL *X509_CRL_load_http(const char *url, BIO *bio, BIO *rbio, int timeout);
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  include <openssl/http.h> /* OSSL_HTTP_REQ_CTX_nbio_d2i */
#  define X509_http_nbio(rctx, pcert) \
    OSSL_HTTP_REQ_CTX_nbio_d2i(rctx, pcert, ASN1_ITEM_rptr(X509))
#  define X509_CRL_http_nbio(rctx, pcrl) \
    OSSL_HTTP_REQ_CTX_nbio_d2i(rctx, pcrl, ASN1_ITEM_rptr(X509_CRL))
# endif

# ifndef OPENSSL_NO_STDIO
X509 *d2i_X509_fp(FILE *fp, X509 **x509);
int i2d_X509_fp(FILE *fp, const X509 *x509);
X509_CRL *d2i_X509_CRL_fp(FILE *fp, X509_CRL **crl);
int i2d_X509_CRL_fp(FILE *fp, const X509_CRL *crl);
X509_REQ *d2i_X509_REQ_fp(FILE *fp, X509_REQ **req);
int i2d_X509_REQ_fp(FILE *fp, const X509_REQ *req);
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 RSA *d2i_RSAPrivateKey_fp(FILE *fp, RSA
 **rsa);
OSSL_DEPRECATEDIN_3_0 int i2d_RSAPrivateKey_fp(FILE *fp, const RSA *rsa);
OSSL_DEPRECATEDIN_3_0 RSA *d2i_RSAPublicKey_fp(FILE *fp, RSA **rsa);
```

```
OSSL_DEPRECATEDIN_3_0 int i2d_RSAPublicKey_fp(FILE *fp, const RSA *rsa);
OSSL_DEPRECATEDIN_3_0 RSA *d2i_RSA_PUBKEY_fp(FILE *fp, RSA **rsa);
OSSL_DEPRECATEDIN_3_0 int i2d_RSA_PUBKEY_fp(FILE *fp, const RSA *rsa);
#  endif
#  ifndef OPENSSL_NO_DEPRECATED_3_0
#   ifndef OPENSSL_NO_DSA
OSSL_DEPRECATEDIN_3_0 DSA *d2i_DSA_PUBKEY_fp(FILE *fp, DSA **dsa);
OSSL_DEPRECATEDIN_3_0 int i2d_DSA_PUBKEY_fp(FILE *fp, const DSA *dsa);
OSSL_DEPRECATEDIN_3_0 DSA *d2i_DSAPrivateKey_fp(FILE *fp, DSA **dsa);
OSSL_DEPRECATEDIN_3_0 int i2d_DSAPrivateKey_fp(FILE *fp, const DSA *dsa);
#   endif
#  endif
#  ifndef OPENSSL_NO_DEPRECATED_3_0
#   ifndef OPENSSL_NO_EC
OSSL_DEPRECATEDIN_3_0 EC_KEY *d2i_EC_PUBKEY_fp(FILE *fp, EC_KEY **eckey);
OSSL_DEPRECATEDIN_3_0 int i2d_EC_PUBKEY_fp(FILE *fp, const EC_KEY *eckey);
OSSL_DEPRECATEDIN_3_0 EC_KEY *d2i_ECPrivateKey_fp(FILE *fp,
 EC_KEY **eckey);
OSSL_DEPRECATEDIN_3_0 int i2d_ECPrivateKey_fp(FILE *fp, const EC_KEY *eckey);
#   endif /* OPENSSL_NO_EC */
#  endif /* OPENSSL_NO_DEPRECATED_3_0 */
X509_SIG *d2i_PKCS8_fp(FILE *fp, X509_SIG **p8);
int i2d_PKCS8_fp(FILE *fp, const X509_SIG *p8);
X509_PUBKEY *d2i_X509_PUBKEY_fp(FILE *fp, X509_PUBKEY **xpk);
int i2d_X509_PUBKEY_fp(FILE *fp, const X509_PUBKEY *xpk);
PKCS8_PRIV_KEY_INFO *d2i_PKCS8_PRIV_KEY_INFO_fp(FILE *fp,
                                PKCS8_PRIV_KEY_INFO **p8inf);
int i2d_PKCS8_PRIV_KEY_INFO_fp(FILE *fp, const PKCS8_PRIV_KEY_INFO *p8inf);
int i2d_PKCS8PrivateKeyInfo_fp(FILE *fp, const EVP_PKEY *key);
int i2d_PrivateKey_fp(FILE *fp, const EVP_PKEY *pkey);
EVP_PKEY *d2i_PrivateKey_ex_fp(FILE *fp, EVP_PKEY **a, OSSL_LIB_CTX *libctx,
                       const char *propq);
EVP_PKEY *d2i_PrivateKey_fp(FILE *fp, EVP_PKEY **a);
int i2d_PUBKEY_fp(FILE *fp, const EVP_PKEY *pkey);
EVP_PKEY *d2i_PUBKEY_fp(FILE *fp, EVP_PKEY **a);
#
 endif

X509 *d2i_X509_bio(BIO *bp, X509 **x509);
int i2d_X509_bio(BIO *bp, const X509 *x509);
X509_CRL *d2i_X509_CRL_bio(BIO *bp, X509_CRL **crl);
int i2d_X509_CRL_bio(BIO *bp, const X509_CRL *crl);
X509_REQ *d2i_X509_REQ_bio(BIO *bp, X509_REQ **req);
int i2d_X509_REQ_bio(BIO *bp, const X509_REQ *req);
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 RSA *d2i_RSAPrivateKey_bio(BIO *bp, RSA **rsa);
OSSL_DEPRECATEDIN_3_0 int i2d_RSAPrivateKey_bio(BIO *bp, const RSA *rsa);
OSSL_DEPRECATEDIN_3_0 RSA *d2i_RSAPublicKey_bio(BIO *bp, RSA **rsa);
```

```
OSSL_DEPRECATEDIN_3_0 int i2d_RSAPublicKey_bio(BIO *bp, const RSA *rsa);
OSSL_DEPRECATEDIN_3_0 RSA *d2i_RSA_PUBKEY_bio(BIO *bp, RSA **rsa);
OSSL_DEPRECATEDIN_3_0 int i2d_RSA_PUBKEY_bio(BIO *bp, const RSA *rsa);
#  endif
#  ifndef OPENSSL_NO_DEPRECATED_3_0
#   ifndef OPENSSL_NO_DSA
OSSL_DEPRECATEDIN_3_0 DSA *d2i_DSA_PUBKEY_bio(BIO *bp, DSA **dsa);
OSSL_DEPRECATEDIN_3_0 int i2d_DSA_PUBKEY_bio(BIO *bp, const DSA *dsa);
OSSL_DEPRECATEDIN_3_0 DSA *d2i_DSAPrivateKey_bio(BIO
 *bp, DSA **dsa);
OSSL_DEPRECATEDIN_3_0 int i2d_DSAPrivateKey_bio(BIO *bp, const DSA *dsa);
#   endif
#  endif

#  ifndef OPENSSL_NO_DEPRECATED_3_0
#   ifndef OPENSSL_NO_EC
OSSL_DEPRECATEDIN_3_0 EC_KEY *d2i_EC_PUBKEY_bio(BIO *bp, EC_KEY **eckey);
OSSL_DEPRECATEDIN_3_0 int i2d_EC_PUBKEY_bio(BIO *bp, const EC_KEY *eckey);
OSSL_DEPRECATEDIN_3_0 EC_KEY *d2i_ECPrivateKey_bio(BIO *bp, EC_KEY **eckey);
OSSL_DEPRECATEDIN_3_0 int i2d_ECPrivateKey_bio(BIO *bp, const EC_KEY *eckey);
#   endif /* OPENSSL_NO_EC */
#  endif /* OPENSSL_NO_DEPRECATED_3_0 */

X509_SIG *d2i_PKCS8_bio(BIO *bp, X509_SIG **p8);
int i2d_PKCS8_bio(BIO *bp, const X509_SIG *p8);
X509_PUBKEY *d2i_X509_PUBKEY_bio(BIO *bp, X509_PUBKEY **xpk);
int i2d_X509_PUBKEY_bio(BIO *bp, const X509_PUBKEY *xpk);
PKCS8_PRIV_KEY_INFO *d2i_PKCS8_PRIV_KEY_INFO_bio(BIO *bp,
                                 PKCS8_PRIV_KEY_INFO **p8inf);
int i2d_PKCS8_PRIV_KEY_INFO_bio(BIO *bp, const PKCS8_PRIV_KEY_INFO *p8inf);
int
 i2d_PKCS8PrivateKeyInfo_bio(BIO *bp, const EVP_PKEY *key);
int i2d_PrivateKey_bio(BIO *bp, const EVP_PKEY *pkey);
EVP_PKEY *d2i_PrivateKey_ex_bio(BIO *bp, EVP_PKEY **a, OSSL_LIB_CTX *libctx,
                    const char *propq);
EVP_PKEY *d2i_PrivateKey_bio(BIO *bp, EVP_PKEY **a);
int i2d_PUBKEY_bio(BIO *bp, const EVP_PKEY *pkey);
EVP_PKEY *d2i_PUBKEY_bio(BIO *bp, EVP_PKEY **a);

DECLARE_ASN1_DUP_FUNCTION(X509)
DECLARE_ASN1_DUP_FUNCTION(X509_ALGOR)
DECLARE_ASN1_DUP_FUNCTION(X509_ATTRIBUTE)
DECLARE_ASN1_DUP_FUNCTION(X509_CRL)
DECLARE_ASN1_DUP_FUNCTION(X509_EXTENSION)
DECLARE_ASN1_DUP_FUNCTION(X509_PUBKEY)
DECLARE_ASN1_DUP_FUNCTION(X509_REQ)
DECLARE_ASN1_DUP_FUNCTION(X509_REVOKED)
int X509_ALGOR_set0(X509_ALGOR *alg, ASN1_OBJECT *aobj, int ptype,
```

```
                void *pval);
void X509_ALGOR_get0(const ASN1_OBJECT **paobj, int *pptype,
                     const void **ppval, const X509_ALGOR *algor);
void X509_ALGOR_set_md(X509_ALGOR *alg, const EVP_MD *md);
int
 X509_ALGOR_cmp(const X509_ALGOR *a, const X509_ALGOR *b);
int X509_ALGOR_copy(X509_ALGOR *dest, const X509_ALGOR *src);

DECLARE_ASN1_DUP_FUNCTION(X509_NAME)
DECLARE_ASN1_DUP_FUNCTION(X509_NAME_ENTRY)

int X509_cmp_time(const ASN1_TIME *s, time_t *t);
int X509_cmp_current_time(const ASN1_TIME *s);
int X509_cmp_timeframe(const X509_VERIFY_PARAM *vpm,
                       const ASN1_TIME *start, const ASN1_TIME *end);
ASN1_TIME *X509_time_adj(ASN1_TIME *s, long adj, time_t *t);
ASN1_TIME *X509_time_adj_ex(ASN1_TIME *s,
                            int offset_day, long offset_sec, time_t *t);
ASN1_TIME *X509_gmtime_adj(ASN1_TIME *s, long adj);

const char *X509_get_default_cert_area(void);
const char *X509_get_default_cert_dir(void);
const char *X509_get_default_cert_file(void);
const char *X509_get_default_cert_dir_env(void);
const char *X509_get_default_cert_file_env(void);
const char *X509_get_default_private_dir(void);

X509_REQ *X509_to_X509_REQ(X509 *x, EVP_PKEY *pkey, const EVP_MD
 *md);
X509 *X509_REQ_to_X509(X509_REQ *r, int days, EVP_PKEY *pkey);

DECLARE_ASN1_FUNCTIONS(X509_ALGOR)
DECLARE_ASN1_ENCODE_FUNCTIONS(X509_ALGORS, X509_ALGORS, X509_ALGORS)
DECLARE_ASN1_FUNCTIONS(X509_VAL)

DECLARE_ASN1_FUNCTIONS(X509_PUBKEY)

X509_PUBKEY *X509_PUBKEY_new_ex(OSSL_LIB_CTX *libctx, const char *propq);
int X509_PUBKEY_set(X509_PUBKEY **x, EVP_PKEY *pkey);
EVP_PKEY *X509_PUBKEY_get0(const X509_PUBKEY *key);
EVP_PKEY *X509_PUBKEY_get(const X509_PUBKEY *key);
int X509_get_pubkey_parameters(EVP_PKEY *pkey, STACK_OF(X509) *chain);
long X509_get_pathlen(X509 *x);
DECLARE_ASN1_ENCODE_FUNCTIONS_only(EVP_PKEY, PUBKEY)
EVP_PKEY *d2i_PUBKEY_ex(EVP_PKEY **a, const unsigned char **pp, long length,
                        OSSL_LIB_CTX *libctx, const char *propq);
# ifndef OPENSSL_NO_DEPRECATED_3_0
DECLARE_ASN1_ENCODE_FUNCTIONS_only_attr(OSSL_DEPRECATEDIN_3_0,RSA, RSA_PUBKEY)
```

```
# endif
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  ifndef OPENSSL_NO_DSA
DECLARE_ASN1_ENCODE_FUNCTIONS_only_attr(OSSL_DEPRECATEDIN_3_0,DSA,
 DSA_PUBKEY)
#  endif
# endif
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  ifndef OPENSSL_NO_EC
DECLARE_ASN1_ENCODE_FUNCTIONS_only_attr(OSSL_DEPRECATEDIN_3_0, EC_KEY, EC_PUBKEY)
#  endif
# endif

DECLARE_ASN1_FUNCTIONS(X509_SIG)
void X509_SIG_get0(const X509_SIG *sig, const X509_ALGOR **palg,
                   const ASN1_OCTET_STRING **pdigest);
void X509_SIG_getm(X509_SIG *sig, X509_ALGOR **palg,
                   ASN1_OCTET_STRING **pdigest);

DECLARE_ASN1_FUNCTIONS(X509_REQ_INFO)
DECLARE_ASN1_FUNCTIONS(X509_REQ)
X509_REQ *X509_REQ_new_ex(OSSL_LIB_CTX *libctx, const char *propq);

DECLARE_ASN1_FUNCTIONS(X509_ATTRIBUTE)
X509_ATTRIBUTE *X509_ATTRIBUTE_create(int nid, int atrtype, void *value);

DECLARE_ASN1_FUNCTIONS(X509_EXTENSION)
DECLARE_ASN1_ENCODE_FUNCTIONS(X509_EXTENSIONS, X509_EXTENSIONS, X509_EXTENSIONS)

DECLARE_ASN1_FUNCTIONS(X509_NAME_ENTRY)

DECLARE_ASN1_FUNCTIONS(X509_NAME)

int X509_NAME_set(X509_NAME **xn, const X509_NAME *name);

DECLARE_ASN1_FUNCTIONS(X509_CINF)
DECLARE_ASN1_FUNCTIONS(X509)
X509
 *X509_new_ex(OSSL_LIB_CTX *libctx, const char *propq);
DECLARE_ASN1_FUNCTIONS(X509_CERT_AUX)

#define X509_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_X509, l, p, newf, dupf, freef)
int X509_set_ex_data(X509 *r, int idx, void *arg);
void *X509_get_ex_data(const X509 *r, int idx);
DECLARE_ASN1_ENCODE_FUNCTIONS_only(X509,X509_AUX)

int i2d_re_X509_tbs(X509 *x, unsigned char **pp);
```

```
int X509_SIG_INFO_get(const X509_SIG_INFO *siginf, int *mdnid, int *pknid,
                      int *secbits, uint32_t *flags);
void X509_SIG_INFO_set(X509_SIG_INFO *siginf, int mdnid, int pknid,
                       int secbits, uint32_t flags);

int X509_get_signature_info(X509 *x, int *mdnid, int *pknid, int *secbits,
                            uint32_t *flags);

void X509_get0_signature(const ASN1_BIT_STRING **psig,
                         const X509_ALGOR **palg, const X509 *x);
int X509_get_signature_nid(const
 X509 *x);

void X509_set0_distinguishing_id(X509 *x, ASN1_OCTET_STRING *d_id);
ASN1_OCTET_STRING *X509_get0_distinguishing_id(X509 *x);
void X509_REQ_set0_distinguishing_id(X509_REQ *x, ASN1_OCTET_STRING *d_id);
ASN1_OCTET_STRING *X509_REQ_get0_distinguishing_id(X509_REQ *x);

int X509_alias_set1(X509 *x, const unsigned char *name, int len);
int X509_keyid_set1(X509 *x, const unsigned char *id, int len);
unsigned char *X509_alias_get0(X509 *x, int *len);
unsigned char *X509_keyid_get0(X509 *x, int *len);

DECLARE_ASN1_FUNCTIONS(X509_REVOKED)
DECLARE_ASN1_FUNCTIONS(X509_CRL_INFO)
DECLARE_ASN1_FUNCTIONS(X509_CRL)
X509_CRL *X509_CRL_new_ex(OSSL_LIB_CTX *libctx, const char *propq);

int X509_CRL_add0_revoked(X509_CRL *crl, X509_REVOKED *rev);
int X509_CRL_get0_by_serial(X509_CRL *crl,
                            X509_REVOKED **ret, const ASN1_INTEGER *serial);
int X509_CRL_get0_by_cert(X509_CRL *crl, X509_REVOKED **ret, X509 *x);

X509_PKEY *X509_PKEY_new(void);
void X509_PKEY_free(X509_PKEY
 *a);

DECLARE_ASN1_FUNCTIONS(NETSCAPE_SPKI)
DECLARE_ASN1_FUNCTIONS(NETSCAPE_SPKAC)
DECLARE_ASN1_FUNCTIONS(NETSCAPE_CERT_SEQUENCE)

X509_INFO *X509_INFO_new(void);
void X509_INFO_free(X509_INFO *a);
char *X509_NAME_oneline(const X509_NAME *a, char *buf, int size);

#ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
```

```
int ASN1_verify(i2d_of_void *i2d, X509_ALGOR *algor1,
            ASN1_BIT_STRING *signature, char *data, EVP_PKEY *pkey);
OSSL_DEPRECATEDIN_3_0
int ASN1_digest(i2d_of_void *i2d, const EVP_MD *type, char *data,
             unsigned char *md, unsigned int *len);
OSSL_DEPRECATEDIN_3_0
int ASN1_sign(i2d_of_void *i2d, X509_ALGOR *algor1, X509_ALGOR *algor2,
           ASN1_BIT_STRING *signature, char *data, EVP_PKEY *pkey,
           const EVP_MD *type);
#endif
int ASN1_item_digest(const ASN1_ITEM *it, const EVP_MD *type, void *data,
                unsigned char *md, unsigned int *len);
int ASN1_item_verify(const ASN1_ITEM *it, const X509_ALGOR *alg,
                 const ASN1_BIT_STRING *signature, const void *data,
                EVP_PKEY *pkey);
int ASN1_item_verify_ctx(const ASN1_ITEM *it, const X509_ALGOR *alg,
                   const ASN1_BIT_STRING *signature, const void *data,
                   EVP_MD_CTX *ctx);
int ASN1_item_sign(const ASN1_ITEM *it, X509_ALGOR *algor1, X509_ALGOR *algor2,
               ASN1_BIT_STRING *signature, const void *data,
               EVP_PKEY *pkey, const EVP_MD *md);
int ASN1_item_sign_ctx(const ASN1_ITEM *it, X509_ALGOR *algor1,
                   X509_ALGOR *algor2, ASN1_BIT_STRING *signature,
                   const void *data, EVP_MD_CTX *ctx);

#define X509_VERSION_1 0
#define X509_VERSION_2 1
#define X509_VERSION_3 2

long X509_get_version(const X509 *x);
int X509_set_version(X509 *x, long version);
int X509_set_serialNumber(X509 *x, ASN1_INTEGER *serial);
ASN1_INTEGER *X509_get_serialNumber(X509 *x);
const ASN1_INTEGER *X509_get0_serialNumber(const
 X509 *x);
int X509_set_issuer_name(X509 *x, const X509_NAME *name);
X509_NAME *X509_get_issuer_name(const X509 *a);
int X509_set_subject_name(X509 *x, const X509_NAME *name);
X509_NAME *X509_get_subject_name(const X509 *a);
const ASN1_TIME * X509_get0_notBefore(const X509 *x);
ASN1_TIME *X509_getm_notBefore(const X509 *x);
int X509_set1_notBefore(X509 *x, const ASN1_TIME *tm);
const ASN1_TIME *X509_get0_notAfter(const X509 *x);
ASN1_TIME *X509_getm_notAfter(const X509 *x);
int X509_set1_notAfter(X509 *x, const ASN1_TIME *tm);
int X509_set_pubkey(X509 *x, EVP_PKEY *pkey);
int X509_up_ref(X509 *x);
int X509_get_signature_type(const X509 *x);
```

```
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define X509_get_notBefore X509_getm_notBefore
#  define X509_get_notAfter X509_getm_notAfter
#  define X509_set_notBefore X509_set1_notBefore
#  define X509_set_notAfter X509_set1_notAfter
#endif


/*
* This one is only used so that a binary form can output, as in
* i2d_X509_PUBKEY(X509_get_X509_PUBKEY(x),
 &buf)
*/
X509_PUBKEY *X509_get_X509_PUBKEY(const X509 *x);
const STACK_OF(X509_EXTENSION) *X509_get0_extensions(const X509 *x);
void X509_get0_uids(const X509 *x, const ASN1_BIT_STRING **piuid,
                    const ASN1_BIT_STRING **psuid);
const X509_ALGOR *X509_get0_tbs_sigalg(const X509 *x);

EVP_PKEY *X509_get0_pubkey(const X509 *x);
EVP_PKEY *X509_get_pubkey(X509 *x);
ASN1_BIT_STRING *X509_get0_pubkey_bitstr(const X509 *x);

#define X509_REQ_VERSION_1 0

long X509_REQ_get_version(const X509_REQ *req);
int X509_REQ_set_version(X509_REQ *x, long version);
X509_NAME *X509_REQ_get_subject_name(const X509_REQ *req);
int X509_REQ_set_subject_name(X509_REQ *req, const X509_NAME *name);
void X509_REQ_get0_signature(const X509_REQ *req, const ASN1_BIT_STRING **psig,
                             const X509_ALGOR **palg);
void X509_REQ_set0_signature(X509_REQ *req, ASN1_BIT_STRING *psig);
int X509_REQ_set1_signature_algo(X509_REQ *req, X509_ALGOR *palg);
int X509_REQ_get_signature_nid(const
 X509_REQ *req);
int i2d_re_X509_REQ_tbs(X509_REQ *req, unsigned char **pp);
int X509_REQ_set_pubkey(X509_REQ *x, EVP_PKEY *pkey);
EVP_PKEY *X509_REQ_get_pubkey(X509_REQ *req);
EVP_PKEY *X509_REQ_get0_pubkey(X509_REQ *req);
X509_PUBKEY *X509_REQ_get_X509_PUBKEY(X509_REQ *req);
int X509_REQ_extension_nid(int nid);
int *X509_REQ_get_extension_nids(void);
void X509_REQ_set_extension_nids(int *nids);
STACK_OF(X509_EXTENSION) *X509_REQ_get_extensions(X509_REQ *req);
int X509_REQ_add_extensions_nid(X509_REQ *req,
                                const STACK_OF(X509_EXTENSION) *exts, int nid);
int X509_REQ_add_extensions(X509_REQ *req, const STACK_OF(X509_EXTENSION) *ext);
```

```
int X509_REQ_get_attr_count(const X509_REQ *req);
int X509_REQ_get_attr_by_NID(const X509_REQ *req, int nid, int lastpos);
int X509_REQ_get_attr_by_OBJ(const X509_REQ *req, const ASN1_OBJECT *obj,
                             int lastpos);
X509_ATTRIBUTE *X509_REQ_get_attr(const X509_REQ *req, int loc);
X509_ATTRIBUTE
 *X509_REQ_delete_attr(X509_REQ *req, int loc);
int X509_REQ_add1_attr(X509_REQ *req, X509_ATTRIBUTE *attr);
int X509_REQ_add1_attr_by_OBJ(X509_REQ *req,
                              const ASN1_OBJECT *obj, int type,
                              const unsigned char *bytes, int len);
int X509_REQ_add1_attr_by_NID(X509_REQ *req,
                              int nid, int type,
                              const unsigned char *bytes, int len);
int X509_REQ_add1_attr_by_txt(X509_REQ *req,
                              const char *attrname, int type,
                              const unsigned char *bytes, int len);

#define X509_CRL_VERSION_1 0
#define X509_CRL_VERSION_2 1

int X509_CRL_set_version(X509_CRL *x, long version);
int X509_CRL_set_issuer_name(X509_CRL *x, const X509_NAME *name);
int X509_CRL_set1_lastUpdate(X509_CRL *x, const ASN1_TIME *tm);
int X509_CRL_set1_nextUpdate(X509_CRL *x, const ASN1_TIME *tm);
int X509_CRL_sort(X509_CRL *crl);
int X509_CRL_up_ref(X509_CRL *crl);

#
 ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define X509_CRL_set_lastUpdate X509_CRL_set1_lastUpdate
#  define X509_CRL_set_nextUpdate X509_CRL_set1_nextUpdate
#endif

long X509_CRL_get_version(const X509_CRL *crl);
const ASN1_TIME *X509_CRL_get0_lastUpdate(const X509_CRL *crl);
const ASN1_TIME *X509_CRL_get0_nextUpdate(const X509_CRL *crl);
#ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 ASN1_TIME *X509_CRL_get_lastUpdate(X509_CRL *crl);
OSSL_DEPRECATEDIN_1_1_0 ASN1_TIME *X509_CRL_get_nextUpdate(X509_CRL *crl);
#endif
X509_NAME *X509_CRL_get_issuer(const X509_CRL *crl);
const STACK_OF(X509_EXTENSION) *X509_CRL_get0_extensions(const X509_CRL *crl);
STACK_OF(X509_REVOKED) *X509_CRL_get_REVOKED(X509_CRL *crl);
void X509_CRL_get0_signature(const X509_CRL *crl, const ASN1_BIT_STRING **psig,
                             const X509_ALGOR **palg);
int X509_CRL_get_signature_nid(const X509_CRL *crl);
int i2d_re_X509_CRL_tbs(X509_CRL *req, unsigned char **pp);
```

```
const ASN1_INTEGER *X509_REVOKED_get0_serialNumber(const
 X509_REVOKED *x);
int X509_REVOKED_set_serialNumber(X509_REVOKED *x, ASN1_INTEGER *serial);
const ASN1_TIME *X509_REVOKED_get0_revocationDate(const X509_REVOKED *x);
int X509_REVOKED_set_revocationDate(X509_REVOKED *r, ASN1_TIME *tm);
const STACK_OF(X509_EXTENSION) *
X509_REVOKED_get0_extensions(const X509_REVOKED *r);

X509_CRL *X509_CRL_diff(X509_CRL *base, X509_CRL *newer,
                        EVP_PKEY *skey, const EVP_MD *md, unsigned int flags);

int X509_REQ_check_private_key(X509_REQ *x509, EVP_PKEY *pkey);

int X509_check_private_key(const X509 *x509, const EVP_PKEY *pkey);
int X509_chain_check_suiteb(int *perror_depth,
                            X509 *x, STACK_OF(X509) *chain,
                            unsigned long flags);
int X509_CRL_check_suiteb(X509_CRL *crl, EVP_PKEY *pk, unsigned long flags);
STACK_OF(X509) *X509_chain_up_ref(STACK_OF(X509) *chain);

int X509_issuer_and_serial_cmp(const X509 *a, const X509 *b);
unsigned long X509_issuer_and_serial_hash(X509
 *a);

int X509_issuer_name_cmp(const X509 *a, const X509 *b);
unsigned long X509_issuer_name_hash(X509 *a);

int X509_subject_name_cmp(const X509 *a, const X509 *b);
unsigned long X509_subject_name_hash(X509 *x);

# ifndef OPENSSL_NO_MD5
unsigned long X509_issuer_name_hash_old(X509 *a);
unsigned long X509_subject_name_hash_old(X509 *x);
# endif

# define X509_ADD_FLAG_DEFAULT  0
# define X509_ADD_FLAG_UP_REF   0x1
# define X509_ADD_FLAG_PREPEND  0x2
# define X509_ADD_FLAG_NO_DUP   0x4
# define X509_ADD_FLAG_NO_SS    0x8
int X509_add_cert(STACK_OF(X509) *sk, X509 *cert, int flags);
int X509_add_certs(STACK_OF(X509) *sk, STACK_OF(X509) *certs, int flags);

int X509_cmp(const X509 *a, const X509 *b);
int X509_NAME_cmp(const X509_NAME *a, const X509_NAME *b);
#ifndef OPENSSL_NO_DEPRECATED_3_0
# define X509_NAME_hash(x) X509_NAME_hash_ex(x, NULL, NULL, NULL)
```

```
OSSL_DEPRECATEDIN_3_0 int X509_certificate_type(const X509 *x,

        const EVP_PKEY *pubkey);
#endif
unsigned long X509_NAME_hash_ex(const X509_NAME *x, OSSL_LIB_CTX *libctx,
                                const char *propq, int *ok);
unsigned long X509_NAME_hash_old(const X509_NAME *x);

int X509_CRL_cmp(const X509_CRL *a, const X509_CRL *b);
int X509_CRL_match(const X509_CRL *a, const X509_CRL *b);
int X509_aux_print(BIO *out, X509 *x, int indent);
# ifndef OPENSSL_NO_STDIO
int X509_print_ex_fp(FILE *bp, X509 *x, unsigned long nmflag,
                     unsigned long cflag);
int X509_print_fp(FILE *bp, X509 *x);
int X509_CRL_print_fp(FILE *bp, X509_CRL *x);
int X509_REQ_print_fp(FILE *bp, X509_REQ *req);
int X509_NAME_print_ex_fp(FILE *fp, const X509_NAME *nm, int indent,
                          unsigned long flags);
# endif

int X509_NAME_print(BIO *bp, const X509_NAME *name, int obase);
int X509_NAME_print_ex(BIO *out, const X509_NAME *nm, int indent,
                       unsigned long flags);
int X509_print_ex(BIO *bp, X509 *x, unsigned
 long nmflag,
                  unsigned long cflag);
int X509_print(BIO *bp, X509 *x);
int X509_ocspid_print(BIO *bp, X509 *x);
int X509_CRL_print_ex(BIO *out, X509_CRL *x, unsigned long nmflag);
int X509_CRL_print(BIO *bp, X509_CRL *x);
int X509_REQ_print_ex(BIO *bp, X509_REQ *x, unsigned long nmflag,
                      unsigned long cflag);
int X509_REQ_print(BIO *bp, X509_REQ *req);

int X509_NAME_entry_count(const X509_NAME *name);
int X509_NAME_get_text_by_NID(const X509_NAME *name, int nid,
                              char *buf, int len);
int X509_NAME_get_text_by_OBJ(const X509_NAME *name, const ASN1_OBJECT *obj,
                              char *buf, int len);

/*
* NOTE: you should be passing -1, not 0 as lastpos. The functions that use
* lastpos, search after that position on.
*/
int X509_NAME_get_index_by_NID(const X509_NAME *name, int nid, int lastpos);
int X509_NAME_get_index_by_OBJ(const X509_NAME *name, const ASN1_OBJECT *obj,
```

```
 int lastpos);
X509_NAME_ENTRY *X509_NAME_get_entry(const X509_NAME *name, int loc);
X509_NAME_ENTRY *X509_NAME_delete_entry(X509_NAME *name, int loc);
int X509_NAME_add_entry(X509_NAME *name, const X509_NAME_ENTRY *ne,
                int loc, int set);
int X509_NAME_add_entry_by_OBJ(X509_NAME *name, const ASN1_OBJECT *obj, int type,
                        const unsigned char *bytes, int len, int loc,
                        int set);
int X509_NAME_add_entry_by_NID(X509_NAME *name, int nid, int type,
                        const unsigned char *bytes, int len, int loc,
                        int set);
X509_NAME_ENTRY *X509_NAME_ENTRY_create_by_txt(X509_NAME_ENTRY **ne,
                                const char *field, int type,
                                const unsigned char *bytes,
                                int len);
X509_NAME_ENTRY *X509_NAME_ENTRY_create_by_NID(X509_NAME_ENTRY **ne, int nid,
                                 int type,
                                const unsigned char *bytes,
                                int len);
int X509_NAME_add_entry_by_txt(X509_NAME *name, const char *field, int type,
                        const unsigned char *bytes, int len, int loc,
                        int set);
X509_NAME_ENTRY *X509_NAME_ENTRY_create_by_OBJ(X509_NAME_ENTRY **ne,
                                const ASN1_OBJECT *obj, int type,
                                const unsigned char *bytes,
                                int len);
int X509_NAME_ENTRY_set_object(X509_NAME_ENTRY *ne, const ASN1_OBJECT *obj);
int X509_NAME_ENTRY_set_data(X509_NAME_ENTRY *ne, int type,
                    const unsigned char *bytes, int len);
ASN1_OBJECT *X509_NAME_ENTRY_get_object(const X509_NAME_ENTRY *ne);
ASN1_STRING * X509_NAME_ENTRY_get_data(const X509_NAME_ENTRY
 *ne);
int X509_NAME_ENTRY_set(const X509_NAME_ENTRY *ne);

int X509_NAME_get0_der(const X509_NAME *nm, const unsigned char **pder,
                size_t *pderlen);

int X509v3_get_ext_count(const STACK_OF(X509_EXTENSION) *x);
int X509v3_get_ext_by_NID(const STACK_OF(X509_EXTENSION) *x,
                int nid, int lastpos);
int X509v3_get_ext_by_OBJ(const STACK_OF(X509_EXTENSION) *x,
                const ASN1_OBJECT *obj, int lastpos);
int X509v3_get_ext_by_critical(const STACK_OF(X509_EXTENSION) *x,
                        int crit, int lastpos);
X509_EXTENSION *X509v3_get_ext(const STACK_OF(X509_EXTENSION) *x, int loc);
X509_EXTENSION *X509v3_delete_ext(STACK_OF(X509_EXTENSION) *x, int loc);
STACK_OF(X509_EXTENSION) *X509v3_add_ext(STACK_OF(X509_EXTENSION) **x,
                            X509_EXTENSION *ex, int loc);
```

```
int X509_get_ext_count(const X509 *x);
int X509_get_ext_by_NID(const X509 *x, int nid, int lastpos);
int X509_get_ext_by_OBJ(const
 X509 *x, const ASN1_OBJECT *obj, int lastpos);
int X509_get_ext_by_critical(const X509 *x, int crit, int lastpos);
X509_EXTENSION *X509_get_ext(const X509 *x, int loc);
X509_EXTENSION *X509_delete_ext(X509 *x, int loc);
int X509_add_ext(X509 *x, X509_EXTENSION *ex, int loc);
void *X509_get_ext_d2i(const X509 *x, int nid, int *crit, int *idx);
int X509_add1_ext_i2d(X509 *x, int nid, void *value, int crit,
                unsigned long flags);

int X509_CRL_get_ext_count(const X509_CRL *x);
int X509_CRL_get_ext_by_NID(const X509_CRL *x, int nid, int lastpos);
int X509_CRL_get_ext_by_OBJ(const X509_CRL *x, const ASN1_OBJECT *obj,
                  int lastpos);
int X509_CRL_get_ext_by_critical(const X509_CRL *x, int crit, int lastpos);
X509_EXTENSION *X509_CRL_get_ext(const X509_CRL *x, int loc);
X509_EXTENSION *X509_CRL_delete_ext(X509_CRL *x, int loc);
int X509_CRL_add_ext(X509_CRL *x, X509_EXTENSION *ex, int loc);
void *X509_CRL_get_ext_d2i(const X509_CRL
 *x, int nid, int *crit, int *idx);
int X509_CRL_add1_ext_i2d(X509_CRL *x, int nid, void *value, int crit,
                unsigned long flags);

int X509_REVOKED_get_ext_count(const X509_REVOKED *x);
int X509_REVOKED_get_ext_by_NID(const X509_REVOKED *x, int nid, int lastpos);
int X509_REVOKED_get_ext_by_OBJ(const X509_REVOKED *x, const ASN1_OBJECT *obj,
                  int lastpos);
int X509_REVOKED_get_ext_by_critical(const X509_REVOKED *x, int crit,
                  int lastpos);
X509_EXTENSION *X509_REVOKED_get_ext(const X509_REVOKED *x, int loc);
X509_EXTENSION *X509_REVOKED_delete_ext(X509_REVOKED *x, int loc);
int X509_REVOKED_add_ext(X509_REVOKED *x, X509_EXTENSION *ex, int loc);
void *X509_REVOKED_get_ext_d2i(const X509_REVOKED *x, int nid, int *crit,
                  int *idx);
int X509_REVOKED_add1_ext_i2d(X509_REVOKED *x, int nid, void *value, int crit,
                  unsigned long flags);

X509_EXTENSION
 *X509_EXTENSION_create_by_NID(X509_EXTENSION **ex,
                  int nid, int crit,
                  ASN1_OCTET_STRING *data);
X509_EXTENSION *X509_EXTENSION_create_by_OBJ(X509_EXTENSION **ex,
                  const ASN1_OBJECT *obj, int crit,
                  ASN1_OCTET_STRING *data);
int X509_EXTENSION_set_object(X509_EXTENSION *ex, const ASN1_OBJECT *obj);
```

```
int X509_EXTENSION_set_critical(X509_EXTENSION *ex, int crit);
int X509_EXTENSION_set_data(X509_EXTENSION *ex, ASN1_OCTET_STRING *data);
ASN1_OBJECT *X509_EXTENSION_get_object(X509_EXTENSION *ex);
ASN1_OCTET_STRING *X509_EXTENSION_get_data(X509_EXTENSION *ne);
int X509_EXTENSION_get_critical(const X509_EXTENSION *ex);

int X509at_get_attr_count(const STACK_OF(X509_ATTRIBUTE) *x);
int X509at_get_attr_by_NID(const STACK_OF(X509_ATTRIBUTE) *x, int nid,
                int lastpos);
int X509at_get_attr_by_OBJ(const
 STACK_OF(X509_ATTRIBUTE) *sk,
                const ASN1_OBJECT *obj, int lastpos);
X509_ATTRIBUTE *X509at_get_attr(const STACK_OF(X509_ATTRIBUTE) *x, int loc);
X509_ATTRIBUTE *X509at_delete_attr(STACK_OF(X509_ATTRIBUTE) *x, int loc);
STACK_OF(X509_ATTRIBUTE) *X509at_add1_attr(STACK_OF(X509_ATTRIBUTE) **x,
                        X509_ATTRIBUTE *attr);
STACK_OF(X509_ATTRIBUTE) *X509at_add1_attr_by_OBJ(STACK_OF(X509_ATTRIBUTE)
                        **x, const ASN1_OBJECT *obj,
                        int type,
                        const unsigned char *bytes,
                        int len);
STACK_OF(X509_ATTRIBUTE) *X509at_add1_attr_by_NID(STACK_OF(X509_ATTRIBUTE)
                        **x, int nid, int type,
                        const unsigned char *bytes,

                int len);
STACK_OF(X509_ATTRIBUTE) *X509at_add1_attr_by_txt(STACK_OF(X509_ATTRIBUTE)
                        **x, const char *attrname,
                        int type,
                        const unsigned char *bytes,
                        int len);
void *X509at_get0_data_by_OBJ(const STACK_OF(X509_ATTRIBUTE) *x,
                const ASN1_OBJECT *obj, int lastpos, int type);
X509_ATTRIBUTE *X509_ATTRIBUTE_create_by_NID(X509_ATTRIBUTE **attr, int nid,
                        int atrtype, const void *data,
                        int len);
X509_ATTRIBUTE *X509_ATTRIBUTE_create_by_OBJ(X509_ATTRIBUTE **attr,
                        const ASN1_OBJECT *obj,
                        int atrtype, const void *data,
                        int len);
X509_ATTRIBUTE
 *X509_ATTRIBUTE_create_by_txt(X509_ATTRIBUTE **attr,
                        const char *atrname, int type,
                        const unsigned char *bytes,
                        int len);
int X509_ATTRIBUTE_set1_object(X509_ATTRIBUTE *attr, const ASN1_OBJECT *obj);
int X509_ATTRIBUTE_set1_data(X509_ATTRIBUTE *attr, int attrtype,
                const void *data, int len);
```

```
void *X509_ATTRIBUTE_get0_data(X509_ATTRIBUTE *attr, int idx, int atrtype,
                               void *data);
int X509_ATTRIBUTE_count(const X509_ATTRIBUTE *attr);
ASN1_OBJECT *X509_ATTRIBUTE_get0_object(X509_ATTRIBUTE *attr);
ASN1_TYPE *X509_ATTRIBUTE_get0_type(X509_ATTRIBUTE *attr, int idx);

int EVP_PKEY_get_attr_count(const EVP_PKEY *key);
int EVP_PKEY_get_attr_by_NID(const EVP_PKEY *key, int nid, int lastpos);
int EVP_PKEY_get_attr_by_OBJ(const EVP_PKEY *key, const ASN1_OBJECT *obj,

      int lastpos);
X509_ATTRIBUTE *EVP_PKEY_get_attr(const EVP_PKEY *key, int loc);
X509_ATTRIBUTE *EVP_PKEY_delete_attr(EVP_PKEY *key, int loc);
int EVP_PKEY_add1_attr(EVP_PKEY *key, X509_ATTRIBUTE *attr);
int EVP_PKEY_add1_attr_by_OBJ(EVP_PKEY *key,
                              const ASN1_OBJECT *obj, int type,
                              const unsigned char *bytes, int len);
int EVP_PKEY_add1_attr_by_NID(EVP_PKEY *key,
                              int nid, int type,
                              const unsigned char *bytes, int len);
int EVP_PKEY_add1_attr_by_txt(EVP_PKEY *key,
                              const char *attrname, int type,
                              const unsigned char *bytes, int len);

/* lookup a cert from a X509 STACK */
X509 *X509_find_by_issuer_and_serial(STACK_OF(X509) *sk, const X509_NAME *name,
                                     const ASN1_INTEGER *serial);
X509 *X509_find_by_subject(STACK_OF(X509) *sk, const X509_NAME *name);

DECLARE_ASN1_FUNCTIONS(PBEPARAM)
DECLARE_ASN1_FUNCTIONS(PBE2PARAM)
DECLARE_ASN1_FUNCTIONS(PBKDF2PARAM)
#ifndef
 OPENSSL_NO_SCRYPT
DECLARE_ASN1_FUNCTIONS(SCRYPT_PARAMS)
#endif

int PKCS5_pbe_set0_algor(X509_ALGOR *algor, int alg, int iter,
                         const unsigned char *salt, int saltlen);
int PKCS5_pbe_set0_algor_ex(X509_ALGOR *algor, int alg, int iter,
                            const unsigned char *salt, int saltlen,
                            OSSL_LIB_CTX *libctx);

X509_ALGOR *PKCS5_pbe_set(int alg, int iter,
                          const unsigned char *salt, int saltlen);
X509_ALGOR *PKCS5_pbe_set_ex(int alg, int iter,
                             const unsigned char *salt, int saltlen,
                             OSSL_LIB_CTX *libctx);
```

```
X509_ALGOR *PKCS5_pbe2_set(const EVP_CIPHER *cipher, int iter,
                           unsigned char *salt, int saltlen);
X509_ALGOR *PKCS5_pbe2_set_iv(const EVP_CIPHER *cipher, int iter,
                              unsigned char *salt, int saltlen,
                              unsigned char *aiv, int prf_nid);
X509_ALGOR *PKCS5_pbe2_set_iv_ex(const EVP_CIPHER *cipher, int iter,
                                 unsigned char *salt, int saltlen,
                                 unsigned char *aiv, int prf_nid,
                                 OSSL_LIB_CTX *libctx);

#ifndef OPENSSL_NO_SCRYPT
X509_ALGOR *PKCS5_pbe2_set_scrypt(const EVP_CIPHER *cipher,
                                  const unsigned char *salt, int saltlen,
                                  unsigned char *aiv, uint64_t N, uint64_t r,
                                  uint64_t p);
#endif

X509_ALGOR *PKCS5_pbkdf2_set(int iter, unsigned char *salt, int saltlen,
                             int prf_nid, int keylen);
X509_ALGOR *PKCS5_pbkdf2_set_ex(int iter, unsigned char *salt, int saltlen,
                                int prf_nid, int keylen,
                                OSSL_LIB_CTX *libctx);

/* PKCS#8 utilities */

DECLARE_ASN1_FUNCTIONS(PKCS8_PRIV_KEY_INFO)

EVP_PKEY
 *EVP_PKCS82PKEY(const PKCS8_PRIV_KEY_INFO *p8);
EVP_PKEY *EVP_PKCS82PKEY_ex(const PKCS8_PRIV_KEY_INFO *p8, OSSL_LIB_CTX *libctx,
                            const char *propq);
PKCS8_PRIV_KEY_INFO *EVP_PKEY2PKCS8(const EVP_PKEY *pkey);

int PKCS8_pkey_set0(PKCS8_PRIV_KEY_INFO *priv, ASN1_OBJECT *aobj,
                    int version, int ptype, void *pval,
                    unsigned char *penc, int penclen);
int PKCS8_pkey_get0(const ASN1_OBJECT **ppkalg,
                    const unsigned char **pk, int *ppklen,
                    const X509_ALGOR **pa, const PKCS8_PRIV_KEY_INFO *p8);

const STACK_OF(X509_ATTRIBUTE) *
PKCS8_pkey_get0_attrs(const PKCS8_PRIV_KEY_INFO *p8);
int PKCS8_pkey_add1_attr(PKCS8_PRIV_KEY_INFO *p8, X509_ATTRIBUTE *attr);
int PKCS8_pkey_add1_attr_by_NID(PKCS8_PRIV_KEY_INFO *p8, int nid, int type,
                                const unsigned char *bytes, int len);
int PKCS8_pkey_add1_attr_by_OBJ(PKCS8_PRIV_KEY_INFO *p8, const ASN1_OBJECT *obj,
```

```
                        int type, const unsigned char *bytes, int len);


int X509_PUBKEY_set0_param(X509_PUBKEY *pub, ASN1_OBJECT *aobj,
                           int ptype, void *pval,
                           unsigned char *penc, int penclen);
int X509_PUBKEY_get0_param(ASN1_OBJECT **ppkalg,
                           const unsigned char **pk, int *ppklen,
                           X509_ALGOR **pa, const X509_PUBKEY *pub);
int X509_PUBKEY_eq(const X509_PUBKEY *a, const X509_PUBKEY *b);

# ifdef  __cplusplus
}
# endif
#endif
BSD-2-Clause
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/cms.h.in
*
* Copyright 2008-2021 The OpenSSL Project Authors. All Rights Reserved.
*
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_CMS_H
# define OPENSSL_CMS_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_CMS_H
# endif

# include <openssl/opensslconf.h>

# ifndef OPENSSL_NO_CMS
# include <openssl/x509.h>
# include <openssl/x509v3.h>
# include <openssl/cmserr.h>
# ifdef __cplusplus
extern "C" {
# endif
```

```
typedef struct CMS_ContentInfo_st CMS_ContentInfo;
typedef struct CMS_SignerInfo_st CMS_SignerInfo;
typedef struct CMS_CertificateChoices CMS_CertificateChoices;
typedef struct CMS_RevocationInfoChoice_st CMS_RevocationInfoChoice;
typedef
 struct CMS_RecipientInfo_st CMS_RecipientInfo;
typedef struct CMS_ReceiptRequest_st CMS_ReceiptRequest;
typedef struct CMS_Receipt_st CMS_Receipt;
typedef struct CMS_RecipientEncryptedKey_st CMS_RecipientEncryptedKey;
typedef struct CMS_OtherKeyAttribute_st CMS_OtherKeyAttribute;

SKM_DEFINE_STACK_OF_INTERNAL(CMS_SignerInfo, CMS_SignerInfo, CMS_SignerInfo)
#define sk_CMS_SignerInfo_num(sk) OPENSSL_sk_num(ossl_check_const_CMS_SignerInfo_sk_type(sk))
#define sk_CMS_SignerInfo_value(sk, idx) ((CMS_SignerInfo
*)OPENSSL_sk_value(ossl_check_const_CMS_SignerInfo_sk_type(sk), (idx)))
#define sk_CMS_SignerInfo_new(cmp) ((STACK_OF(CMS_SignerInfo)
*)OPENSSL_sk_new(ossl_check_CMS_SignerInfo_compfunc_type(cmp)))
#define sk_CMS_SignerInfo_new_null() ((STACK_OF(CMS_SignerInfo) *)OPENSSL_sk_new_null())
#define sk_CMS_SignerInfo_new_reserve(cmp, n) ((STACK_OF(CMS_SignerInfo)
*)OPENSSL_sk_new_reserve(ossl_check_CMS_SignerInfo_compfunc_type(cmp), (n)))
#define sk_CMS_SignerInfo_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_CMS_SignerInfo_sk_type(sk),
 (n))
#define sk_CMS_SignerInfo_free(sk) OPENSSL_sk_free(ossl_check_CMS_SignerInfo_sk_type(sk))
#define sk_CMS_SignerInfo_zero(sk) OPENSSL_sk_zero(ossl_check_CMS_SignerInfo_sk_type(sk))
#define sk_CMS_SignerInfo_delete(sk, i) ((CMS_SignerInfo
*)OPENSSL_sk_delete(ossl_check_CMS_SignerInfo_sk_type(sk), (i)))
#define sk_CMS_SignerInfo_delete_ptr(sk, ptr) ((CMS_SignerInfo
*)OPENSSL_sk_delete_ptr(ossl_check_CMS_SignerInfo_sk_type(sk), ossl_check_CMS_SignerInfo_type(ptr)))
#define sk_CMS_SignerInfo_push(sk, ptr) OPENSSL_sk_push(ossl_check_CMS_SignerInfo_sk_type(sk),
ossl_check_CMS_SignerInfo_type(ptr))
#define sk_CMS_SignerInfo_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_CMS_SignerInfo_sk_type(sk),
ossl_check_CMS_SignerInfo_type(ptr))
#define sk_CMS_SignerInfo_pop(sk) ((CMS_SignerInfo
*)OPENSSL_sk_pop(ossl_check_CMS_SignerInfo_sk_type(sk)))
#define sk_CMS_SignerInfo_shift(sk) ((CMS_SignerInfo
*)OPENSSL_sk_shift(ossl_check_CMS_SignerInfo_sk_type(sk)))
#define
 sk_CMS_SignerInfo_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_CMS_SignerInfo_sk_type(sk),ossl_check_CMS_SignerInfo_freefunc_type(fre
efunc))
#define sk_CMS_SignerInfo_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_CMS_SignerInfo_sk_type(sk),
ossl_check_CMS_SignerInfo_type(ptr), (idx))
#define sk_CMS_SignerInfo_set(sk, idx, ptr) ((CMS_SignerInfo
*)OPENSSL_sk_set(ossl_check_CMS_SignerInfo_sk_type(sk), (idx), ossl_check_CMS_SignerInfo_type(ptr)))
#define sk_CMS_SignerInfo_find(sk, ptr) OPENSSL_sk_find(ossl_check_CMS_SignerInfo_sk_type(sk),
ossl_check_CMS_SignerInfo_type(ptr))
#define sk_CMS_SignerInfo_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_CMS_SignerInfo_sk_type(sk),
```

```
ossl_check_CMS_SignerInfo_type(ptr))
#define sk_CMS_SignerInfo_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_CMS_SignerInfo_sk_type(sk), ossl_check_CMS_SignerInfo_type(ptr), pnum)
#define sk_CMS_SignerInfo_sort(sk) OPENSSL_sk_sort(ossl_check_CMS_SignerInfo_sk_type(sk))
#define sk_CMS_SignerInfo_is_sorted(sk)
 OPENSSL_sk_is_sorted(ossl_check_const_CMS_SignerInfo_sk_type(sk))
#define sk_CMS_SignerInfo_dup(sk) ((STACK_OF(CMS_SignerInfo)
*)OPENSSL_sk_dup(ossl_check_const_CMS_SignerInfo_sk_type(sk)))
#define sk_CMS_SignerInfo_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(CMS_SignerInfo)
*)OPENSSL_sk_deep_copy(ossl_check_const_CMS_SignerInfo_sk_type(sk),
ossl_check_CMS_SignerInfo_copyfunc_type(copyfunc), ossl_check_CMS_SignerInfo_freefunc_type(freefunc)))
#define sk_CMS_SignerInfo_set_cmp_func(sk, cmp)
((sk_CMS_SignerInfo_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_CMS_SignerInfo_sk_type(sk),
ossl_check_CMS_SignerInfo_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(CMS_RecipientEncryptedKey, CMS_RecipientEncryptedKey,
CMS_RecipientEncryptedKey)
#define sk_CMS_RecipientEncryptedKey_num(sk)
OPENSSL_sk_num(ossl_check_const_CMS_RecipientEncryptedKey_sk_type(sk))
#define sk_CMS_RecipientEncryptedKey_value(sk, idx) ((CMS_RecipientEncryptedKey
*)OPENSSL_sk_value(ossl_check_const_CMS_RecipientEncryptedKey_sk_type(sk),
 (idx)))
#define sk_CMS_RecipientEncryptedKey_new(cmp) ((STACK_OF(CMS_RecipientEncryptedKey)
*)OPENSSL_sk_new(ossl_check_CMS_RecipientEncryptedKey_compfunc_type(cmp)))
#define sk_CMS_RecipientEncryptedKey_new_null() ((STACK_OF(CMS_RecipientEncryptedKey)
*)OPENSSL_sk_new_null())
#define sk_CMS_RecipientEncryptedKey_new_reserve(cmp, n) ((STACK_OF(CMS_RecipientEncryptedKey)
*)OPENSSL_sk_new_reserve(ossl_check_CMS_RecipientEncryptedKey_compfunc_type(cmp), (n)))
#define sk_CMS_RecipientEncryptedKey_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk), (n))
#define sk_CMS_RecipientEncryptedKey_free(sk)
OPENSSL_sk_free(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk))
#define sk_CMS_RecipientEncryptedKey_zero(sk)
OPENSSL_sk_zero(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk))
#define sk_CMS_RecipientEncryptedKey_delete(sk, i) ((CMS_RecipientEncryptedKey
*)OPENSSL_sk_delete(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
 (i)))
#define sk_CMS_RecipientEncryptedKey_delete_ptr(sk, ptr) ((CMS_RecipientEncryptedKey
*)OPENSSL_sk_delete_ptr(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr)))
#define sk_CMS_RecipientEncryptedKey_push(sk, ptr)
OPENSSL_sk_push(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr))
#define sk_CMS_RecipientEncryptedKey_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr))
#define sk_CMS_RecipientEncryptedKey_pop(sk) ((CMS_RecipientEncryptedKey
*)OPENSSL_sk_pop(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk)))
#define sk_CMS_RecipientEncryptedKey_shift(sk) ((CMS_RecipientEncryptedKey
```

*)OPENSSL_sk_shift(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk)))
#define sk_CMS_RecipientEncryptedKey_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),ossl_check_CMS_RecipientEncryptedKey_freefunc_type(freefunc))
#define
sk_CMS_RecipientEncryptedKey_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr), (idx))
#define sk_CMS_RecipientEncryptedKey_set(sk, idx, ptr) ((CMS_RecipientEncryptedKey
*)OPENSSL_sk_set(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk), (idx),
ossl_check_CMS_RecipientEncryptedKey_type(ptr)))
#define sk_CMS_RecipientEncryptedKey_find(sk, ptr)
OPENSSL_sk_find(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr))
#define sk_CMS_RecipientEncryptedKey_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr))
#define sk_CMS_RecipientEncryptedKey_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_type(ptr), pnum)
#define sk_CMS_RecipientEncryptedKey_sort(sk)
OPENSSL_sk_sort(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk))
#define
sk_CMS_RecipientEncryptedKey_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_CMS_RecipientEncryptedKey_sk_type(sk))
#define sk_CMS_RecipientEncryptedKey_dup(sk) ((STACK_OF(CMS_RecipientEncryptedKey)
*)OPENSSL_sk_dup(ossl_check_const_CMS_RecipientEncryptedKey_sk_type(sk)))
#define sk_CMS_RecipientEncryptedKey_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(CMS_RecipientEncryptedKey)
*)OPENSSL_sk_deep_copy(ossl_check_const_CMS_RecipientEncryptedKey_sk_type(sk),
ossl_check_CMS_RecipientEncryptedKey_copyfunc_type(copyfunc),
ossl_check_CMS_RecipientEncryptedKey_freefunc_type(freefunc)))
#define sk_CMS_RecipientEncryptedKey_set_cmp_func(sk, cmp)
((sk_CMS_RecipientEncryptedKey_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_CMS_RecipientEncryptedKey_sk_type(sk), ossl_check_CMS_RecipientEncryptedKey_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(CMS_RecipientInfo, CMS_RecipientInfo, CMS_RecipientInfo)
#define sk_CMS_RecipientInfo_num(sk)
OPENSSL_sk_num(ossl_check_const_CMS_RecipientInfo_sk_type(sk))
#define sk_CMS_RecipientInfo_value(sk, idx) ((CMS_RecipientInfo
*)OPENSSL_sk_value(ossl_check_const_CMS_RecipientInfo_sk_type(sk), (idx)))
#define sk_CMS_RecipientInfo_new(cmp) ((STACK_OF(CMS_RecipientInfo)
*)OPENSSL_sk_new(ossl_check_CMS_RecipientInfo_compfunc_type(cmp)))
#define sk_CMS_RecipientInfo_new_null() ((STACK_OF(CMS_RecipientInfo) *)OPENSSL_sk_new_null())
#define sk_CMS_RecipientInfo_new_reserve(cmp, n) ((STACK_OF(CMS_RecipientInfo)
*)OPENSSL_sk_new_reserve(ossl_check_CMS_RecipientInfo_compfunc_type(cmp), (n)))
#define sk_CMS_RecipientInfo_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_CMS_RecipientInfo_sk_type(sk), (n))
#define sk_CMS_RecipientInfo_free(sk) OPENSSL_sk_free(ossl_check_CMS_RecipientInfo_sk_type(sk))

```
#define sk_CMS_RecipientInfo_zero(sk) OPENSSL_sk_zero(ossl_check_CMS_RecipientInfo_sk_type(sk))
#define sk_CMS_RecipientInfo_delete(sk, i) ((CMS_RecipientInfo
*)OPENSSL_sk_delete(ossl_check_CMS_RecipientInfo_sk_type(sk),
 (i)))
#define sk_CMS_RecipientInfo_delete_ptr(sk, ptr) ((CMS_RecipientInfo
*)OPENSSL_sk_delete_ptr(ossl_check_CMS_RecipientInfo_sk_type(sk),
ossl_check_CMS_RecipientInfo_type(ptr)))
#define sk_CMS_RecipientInfo_push(sk, ptr) OPENSSL_sk_push(ossl_check_CMS_RecipientInfo_sk_type(sk),
ossl_check_CMS_RecipientInfo_type(ptr))
#define sk_CMS_RecipientInfo_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_CMS_RecipientInfo_sk_type(sk), ossl_check_CMS_RecipientInfo_type(ptr))
#define sk_CMS_RecipientInfo_pop(sk) ((CMS_RecipientInfo
*)OPENSSL_sk_pop(ossl_check_CMS_RecipientInfo_sk_type(sk)))
#define sk_CMS_RecipientInfo_shift(sk) ((CMS_RecipientInfo
*)OPENSSL_sk_shift(ossl_check_CMS_RecipientInfo_sk_type(sk)))
#define sk_CMS_RecipientInfo_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_CMS_RecipientInfo_sk_type(sk),ossl_check_CMS_RecipientInfo_freefunc_ty
pe(freefunc))
#define sk_CMS_RecipientInfo_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_CMS_RecipientInfo_sk_type(sk),
 ossl_check_CMS_RecipientInfo_type(ptr), (idx))
#define sk_CMS_RecipientInfo_set(sk, idx, ptr) ((CMS_RecipientInfo
*)OPENSSL_sk_set(ossl_check_CMS_RecipientInfo_sk_type(sk), (idx),
ossl_check_CMS_RecipientInfo_type(ptr)))
#define sk_CMS_RecipientInfo_find(sk, ptr) OPENSSL_sk_find(ossl_check_CMS_RecipientInfo_sk_type(sk),
ossl_check_CMS_RecipientInfo_type(ptr))
#define sk_CMS_RecipientInfo_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_CMS_RecipientInfo_sk_type(sk), ossl_check_CMS_RecipientInfo_type(ptr))
#define sk_CMS_RecipientInfo_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_CMS_RecipientInfo_sk_type(sk), ossl_check_CMS_RecipientInfo_type(ptr),
pnum)
#define sk_CMS_RecipientInfo_sort(sk) OPENSSL_sk_sort(ossl_check_CMS_RecipientInfo_sk_type(sk))
#define sk_CMS_RecipientInfo_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_CMS_RecipientInfo_sk_type(sk))
#define sk_CMS_RecipientInfo_dup(sk) ((STACK_OF(CMS_RecipientInfo)
*)OPENSSL_sk_dup(ossl_check_const_CMS_RecipientInfo_sk_type(sk)))
#define
 sk_CMS_RecipientInfo_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(CMS_RecipientInfo)
*)OPENSSL_sk_deep_copy(ossl_check_const_CMS_RecipientInfo_sk_type(sk),
ossl_check_CMS_RecipientInfo_copyfunc_type(copyfunc),
ossl_check_CMS_RecipientInfo_freefunc_type(freefunc)))
#define sk_CMS_RecipientInfo_set_cmp_func(sk, cmp)
((sk_CMS_RecipientInfo_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_CMS_RecipientInfo_sk_type(sk),
ossl_check_CMS_RecipientInfo_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(CMS_RevocationInfoChoice, CMS_RevocationInfoChoice,
CMS_RevocationInfoChoice)
#define sk_CMS_RevocationInfoChoice_num(sk)
OPENSSL_sk_num(ossl_check_const_CMS_RevocationInfoChoice_sk_type(sk))
```

```
#define sk_CMS_RevocationInfoChoice_value(sk, idx) ((CMS_RevocationInfoChoice
*)OPENSSL_sk_value(ossl_check_const_CMS_RevocationInfoChoice_sk_type(sk), (idx)))
#define sk_CMS_RevocationInfoChoice_new(cmp) ((STACK_OF(CMS_RevocationInfoChoice)
*)OPENSSL_sk_new(ossl_check_CMS_RevocationInfoChoice_compfunc_type(cmp)))
#define
 sk_CMS_RevocationInfoChoice_new_null() ((STACK_OF(CMS_RevocationInfoChoice)
*)OPENSSL_sk_new_null())
#define sk_CMS_RevocationInfoChoice_new_reserve(cmp, n) ((STACK_OF(CMS_RevocationInfoChoice)
*)OPENSSL_sk_new_reserve(ossl_check_CMS_RevocationInfoChoice_compfunc_type(cmp), (n)))
#define sk_CMS_RevocationInfoChoice_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_CMS_RevocationInfoChoice_sk_type(sk), (n))
#define sk_CMS_RevocationInfoChoice_free(sk)
OPENSSL_sk_free(ossl_check_CMS_RevocationInfoChoice_sk_type(sk))
#define sk_CMS_RevocationInfoChoice_zero(sk)
OPENSSL_sk_zero(ossl_check_CMS_RevocationInfoChoice_sk_type(sk))
#define sk_CMS_RevocationInfoChoice_delete(sk, i) ((CMS_RevocationInfoChoice
*)OPENSSL_sk_delete(ossl_check_CMS_RevocationInfoChoice_sk_type(sk), (i)))
#define sk_CMS_RevocationInfoChoice_delete_ptr(sk, ptr) ((CMS_RevocationInfoChoice
*)OPENSSL_sk_delete_ptr(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr)))
#define
 sk_CMS_RevocationInfoChoice_push(sk, ptr)
OPENSSL_sk_push(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr))
#define sk_CMS_RevocationInfoChoice_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr))
#define sk_CMS_RevocationInfoChoice_pop(sk) ((CMS_RevocationInfoChoice
*)OPENSSL_sk_pop(ossl_check_CMS_RevocationInfoChoice_sk_type(sk)))
#define sk_CMS_RevocationInfoChoice_shift(sk) ((CMS_RevocationInfoChoice
*)OPENSSL_sk_shift(ossl_check_CMS_RevocationInfoChoice_sk_type(sk)))
#define sk_CMS_RevocationInfoChoice_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),ossl_check_CMS_RevocationInfoC
hoice_freefunc_type(freefunc))
#define sk_CMS_RevocationInfoChoice_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr), (idx))
#define
 sk_CMS_RevocationInfoChoice_set(sk, idx, ptr) ((CMS_RevocationInfoChoice
*)OPENSSL_sk_set(ossl_check_CMS_RevocationInfoChoice_sk_type(sk), (idx),
ossl_check_CMS_RevocationInfoChoice_type(ptr)))
#define sk_CMS_RevocationInfoChoice_find(sk, ptr)
OPENSSL_sk_find(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr))
#define sk_CMS_RevocationInfoChoice_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr))
#define sk_CMS_RevocationInfoChoice_find_all(sk, ptr, pnum)
```

```
OPENSSL_sk_find_all(ossl_check_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_type(ptr), pnum)
#define sk_CMS_RevocationInfoChoice_sort(sk)
OPENSSL_sk_sort(ossl_check_CMS_RevocationInfoChoice_sk_type(sk))
#define sk_CMS_RevocationInfoChoice_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_CMS_RevocationInfoChoice_sk_type(sk))
#define sk_CMS_RevocationInfoChoice_dup(sk) ((STACK_OF(CMS_RevocationInfoChoice)
 *)OPENSSL_sk_dup(ossl_check_const_CMS_RevocationInfoChoice_sk_type(sk)))
#define sk_CMS_RevocationInfoChoice_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(CMS_RevocationInfoChoice)
*)OPENSSL_sk_deep_copy(ossl_check_const_CMS_RevocationInfoChoice_sk_type(sk),
ossl_check_CMS_RevocationInfoChoice_copyfunc_type(copyfunc),
ossl_check_CMS_RevocationInfoChoice_freefunc_type(freefunc)))
#define sk_CMS_RevocationInfoChoice_set_cmp_func(sk, cmp)
((sk_CMS_RevocationInfoChoice_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_CMS_RevocationInfoChoi
ce_sk_type(sk), ossl_check_CMS_RevocationInfoChoice_compfunc_type(cmp)))


DECLARE_ASN1_FUNCTIONS(CMS_ContentInfo)
DECLARE_ASN1_FUNCTIONS(CMS_ReceiptRequest)
DECLARE_ASN1_PRINT_FUNCTION(CMS_ContentInfo)

CMS_ContentInfo *CMS_ContentInfo_new_ex(OSSL_LIB_CTX *libctx, const char *propq);

# define CMS_SIGNERINFO_ISSUER_SERIAL    0
# define CMS_SIGNERINFO_KEYIDENTIFIER    1

# define CMS_RECIPINFO_NONE            -1
# define CMS_RECIPINFO_TRANS
          0
# define CMS_RECIPINFO_AGREE            1
# define CMS_RECIPINFO_KEK             2
# define CMS_RECIPINFO_PASS            3
# define CMS_RECIPINFO_OTHER            4

/* S/MIME related flags */

# define CMS_TEXT                    0x1
# define CMS_NOCERTS                 0x2
# define CMS_NO_CONTENT_VERIFY         0x4
# define CMS_NO_ATTR_VERIFY            0x8
# define CMS_NOSIGS                  \
                (CMS_NO_CONTENT_VERIFY|CMS_NO_ATTR_VERIFY)
# define CMS_NOINTERN                0x10
# define CMS_NO_SIGNER_CERT_VERIFY      0x20
# define CMS_NOVERIFY                0x20
# define CMS_DETACHED                 0x40
# define CMS_BINARY                  0x80
```

```
# define CMS_NOATTR                  0x100
# define CMS_NOSMIMECAP              0x200
# define CMS_NOOLDMIMETYPE           0x400
# define CMS_CRLFEOL                 0x800
# define CMS_STREAM                  0x1000
# define CMS_NOCRL
                0x2000
# define CMS_PARTIAL                 0x4000
# define CMS_REUSE_DIGEST            0x8000
# define CMS_USE_KEYID               0x10000
# define CMS_DEBUG_DECRYPT           0x20000
# define CMS_KEY_PARAM               0x40000
# define CMS_ASCIICRLF               0x80000
# define CMS_CADES                   0x100000
# define CMS_USE_ORIGINATOR_KEYID    0x200000

const ASN1_OBJECT *CMS_get0_type(const CMS_ContentInfo *cms);

BIO *CMS_dataInit(CMS_ContentInfo *cms, BIO *icont);
int CMS_dataFinal(CMS_ContentInfo *cms, BIO *bio);

ASN1_OCTET_STRING **CMS_get0_content(CMS_ContentInfo *cms);
int CMS_is_detached(CMS_ContentInfo *cms);
int CMS_set_detached(CMS_ContentInfo *cms, int detached);

# ifdef OPENSSL_PEM_H
DECLARE_PEM_rw(CMS, CMS_ContentInfo)
# endif
int CMS_stream(unsigned char ***boundary, CMS_ContentInfo *cms);
CMS_ContentInfo *d2i_CMS_bio(BIO *bp, CMS_ContentInfo **cms);
int i2d_CMS_bio(BIO *bp, CMS_ContentInfo *cms);

BIO *BIO_new_CMS(BIO
 *out, CMS_ContentInfo *cms);
int i2d_CMS_bio_stream(BIO *out, CMS_ContentInfo *cms, BIO *in, int flags);
int PEM_write_bio_CMS_stream(BIO *out, CMS_ContentInfo *cms, BIO *in,
                     int flags);
CMS_ContentInfo *SMIME_read_CMS(BIO *bio, BIO **bcont);
CMS_ContentInfo *SMIME_read_CMS_ex(BIO *bio, int flags, BIO **bcont, CMS_ContentInfo **ci);
int SMIME_write_CMS(BIO *bio, CMS_ContentInfo *cms, BIO *data, int flags);

int CMS_final(CMS_ContentInfo *cms, BIO *data, BIO *dcont,
          unsigned int flags);

CMS_ContentInfo *CMS_sign(X509 *signcert, EVP_PKEY *pkey,
                    STACK_OF(X509) *certs, BIO *data,
                    unsigned int flags);
CMS_ContentInfo *CMS_sign_ex(X509 *signcert, EVP_PKEY *pkey,
```

```
                    STACK_OF(X509) *certs, BIO *data,
                    unsigned int flags, OSSL_LIB_CTX *ctx,
                    const char *propq);

CMS_ContentInfo *CMS_sign_receipt(CMS_SignerInfo
 *si,
                        X509 *signcert, EVP_PKEY *pkey,
                        STACK_OF(X509) *certs, unsigned int flags);

int CMS_data(CMS_ContentInfo *cms, BIO *out, unsigned int flags);
CMS_ContentInfo *CMS_data_create(BIO *in, unsigned int flags);
CMS_ContentInfo *CMS_data_create_ex(BIO *in, unsigned int flags,
                         OSSL_LIB_CTX *ctx, const char *propq);

int CMS_digest_verify(CMS_ContentInfo *cms, BIO *dcont, BIO *out,
                unsigned int flags);
CMS_ContentInfo *CMS_digest_create(BIO *in, const EVP_MD *md,
                         unsigned int flags);
CMS_ContentInfo *CMS_digest_create_ex(BIO *in, const EVP_MD *md,
                           unsigned int flags, OSSL_LIB_CTX *ctx,
                           const char *propq);

int CMS_EncryptedData_decrypt(CMS_ContentInfo *cms,
                      const unsigned char *key, size_t keylen,

    BIO *dcont, BIO *out, unsigned int flags);

CMS_ContentInfo *CMS_EncryptedData_encrypt(BIO *in, const EVP_CIPHER *cipher,
                                const unsigned char *key,
                                size_t keylen, unsigned int flags);
CMS_ContentInfo *CMS_EncryptedData_encrypt_ex(BIO *in, const EVP_CIPHER *cipher,
                                  const unsigned char *key,
                                  size_t keylen, unsigned int flags,
                                  OSSL_LIB_CTX *ctx,
                                  const char *propq);

int CMS_EncryptedData_set1_key(CMS_ContentInfo *cms, const EVP_CIPHER *ciph,
                      const unsigned char *key, size_t keylen);

int CMS_verify(CMS_ContentInfo *cms, STACK_OF(X509) *certs,
           X509_STORE *store, BIO *dcont, BIO *out, unsigned int flags);

int CMS_verify_receipt(CMS_ContentInfo *rcms, CMS_ContentInfo *ocms,

                STACK_OF(X509) *certs,
                X509_STORE *store, unsigned int flags);

STACK_OF(X509) *CMS_get0_signers(CMS_ContentInfo *cms);
```

```
CMS_ContentInfo *CMS_encrypt(STACK_OF(X509) *certs, BIO *in,
                             const EVP_CIPHER *cipher, unsigned int flags);
CMS_ContentInfo *CMS_encrypt_ex(STACK_OF(X509) *certs, BIO *in,
                                const EVP_CIPHER *cipher, unsigned int flags,
                                OSSL_LIB_CTX *ctx, const char *propq);

int CMS_decrypt(CMS_ContentInfo *cms, EVP_PKEY *pkey, X509 *cert,
                BIO *dcont, BIO *out, unsigned int flags);

int CMS_decrypt_set1_pkey(CMS_ContentInfo *cms, EVP_PKEY *pk, X509 *cert);
int CMS_decrypt_set1_pkey_and_peer(CMS_ContentInfo *cms, EVP_PKEY *pk,
                                   X509 *cert, X509 *peer);
int CMS_decrypt_set1_key(CMS_ContentInfo *cms,
                         unsigned char *key, size_t keylen,
                         const unsigned char
 *id, size_t idlen);
int CMS_decrypt_set1_password(CMS_ContentInfo *cms,
                              unsigned char *pass, ossl_ssize_t passlen);

STACK_OF(CMS_RecipientInfo) *CMS_get0_RecipientInfos(CMS_ContentInfo *cms);
int CMS_RecipientInfo_type(CMS_RecipientInfo *ri);
EVP_PKEY_CTX *CMS_RecipientInfo_get0_pkey_ctx(CMS_RecipientInfo *ri);
CMS_ContentInfo *CMS_AuthEnvelopedData_create(const EVP_CIPHER *cipher);
CMS_ContentInfo *
CMS_AuthEnvelopedData_create_ex(const EVP_CIPHER *cipher, OSSL_LIB_CTX *ctx,
                                const char *propq);
CMS_ContentInfo *CMS_EnvelopedData_create(const EVP_CIPHER *cipher);
CMS_ContentInfo *CMS_EnvelopedData_create_ex(const EVP_CIPHER *cipher,
                                             OSSL_LIB_CTX *ctx,
                                             const char *propq);

CMS_RecipientInfo *CMS_add1_recipient_cert(CMS_ContentInfo *cms,
                                           X509 *recip, unsigned int flags);
CMS_RecipientInfo *CMS_add1_recipient(CMS_ContentInfo
 *cms, X509 *recip,
   EVP_PKEY *originatorPrivKey, X509 * originator, unsigned int flags);
int CMS_RecipientInfo_set0_pkey(CMS_RecipientInfo *ri, EVP_PKEY *pkey);
int CMS_RecipientInfo_ktri_cert_cmp(CMS_RecipientInfo *ri, X509 *cert);
int CMS_RecipientInfo_ktri_get0_algs(CMS_RecipientInfo *ri,
                                     EVP_PKEY **pk, X509 **recip,
                                     X509_ALGOR **palg);
int CMS_RecipientInfo_ktri_get0_signer_id(CMS_RecipientInfo *ri,
                                          ASN1_OCTET_STRING **keyid,
                                          X509_NAME **issuer,
                                          ASN1_INTEGER **sno);

CMS_RecipientInfo *CMS_add0_recipient_key(CMS_ContentInfo *cms, int nid,
```

```
                                unsigned char *key, size_t keylen,
                                unsigned char *id, size_t idlen,
                                ASN1_GENERALIZEDTIME *date,
                                 ASN1_OBJECT *otherTypeId,
                                ASN1_TYPE *otherType);

int CMS_RecipientInfo_kekri_get0_id(CMS_RecipientInfo *ri,
                        X509_ALGOR **palg,
                        ASN1_OCTET_STRING **pid,
                        ASN1_GENERALIZEDTIME **pdate,
                        ASN1_OBJECT **potherid,
                        ASN1_TYPE **pothertype);

int CMS_RecipientInfo_set0_key(CMS_RecipientInfo *ri,
                    unsigned char *key, size_t keylen);

int CMS_RecipientInfo_kekri_id_cmp(CMS_RecipientInfo *ri,
                        const unsigned char *id, size_t idlen);

int CMS_RecipientInfo_set0_password(CMS_RecipientInfo *ri,
                        unsigned char *pass,
                        ossl_ssize_t passlen);

CMS_RecipientInfo *CMS_add0_recipient_password(CMS_ContentInfo *cms,
                                 int iter, int wrap_nid,
                                int pbe_nid,
                                unsigned char *pass,
                                ossl_ssize_t passlen,
                                const EVP_CIPHER *kekciph);

int CMS_RecipientInfo_decrypt(CMS_ContentInfo *cms, CMS_RecipientInfo *ri);
int CMS_RecipientInfo_encrypt(const CMS_ContentInfo *cms, CMS_RecipientInfo *ri);

int CMS_uncompress(CMS_ContentInfo *cms, BIO *dcont, BIO *out,
            unsigned int flags);
CMS_ContentInfo *CMS_compress(BIO *in, int comp_nid, unsigned int flags);

int CMS_set1_eContentType(CMS_ContentInfo *cms, const ASN1_OBJECT *oid);
const ASN1_OBJECT *CMS_get0_eContentType(CMS_ContentInfo *cms);

CMS_CertificateChoices *CMS_add0_CertificateChoices(CMS_ContentInfo *cms);
int CMS_add0_cert(CMS_ContentInfo *cms, X509 *cert);
int CMS_add1_cert(CMS_ContentInfo *cms, X509 *cert);
STACK_OF(X509)
 *CMS_get1_certs(CMS_ContentInfo *cms);

CMS_RevocationInfoChoice *CMS_add0_RevocationInfoChoice(CMS_ContentInfo *cms);
int CMS_add0_crl(CMS_ContentInfo *cms, X509_CRL *crl);
```

```
int CMS_add1_crl(CMS_ContentInfo *cms, X509_CRL *crl);
STACK_OF(X509_CRL) *CMS_get1_crls(CMS_ContentInfo *cms);

int CMS_SignedData_init(CMS_ContentInfo *cms);
CMS_SignerInfo *CMS_add1_signer(CMS_ContentInfo *cms,
                        X509 *signer, EVP_PKEY *pk, const EVP_MD *md,
                        unsigned int flags);
EVP_PKEY_CTX *CMS_SignerInfo_get0_pkey_ctx(CMS_SignerInfo *si);
EVP_MD_CTX *CMS_SignerInfo_get0_md_ctx(CMS_SignerInfo *si);
STACK_OF(CMS_SignerInfo) *CMS_get0_SignerInfos(CMS_ContentInfo *cms);

void CMS_SignerInfo_set1_signer_cert(CMS_SignerInfo *si, X509 *signer);
int CMS_SignerInfo_get0_signer_id(CMS_SignerInfo *si,
                         ASN1_OCTET_STRING **keyid,
                         X509_NAME **issuer, ASN1_INTEGER **sno);
int CMS_SignerInfo_cert_cmp(CMS_SignerInfo
 *si, X509 *cert);
int CMS_set1_signers_certs(CMS_ContentInfo *cms, STACK_OF(X509) *certs,
                   unsigned int flags);
void CMS_SignerInfo_get0_algs(CMS_SignerInfo *si, EVP_PKEY **pk,
                        X509 **signer, X509_ALGOR **pdig,
                        X509_ALGOR **psig);
ASN1_OCTET_STRING *CMS_SignerInfo_get0_signature(CMS_SignerInfo *si);
int CMS_SignerInfo_sign(CMS_SignerInfo *si);
int CMS_SignerInfo_verify(CMS_SignerInfo *si);
int CMS_SignerInfo_verify_content(CMS_SignerInfo *si, BIO *chain);

int CMS_add_smimecap(CMS_SignerInfo *si, STACK_OF(X509_ALGOR) *algs);
int CMS_add_simple_smimecap(STACK_OF(X509_ALGOR) **algs,
                    int algnid, int keysize);
int CMS_add_standard_smimecap(STACK_OF(X509_ALGOR) **smcap);

int CMS_signed_get_attr_count(const CMS_SignerInfo *si);
int CMS_signed_get_attr_by_NID(const CMS_SignerInfo *si, int nid,
                         int lastpos);
int CMS_signed_get_attr_by_OBJ(const
 CMS_SignerInfo *si, const ASN1_OBJECT *obj,
                         int lastpos);
X509_ATTRIBUTE *CMS_signed_get_attr(const CMS_SignerInfo *si, int loc);
X509_ATTRIBUTE *CMS_signed_delete_attr(CMS_SignerInfo *si, int loc);
int CMS_signed_add1_attr(CMS_SignerInfo *si, X509_ATTRIBUTE *attr);
int CMS_signed_add1_attr_by_OBJ(CMS_SignerInfo *si,
                         const ASN1_OBJECT *obj, int type,
                         const void *bytes, int len);
int CMS_signed_add1_attr_by_NID(CMS_SignerInfo *si,
                         int nid, int type,
                         const void *bytes, int len);
int CMS_signed_add1_attr_by_txt(CMS_SignerInfo *si,
```

```
                        const char *attrname, int type,
                        const void *bytes, int len);
void *CMS_signed_get0_data_by_OBJ(const CMS_SignerInfo *si,
                         const ASN1_OBJECT *oid,

  int lastpos, int type);

int CMS_unsigned_get_attr_count(const CMS_SignerInfo *si);
int CMS_unsigned_get_attr_by_NID(const CMS_SignerInfo *si, int nid,
                        int lastpos);
int CMS_unsigned_get_attr_by_OBJ(const CMS_SignerInfo *si,
                        const ASN1_OBJECT *obj, int lastpos);
X509_ATTRIBUTE *CMS_unsigned_get_attr(const CMS_SignerInfo *si, int loc);
X509_ATTRIBUTE *CMS_unsigned_delete_attr(CMS_SignerInfo *si, int loc);
int CMS_unsigned_add1_attr(CMS_SignerInfo *si, X509_ATTRIBUTE *attr);
int CMS_unsigned_add1_attr_by_OBJ(CMS_SignerInfo *si,
                         const ASN1_OBJECT *obj, int type,
                         const void *bytes, int len);
int CMS_unsigned_add1_attr_by_NID(CMS_SignerInfo *si,
                         int nid, int type,
                         const void *bytes, int len);
int CMS_unsigned_add1_attr_by_txt(CMS_SignerInfo *si,
                         const char
 *attrname, int type,
                         const void *bytes, int len);
void *CMS_unsigned_get0_data_by_OBJ(CMS_SignerInfo *si, ASN1_OBJECT *oid,
                          int lastpos, int type);

int CMS_get1_ReceiptRequest(CMS_SignerInfo *si, CMS_ReceiptRequest **prr);
CMS_ReceiptRequest *CMS_ReceiptRequest_create0(
  unsigned char *id, int idlen, int allorfirst,
  STACK_OF(GENERAL_NAMES) *receiptList,
  STACK_OF(GENERAL_NAMES) *receiptsTo);
CMS_ReceiptRequest *CMS_ReceiptRequest_create0_ex(
  unsigned char *id, int idlen, int allorfirst,
  STACK_OF(GENERAL_NAMES) *receiptList,
  STACK_OF(GENERAL_NAMES) *receiptsTo,
  OSSL_LIB_CTX *ctx);

int CMS_add1_ReceiptRequest(CMS_SignerInfo *si, CMS_ReceiptRequest *rr);
void CMS_ReceiptRequest_get0_values(CMS_ReceiptRequest *rr,
                          ASN1_STRING **pcid,
                          int *pallorfirst,
                          STACK_OF(GENERAL_NAMES) **plist,

                         STACK_OF(GENERAL_NAMES) **prto);
int CMS_RecipientInfo_kari_get0_alg(CMS_RecipientInfo *ri,
                          X509_ALGOR **palg,
```

```
                            ASN1_OCTET_STRING **pukm);
STACK_OF(CMS_RecipientEncryptedKey)
*CMS_RecipientInfo_kari_get0_reks(CMS_RecipientInfo *ri);

int CMS_RecipientInfo_kari_get0_orig_id(CMS_RecipientInfo *ri,
                                X509_ALGOR **pubalg,
                                ASN1_BIT_STRING **pubkey,
                                ASN1_OCTET_STRING **keyid,
                                X509_NAME **issuer,
                                ASN1_INTEGER **sno);

int CMS_RecipientInfo_kari_orig_id_cmp(CMS_RecipientInfo *ri, X509 *cert);

int CMS_RecipientEncryptedKey_get0_id(CMS_RecipientEncryptedKey *rek,
                                ASN1_OCTET_STRING **keyid,
                                ASN1_GENERALIZEDTIME **tm,

                            CMS_OtherKeyAttribute **other,
                                X509_NAME **issuer, ASN1_INTEGER **sno);
int CMS_RecipientEncryptedKey_cert_cmp(CMS_RecipientEncryptedKey *rek,
                                X509 *cert);
int CMS_RecipientInfo_kari_set0_pkey(CMS_RecipientInfo *ri, EVP_PKEY *pk);
int CMS_RecipientInfo_kari_set0_pkey_and_peer(CMS_RecipientInfo *ri, EVP_PKEY *pk, X509 *peer);
EVP_CIPHER_CTX *CMS_RecipientInfo_kari_get0_ctx(CMS_RecipientInfo *ri);
int CMS_RecipientInfo_kari_decrypt(CMS_ContentInfo *cms,
                                CMS_RecipientInfo *ri,
                                CMS_RecipientEncryptedKey *rek);

int CMS_SharedInfo_encode(unsigned char **pder, X509_ALGOR *kekalg,
                        ASN1_OCTET_STRING *ukm, int keylen);

/* Backward compatibility for spelling errors. */
# define CMS_R_UNKNOWN_DIGEST_ALGORITM CMS_R_UNKNOWN_DIGEST_ALGORITHM
# define CMS_R_UNSUPPORTED_RECPIENTINFO_TYPE \
  CMS_R_UNSUPPORTED_RECIPIENTINFO_TYPE

#
 ifdef  __cplusplus
}
#  endif
# endif
#endif
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/asn1.h.in
*
* Copyright 1995-2021 The OpenSSL Project Authors. All Rights Reserved.
*
```

```
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_ASN1_H
# define OPENSSL_ASN1_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_ASN1_H
# endif

# include <time.h>
# include <openssl/e_os2.h>
# include <openssl/opensslconf.h>
# include <openssl/bio.h>
# include <openssl/safestack.h>
# include <openssl/asn1err.h>
# include <openssl/symhacks.h>

# include <openssl/types.h>
# include <openssl/bn.h>

# ifdef OPENSSL_BUILD_SHLIBCRYPTO
#  undef OPENSSL_EXTERN
#  define OPENSSL_EXTERN OPENSSL_EXPORT
# endif

#ifdef  __cplusplus
extern "C" {
#endif

# define V_ASN1_UNIVERSAL
              0x00
# define V_ASN1_APPLICATION             0x40
# define V_ASN1_CONTEXT_SPECIFIC        0x80
# define V_ASN1_PRIVATE                 0xc0

# define V_ASN1_CONSTRUCTED             0x20
# define V_ASN1_PRIMITIVE_TAG           0x1f
# define V_ASN1_PRIMATIVE_TAG /*compat*/ V_ASN1_PRIMITIVE_TAG

# define V_ASN1_APP_CHOOSE              -2/* let the recipient choose */
```

```
# define V_ASN1_OTHER                -3/* used in ASN1_TYPE */
# define V_ASN1_ANY                  -4/* used in ASN1 template code */

# define V_ASN1_UNDEF                -1
/* ASN.1 tag values */
# define V_ASN1_EOC                  0
# define V_ASN1_BOOLEAN              1 /**/
# define V_ASN1_INTEGER              2
# define V_ASN1_BIT_STRING           3
# define V_ASN1_OCTET_STRING         4
# define V_ASN1_NULL                 5
# define V_ASN1_OBJECT               6
# define V_ASN1_OBJECT_DESCRIPTOR    7
# define V_ASN1_EXTERNAL             8
#
 define V_ASN1_REAL                 9
# define V_ASN1_ENUMERATED           10
# define V_ASN1_UTF8STRING           12
# define V_ASN1_SEQUENCE             16
# define V_ASN1_SET                  17
# define V_ASN1_NUMERICSTRING        18 /**/
# define V_ASN1_PRINTABLESTRING      19
# define V_ASN1_T61STRING            20
# define V_ASN1_TELETEXSTRING        20/* alias */
# define V_ASN1_VIDEOTEXSTRING       21 /**/
# define V_ASN1_IA5STRING            22
# define V_ASN1_UTCTIME              23
# define V_ASN1_GENERALIZEDTIME      24 /**/
# define V_ASN1_GRAPHICSTRING        25 /**/
# define V_ASN1_ISO64STRING          26 /**/
# define V_ASN1_VISIBLESTRING        26/* alias */
# define V_ASN1_GENERALSTRING        27 /**/
# define V_ASN1_UNIVERSALSTRING      28 /**/
# define V_ASN1_BMPSTRING            30

/*
* NB the constants below are used internally by ASN1_INTEGER
* and ASN1_ENUMERATED to indicate the sign.
 They are *not* on
* the wire tag values.
*/

# define V_ASN1_NEG                  0x100
# define V_ASN1_NEG_INTEGER          (2 | V_ASN1_NEG)
# define V_ASN1_NEG_ENUMERATED       (10 | V_ASN1_NEG)

/* For use with d2i_ASN1_type_bytes() */
# define B_ASN1_NUMERICSTRING    0x0001
```

```
# define B_ASN1_PRINTABLESTRING  0x0002
# define B_ASN1_T61STRING        0x0004
# define B_ASN1_TELETEXSTRING    0x0004
# define B_ASN1_VIDEOTEXSTRING   0x0008
# define B_ASN1_IA5STRING        0x0010
# define B_ASN1_GRAPHICSTRING    0x0020
# define B_ASN1_ISO64STRING      0x0040
# define B_ASN1_VISIBLESTRING    0x0040
# define B_ASN1_GENERALSTRING    0x0080
# define B_ASN1_UNIVERSALSTRING  0x0100
# define B_ASN1_OCTET_STRING     0x0200
# define B_ASN1_BIT_STRING       0x0400
# define B_ASN1_BMPSTRING        0x0800
# define B_ASN1_UNKNOWN          0x1000
# define B_ASN1_UTF8STRING       0x2000
# define B_ASN1_UTCTIME          0x4000
# define B_ASN1_GENERALIZEDTIME  0x8000
# define B_ASN1_SEQUENCE
        0x10000
/* For use with ASN1_mbstring_copy() */
# define MBSTRING_FLAG          0x1000
# define MBSTRING_UTF8          (MBSTRING_FLAG)
# define MBSTRING_ASC           (MBSTRING_FLAG|1)
# define MBSTRING_BMP           (MBSTRING_FLAG|2)
# define MBSTRING_UNIV          (MBSTRING_FLAG|4)
# define SMIME_OLDMIME          0x400
# define SMIME_CRLFEOL          0x800
# define SMIME_STREAM           0x1000

/* Stacks for types not otherwise defined in this header */
SKM_DEFINE_STACK_OF_INTERNAL(X509_ALGOR, X509_ALGOR, X509_ALGOR)
#define sk_X509_ALGOR_num(sk) OPENSSL_sk_num(ossl_check_const_X509_ALGOR_sk_type(sk))
#define sk_X509_ALGOR_value(sk, idx) ((X509_ALGOR
*)OPENSSL_sk_value(ossl_check_const_X509_ALGOR_sk_type(sk), (idx)))
#define sk_X509_ALGOR_new(cmp) ((STACK_OF(X509_ALGOR)
*)OPENSSL_sk_new(ossl_check_X509_ALGOR_compfunc_type(cmp)))
#define sk_X509_ALGOR_new_null() ((STACK_OF(X509_ALGOR) *)OPENSSL_sk_new_null())
#define sk_X509_ALGOR_new_reserve(cmp, n) ((STACK_OF(X509_ALGOR)
 *)OPENSSL_sk_new_reserve(ossl_check_X509_ALGOR_compfunc_type(cmp), (n)))
#define sk_X509_ALGOR_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_ALGOR_sk_type(sk), (n))
#define sk_X509_ALGOR_free(sk) OPENSSL_sk_free(ossl_check_X509_ALGOR_sk_type(sk))
#define sk_X509_ALGOR_zero(sk) OPENSSL_sk_zero(ossl_check_X509_ALGOR_sk_type(sk))
#define sk_X509_ALGOR_delete(sk, i) ((X509_ALGOR
*)OPENSSL_sk_delete(ossl_check_X509_ALGOR_sk_type(sk), (i)))
#define sk_X509_ALGOR_delete_ptr(sk, ptr) ((X509_ALGOR
*)OPENSSL_sk_delete_ptr(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_type(ptr)))
#define sk_X509_ALGOR_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_ALGOR_sk_type(sk),
ossl_check_X509_ALGOR_type(ptr))
```

#define sk_X509_ALGOR_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_type(ptr))
#define sk_X509_ALGOR_pop(sk) ((X509_ALGOR *)OPENSSL_sk_pop(ossl_check_X509_ALGOR_sk_type(sk)))
#define sk_X509_ALGOR_shift(sk) ((X509_ALGOR *)OPENSSL_sk_shift(ossl_check_X509_ALGOR_sk_type(sk)))
#define sk_X509_ALGOR_pop_free(sk, freefunc) OPENSSL_sk_pop_free(ossl_check_X509_ALGOR_sk_type(sk),ossl_check_X509_ALGOR_freefunc_type(freefunc))
#define sk_X509_ALGOR_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_type(ptr), (idx))
#define sk_X509_ALGOR_set(sk, idx, ptr) ((X509_ALGOR *)OPENSSL_sk_set(ossl_check_X509_ALGOR_sk_type(sk), (idx), ossl_check_X509_ALGOR_type(ptr)))
#define sk_X509_ALGOR_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_type(ptr))
#define sk_X509_ALGOR_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_type(ptr))
#define sk_X509_ALGOR_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_type(ptr), pnum)
#define sk_X509_ALGOR_sort(sk) OPENSSL_sk_sort(ossl_check_X509_ALGOR_sk_type(sk))
#define sk_X509_ALGOR_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_ALGOR_sk_type(sk))
#define sk_X509_ALGOR_dup(sk) ((STACK_OF(X509_ALGOR) *)OPENSSL_sk_dup(ossl_check_const_X509_ALGOR_sk_type(sk)))
#define sk_X509_ALGOR_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_ALGOR) *)OPENSSL_sk_deep_copy(ossl_check_const_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_copyfunc_type(copyfunc), ossl_check_X509_ALGOR_freefunc_type(freefunc)))
#define sk_X509_ALGOR_set_cmp_func(sk, cmp) ((sk_X509_ALGOR_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_ALGOR_sk_type(sk), ossl_check_X509_ALGOR_compfunc_type(cmp)))

define ASN1_STRING_FLAG_BITS_LEFT 0x08/* Set if 0x07 has bits left value */
/*
* This indicates that the ASN1_STRING is not a real value but just a place
* holder for the location where indefinite length constructed data should be
* inserted in the memory buffer
*/
define ASN1_STRING_FLAG_NDEF 0x010

/*
* This flag is used by the CMS code to indicate that a string is not
* complete and is a place holder for content when it had
all been accessed.
* The flag will be reset when content has been written to it.
*/

```
# define ASN1_STRING_FLAG_CONT 0x020
/*
* This flag is used by ASN1 code to indicate an ASN1_STRING is an MSTRING
* type.
*/
# define ASN1_STRING_FLAG_MSTRING 0x040
/* String is embedded and only content should be freed */
# define ASN1_STRING_FLAG_EMBED 0x080
/* String should be parsed in RFC 5280's time format */
# define ASN1_STRING_FLAG_X509_TIME 0x100
/* This is the base type that holds just about everything :-) */
struct asn1_string_st {
  int length;
  int type;
  unsigned char *data;
  /*
   * The value of the following field depends on the type being held.  It
   * is mostly being used for BIT_STRING so if the input data has a
   * non-zero 'unused bits' value, it will be handled correctly
   */
  long flags;
};

/*
* ASN1_ENCODING structure: this is used to save the received encoding of an
* ASN1 type. This is useful to get round problems with invalid encodings
* which
 can break signatures.
*/

typedef struct ASN1_ENCODING_st {
  unsigned char *enc;        /* DER encoding */
  long len;                  /* Length of encoding */
  int modified;              /* set to 1 if 'enc' is invalid */
} ASN1_ENCODING;

/* Used with ASN1 LONG type: if a long is set to this it is omitted */
# define ASN1_LONG_UNDEF 0x7fffffffL

# define STABLE_FLAGS_MALLOC     0x01
/*
* A zero passed to ASN1_STRING_TABLE_new_add for the flags is interpreted
* as "don't change" and STABLE_FLAGS_MALLOC is always set. By setting
* STABLE_FLAGS_MALLOC only we can clear the existing value. Use the alias
* STABLE_FLAGS_CLEAR to reflect this.
*/
# define STABLE_FLAGS_CLEAR      STABLE_FLAGS_MALLOC
```

```
# define STABLE_NO_MASK          0x02
# define DIRSTRING_TYPE  \
(B_ASN1_PRINTABLESTRING|B_ASN1_T61STRING|B_ASN1_BMPSTRING|B_ASN1_UTF8STRING)
# define PKCS9STRING_TYPE (DIRSTRING_TYPE|B_ASN1_IA5STRING)

struct asn1_string_table_st {
  int nid;
  long minsize;
  long maxsize;
   unsigned long mask;
  unsigned long flags;
};

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_STRING_TABLE, ASN1_STRING_TABLE,
ASN1_STRING_TABLE)
#define sk_ASN1_STRING_TABLE_num(sk)
OPENSSL_sk_num(ossl_check_const_ASN1_STRING_TABLE_sk_type(sk))
#define sk_ASN1_STRING_TABLE_value(sk, idx) ((ASN1_STRING_TABLE
*)OPENSSL_sk_value(ossl_check_const_ASN1_STRING_TABLE_sk_type(sk), (idx)))
#define sk_ASN1_STRING_TABLE_new(cmp) ((STACK_OF(ASN1_STRING_TABLE)
*)OPENSSL_sk_new(ossl_check_ASN1_STRING_TABLE_compfunc_type(cmp)))
#define sk_ASN1_STRING_TABLE_new_null() ((STACK_OF(ASN1_STRING_TABLE)
*)OPENSSL_sk_new_null())
#define sk_ASN1_STRING_TABLE_new_reserve(cmp, n) ((STACK_OF(ASN1_STRING_TABLE)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_STRING_TABLE_compfunc_type(cmp), (n)))
#define sk_ASN1_STRING_TABLE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_ASN1_STRING_TABLE_sk_type(sk), (n))
#define sk_ASN1_STRING_TABLE_free(sk)
OPENSSL_sk_free(ossl_check_ASN1_STRING_TABLE_sk_type(sk))
#define sk_ASN1_STRING_TABLE_zero(sk)
 OPENSSL_sk_zero(ossl_check_ASN1_STRING_TABLE_sk_type(sk))
#define sk_ASN1_STRING_TABLE_delete(sk, i) ((ASN1_STRING_TABLE
*)OPENSSL_sk_delete(ossl_check_ASN1_STRING_TABLE_sk_type(sk), (i)))
#define sk_ASN1_STRING_TABLE_delete_ptr(sk, ptr) ((ASN1_STRING_TABLE
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr)))
#define sk_ASN1_STRING_TABLE_push(sk, ptr)
OPENSSL_sk_push(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr))
#define sk_ASN1_STRING_TABLE_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr))
#define sk_ASN1_STRING_TABLE_pop(sk) ((ASN1_STRING_TABLE
*)OPENSSL_sk_pop(ossl_check_ASN1_STRING_TABLE_sk_type(sk)))
#define sk_ASN1_STRING_TABLE_shift(sk) ((ASN1_STRING_TABLE
*)OPENSSL_sk_shift(ossl_check_ASN1_STRING_TABLE_sk_type(sk)))
#define sk_ASN1_STRING_TABLE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_STRING_TABLE_sk_type(sk),ossl_check_ASN1_STRING_TABLE_
```

```
freefunc_type(freefunc))
#define
 sk_ASN1_STRING_TABLE_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr), (idx))
#define sk_ASN1_STRING_TABLE_set(sk, idx, ptr) ((ASN1_STRING_TABLE
*)OPENSSL_sk_set(ossl_check_ASN1_STRING_TABLE_sk_type(sk), (idx),
ossl_check_ASN1_STRING_TABLE_type(ptr)))
#define sk_ASN1_STRING_TABLE_find(sk, ptr)
OPENSSL_sk_find(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr))
#define sk_ASN1_STRING_TABLE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr))
#define sk_ASN1_STRING_TABLE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_type(ptr), pnum)
#define sk_ASN1_STRING_TABLE_sort(sk)
OPENSSL_sk_sort(ossl_check_ASN1_STRING_TABLE_sk_type(sk))
#define sk_ASN1_STRING_TABLE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_ASN1_STRING_TABLE_sk_type(sk))
#define
 sk_ASN1_STRING_TABLE_dup(sk) ((STACK_OF(ASN1_STRING_TABLE)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_STRING_TABLE_sk_type(sk)))
#define sk_ASN1_STRING_TABLE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_STRING_TABLE)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_STRING_TABLE_sk_type(sk),
ossl_check_ASN1_STRING_TABLE_copyfunc_type(copyfunc),
ossl_check_ASN1_STRING_TABLE_freefunc_type(freefunc)))
#define sk_ASN1_STRING_TABLE_set_cmp_func(sk, cmp)
((sk_ASN1_STRING_TABLE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_STRING_TABLE_sk_t
ype(sk), ossl_check_ASN1_STRING_TABLE_compfunc_type(cmp)))


/* size limits: this stuff is taken straight from RFC2459 */

# define ub_name                        32768
# define ub_common_name                 64
# define ub_locality_name               128
# define ub_state_name                  128
# define ub_organization_name           64
# define ub_organization_unit_name      64
#
 define ub_title                       64
# define ub_email_address               128

/*
* Declarations for template structures: for full definitions see asn1t.h
*/
```

```
typedef struct ASN1_TEMPLATE_st ASN1_TEMPLATE;
typedef struct ASN1_TLC_st ASN1_TLC;
/* This is just an opaque pointer */
typedef struct ASN1_VALUE_st ASN1_VALUE;

/* Declare ASN1 functions: the implement macro in in asn1t.h */

/*
* The mysterious 'extern' that's passed to some macros is innocuous,
* and is there to quiet pre-C99 compilers that may complain about empty
* arguments in macro calls.
*/

# define DECLARE_ASN1_FUNCTIONS_attr(attr, type)                        \
  DECLARE_ASN1_FUNCTIONS_name_attr(attr, type, type)
# define DECLARE_ASN1_FUNCTIONS(type)                                   \
  DECLARE_ASN1_FUNCTIONS_attr(extern, type)

# define DECLARE_ASN1_ALLOC_FUNCTIONS_attr(attr, type)                  \
  DECLARE_ASN1_ALLOC_FUNCTIONS_name_attr(attr, type, type)
# define DECLARE_ASN1_ALLOC_FUNCTIONS(type)
                        \
  DECLARE_ASN1_ALLOC_FUNCTIONS_attr(extern, type)

# define DECLARE_ASN1_FUNCTIONS_name_attr(attr, type, name)             \
  DECLARE_ASN1_ALLOC_FUNCTIONS_name_attr(attr, type, name)              \
  DECLARE_ASN1_ENCODE_FUNCTIONS_name_attr(attr, type, name)
# define DECLARE_ASN1_FUNCTIONS_name(type, name)                        \
  DECLARE_ASN1_FUNCTIONS_name_attr(extern, type, name)

# define DECLARE_ASN1_ENCODE_FUNCTIONS_attr(attr, type, itname, name)      \
  DECLARE_ASN1_ENCODE_FUNCTIONS_only_attr(attr, type, name)             \
  DECLARE_ASN1_ITEM_attr(attr, itname)
# define DECLARE_ASN1_ENCODE_FUNCTIONS(type, itname, name)              \
  DECLARE_ASN1_ENCODE_FUNCTIONS_attr(extern, type, itname, name)

# define DECLARE_ASN1_ENCODE_FUNCTIONS_name_attr(attr, type, name)        \
  DECLARE_ASN1_ENCODE_FUNCTIONS_attr(attr, type, name, name)
# define DECLARE_ASN1_ENCODE_FUNCTIONS_name(type, name)
 \
  DECLARE_ASN1_ENCODE_FUNCTIONS_name_attr(extern, type, name)

# define DECLARE_ASN1_ENCODE_FUNCTIONS_only_attr(attr, type, name)        \
  attr type *d2i_##name(type **a, const unsigned char **in, long len);    \
  attr int i2d_##name(const type *a, unsigned char **out);
# define DECLARE_ASN1_ENCODE_FUNCTIONS_only(type, name)                 \
  DECLARE_ASN1_ENCODE_FUNCTIONS_only_attr(extern, type, name)
```

```
# define DECLARE_ASN1_NDEF_FUNCTION_attr(attr, name)                    \
  attr int i2d_##name##_NDEF(const name *a, unsigned char **out);
# define DECLARE_ASN1_NDEF_FUNCTION(name)                               \
  DECLARE_ASN1_NDEF_FUNCTION_attr(extern, name)

# define DECLARE_ASN1_ALLOC_FUNCTIONS_name_attr(attr, type, name)       \
  attr type *name##_new(void);                                          \
  attr void name##_free(type *a);
# define DECLARE_ASN1_ALLOC_FUNCTIONS_name(type, name)                  \
  DECLARE_ASN1_ALLOC_FUNCTIONS_name_attr(extern,
 type, name)

# define DECLARE_ASN1_DUP_FUNCTION_attr(attr, type)                     \
  DECLARE_ASN1_DUP_FUNCTION_name_attr(attr, type, type)
# define DECLARE_ASN1_DUP_FUNCTION(type)                                \
  DECLARE_ASN1_DUP_FUNCTION_attr(extern, type)

# define DECLARE_ASN1_DUP_FUNCTION_name_attr(attr, type, name)          \
  attr type *name##_dup(const type *a);
# define DECLARE_ASN1_DUP_FUNCTION_name(type, name)                     \
  DECLARE_ASN1_DUP_FUNCTION_name_attr(extern, type, name)

# define DECLARE_ASN1_PRINT_FUNCTION_attr(attr, stname)                 \
  DECLARE_ASN1_PRINT_FUNCTION_fname_attr(attr, stname, stname)
# define DECLARE_ASN1_PRINT_FUNCTION(stname)                            \
  DECLARE_ASN1_PRINT_FUNCTION_attr(extern, stname)

# define DECLARE_ASN1_PRINT_FUNCTION_fname_attr(attr, stname, fname)    \
  attr int fname##_print_ctx(BIO *out, const stname *x, int indent,     \

                     const ASN1_PCTX *pctx);
# define DECLARE_ASN1_PRINT_FUNCTION_fname(stname, fname)               \
  DECLARE_ASN1_PRINT_FUNCTION_fname_attr(extern, stname, fname)

# define D2I_OF(type) type *(*)(type **,const unsigned char **,long)
# define I2D_OF(type) int (*)(const type *,unsigned char **)

# define CHECKED_D2I_OF(type, d2i) \
  ((d2i_of_void*) (1 ? d2i : ((D2I_OF(type))0)))
# define CHECKED_I2D_OF(type, i2d) \
  ((i2d_of_void*) (1 ? i2d : ((I2D_OF(type))0)))
# define CHECKED_NEW_OF(type, xnew) \
  ((void *(*)(void)) (1 ? xnew : ((type *(*)(void))0)))
# define CHECKED_PTR_OF(type, p) \
  ((void*) (1 ? p : (type*)0))
# define CHECKED_PPTR_OF(type, p) \
  ((void**) (1 ? p : (type**)0))
```

```
# define TYPEDEF_D2I_OF(type) typedef type *d2i_of_##type(type **,const unsigned char **,long)
# define TYPEDEF_I2D_OF(type) typedef int i2d_of_##type(const type *,unsigned char **)
# define TYPEDEF_D2I2D_OF(type) TYPEDEF_D2I_OF(type); TYPEDEF_I2D_OF(type)

typedef
 void *d2i_of_void(void **, const unsigned char **, long);
typedef int i2d_of_void(const void *, unsigned char **);

/*-
* The following macros and typedefs allow an ASN1_ITEM
* to be embedded in a structure and referenced. Since
* the ASN1_ITEM pointers need to be globally accessible
* (possibly from shared libraries) they may exist in
* different forms. On platforms that support it the
* ASN1_ITEM structure itself will be globally exported.
* Other platforms will export a function that returns
* an ASN1_ITEM pointer.
*
* To handle both cases transparently the macros below
* should be used instead of hard coding an ASN1_ITEM
* pointer in a structure.
*
* The structure will look like this:
*
* typedef struct SOMETHING_st {
*      ...
*      ASN1_ITEM_EXP *iptr;
*      ...
* } SOMETHING;
*
* It would be initialised as e.g.:
*
* SOMETHING somevar = {...,ASN1_ITEM_ref(X509),...};
*
* and the actual pointer extracted with:
*
* const ASN1_ITEM *it = ASN1_ITEM_ptr(somevar.iptr);
 *
* Finally an ASN1_ITEM pointer can be extracted from an
* appropriate reference with: ASN1_ITEM_rptr(X509). This
* would be used when a function takes an ASN1_ITEM * argument.
*
*/



/*
* Platforms that can't easily handle shared global variables are declared as
* functions returning ASN1_ITEM pointers.
```

```
*/

/* ASN1_ITEM pointer exported type */
typedef const ASN1_ITEM *ASN1_ITEM_EXP (void);

/* Macro to obtain ASN1_ITEM pointer from exported type */
# define ASN1_ITEM_ptr(iptr) (iptr())

/* Macro to include ASN1_ITEM pointer from base type */
# define ASN1_ITEM_ref(iptr) (iptr##_it)

# define ASN1_ITEM_rptr(ref) (ref##_it())

# define DECLARE_ASN1_ITEM_attr(attr, name)                              \
   attr const ASN1_ITEM * name##_it(void);
# define DECLARE_ASN1_ITEM(name)                                         \
   DECLARE_ASN1_ITEM_attr(extern, name)

/* Parameters used by ASN1_STRING_print_ex() */

/*
* These determine which characters to escape:
 RFC2253 special characters,
* control characters and MSB set characters
*/

# define ASN1_STRFLGS_ESC_2253          1
# define ASN1_STRFLGS_ESC_CTRL          2
# define ASN1_STRFLGS_ESC_MSB           4

/* Lower 8 bits are reserved as an output type specifier */
# define ASN1_DTFLGS_TYPE_MASK    0x0FUL
# define ASN1_DTFLGS_RFC822       0x00UL
# define ASN1_DTFLGS_ISO8601      0x01UL

/*
* This flag determines how we do escaping: normally RC2253 backslash only,
* set this to use backslash and quote.
*/

# define ASN1_STRFLGS_ESC_QUOTE         8

/* These three flags are internal use only. */

/* Character is a valid PrintableString character */
# define CHARTYPE_PRINTABLESTRING       0x10
/* Character needs escaping if it is the first character */
# define CHARTYPE_FIRST_ESC_2253        0x20
```

```
/* Character needs escaping if it is the last character */
# define CHARTYPE_LAST_ESC_2253          0x40

/*
* NB the internal flags are safely reused below by flags handled at the top
 * level.
*/

/*
* If this is set we convert all character strings to UTF8 first
*/

# define ASN1_STRFLGS_UTF8_CONVERT       0x10

/*
* If this is set we don't attempt to interpret content: just assume all
* strings are 1 byte per character. This will produce some pretty odd
* looking output!
*/

# define ASN1_STRFLGS_IGNORE_TYPE        0x20

/* If this is set we include the string type in the output */
# define ASN1_STRFLGS_SHOW_TYPE          0x40

/*
* This determines which strings to display and which to 'dump' (hex dump of
* content octets or DER encoding). We can only dump non character strings or
* everything. If we don't dump 'unknown' they are interpreted as character
* strings with 1 octet per character and are subject to the usual escaping
* options.
*/

# define ASN1_STRFLGS_DUMP_ALL           0x80
# define ASN1_STRFLGS_DUMP_UNKNOWN       0x100

/*
* These determine what 'dumping' does, we can dump the content octets or the
* DER encoding: both use the RFC2253
 #XXXXX notation.
*/

# define ASN1_STRFLGS_DUMP_DER           0x200

/*
* This flag specifies that RC2254 escaping shall be performed.
*/
#define ASN1_STRFLGS_ESC_2254           0x400
```

```
/*
* All the string flags consistent with RFC2253, escaping control characters
* isn't essential in RFC2253 but it is advisable anyway.
*/

# define ASN1_STRFLGS_RFC2253    (ASN1_STRFLGS_ESC_2253 | \
                        ASN1_STRFLGS_ESC_CTRL | \
                        ASN1_STRFLGS_ESC_MSB | \
                        ASN1_STRFLGS_UTF8_CONVERT | \
                        ASN1_STRFLGS_DUMP_UNKNOWN | \
                        ASN1_STRFLGS_DUMP_DER)


struct asn1_type_st {
  int type;
  union {
     char *ptr;
     ASN1_BOOLEAN boolean;
     ASN1_STRING *asn1_string;
     ASN1_OBJECT *object;
     ASN1_INTEGER *integer;
     ASN1_ENUMERATED *enumerated;
     ASN1_BIT_STRING *bit_string;
     ASN1_OCTET_STRING *octet_string;

    ASN1_PRINTABLESTRING *printablestring;
     ASN1_T61STRING *t61string;
     ASN1_IA5STRING *ia5string;
     ASN1_GENERALSTRING *generalstring;
     ASN1_BMPSTRING *bmpstring;
     ASN1_UNIVERSALSTRING *universalstring;
     ASN1_UTCTIME *utctime;
     ASN1_GENERALIZEDTIME *generalizedtime;
     ASN1_VISIBLESTRING *visiblestring;
     ASN1_UTF8STRING *utf8string;
     /*
      * set and sequence are left complete and still contain the set or
      * sequence bytes
      */
     ASN1_STRING *set;
     ASN1_STRING *sequence;
     ASN1_VALUE *asn1_value;
  } value;
};

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_TYPE, ASN1_TYPE, ASN1_TYPE)
#define sk_ASN1_TYPE_num(sk) OPENSSL_sk_num(ossl_check_const_ASN1_TYPE_sk_type(sk))
```

```
#define sk_ASN1_TYPE_value(sk, idx) ((ASN1_TYPE
*)OPENSSL_sk_value(ossl_check_const_ASN1_TYPE_sk_type(sk), (idx)))
#define sk_ASN1_TYPE_new(cmp) ((STACK_OF(ASN1_TYPE)
*)OPENSSL_sk_new(ossl_check_ASN1_TYPE_compfunc_type(cmp)))
#define
 sk_ASN1_TYPE_new_null() ((STACK_OF(ASN1_TYPE) *)OPENSSL_sk_new_null())
#define sk_ASN1_TYPE_new_reserve(cmp, n) ((STACK_OF(ASN1_TYPE)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_TYPE_compfunc_type(cmp), (n)))
#define sk_ASN1_TYPE_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ASN1_TYPE_sk_type(sk), (n))
#define sk_ASN1_TYPE_free(sk) OPENSSL_sk_free(ossl_check_ASN1_TYPE_sk_type(sk))
#define sk_ASN1_TYPE_zero(sk) OPENSSL_sk_zero(ossl_check_ASN1_TYPE_sk_type(sk))
#define sk_ASN1_TYPE_delete(sk, i) ((ASN1_TYPE
*)OPENSSL_sk_delete(ossl_check_ASN1_TYPE_sk_type(sk), (i)))
#define sk_ASN1_TYPE_delete_ptr(sk, ptr) ((ASN1_TYPE
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_TYPE_sk_type(sk), ossl_check_ASN1_TYPE_type(ptr)))
#define sk_ASN1_TYPE_push(sk, ptr) OPENSSL_sk_push(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_type(ptr))
#define sk_ASN1_TYPE_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_type(ptr))
#define sk_ASN1_TYPE_pop(sk) ((ASN1_TYPE *)OPENSSL_sk_pop(ossl_check_ASN1_TYPE_sk_type(sk)))
#define
 sk_ASN1_TYPE_shift(sk) ((ASN1_TYPE *)OPENSSL_sk_shift(ossl_check_ASN1_TYPE_sk_type(sk)))
#define sk_ASN1_TYPE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_TYPE_sk_type(sk),ossl_check_ASN1_TYPE_freefunc_type(freefunc))
#define sk_ASN1_TYPE_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_type(ptr), (idx))
#define sk_ASN1_TYPE_set(sk, idx, ptr) ((ASN1_TYPE
*)OPENSSL_sk_set(ossl_check_ASN1_TYPE_sk_type(sk), (idx), ossl_check_ASN1_TYPE_type(ptr)))
#define sk_ASN1_TYPE_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_type(ptr))
#define sk_ASN1_TYPE_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_type(ptr))
#define sk_ASN1_TYPE_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_type(ptr), pnum)
#define sk_ASN1_TYPE_sort(sk) OPENSSL_sk_sort(ossl_check_ASN1_TYPE_sk_type(sk))
#define
 sk_ASN1_TYPE_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_ASN1_TYPE_sk_type(sk))
#define sk_ASN1_TYPE_dup(sk) ((STACK_OF(ASN1_TYPE)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_TYPE_sk_type(sk)))
#define sk_ASN1_TYPE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_TYPE)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_copyfunc_type(copyfunc), ossl_check_ASN1_TYPE_freefunc_type(freefunc)))
#define sk_ASN1_TYPE_set_cmp_func(sk, cmp)
((sk_ASN1_TYPE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_TYPE_sk_type(sk),
ossl_check_ASN1_TYPE_compfunc_type(cmp)))


typedef STACK_OF(ASN1_TYPE) ASN1_SEQUENCE_ANY;
```

```
DECLARE_ASN1_ENCODE_FUNCTIONS_name(ASN1_SEQUENCE_ANY, ASN1_SEQUENCE_ANY)
DECLARE_ASN1_ENCODE_FUNCTIONS_name(ASN1_SEQUENCE_ANY, ASN1_SET_ANY)

/* This is used to contain a list of bit names */
typedef struct BIT_STRING_BITNAME_st {
  int bitnum;
  const char *lname;
  const char *sname;
} BIT_STRING_BITNAME;

# define
 B_ASN1_TIME \
                B_ASN1_UTCTIME | \
                B_ASN1_GENERALIZEDTIME

# define B_ASN1_PRINTABLE \
                B_ASN1_NUMERICSTRING| \
                B_ASN1_PRINTABLESTRING| \
                B_ASN1_T61STRING| \
                B_ASN1_IA5STRING| \
                B_ASN1_BIT_STRING| \
                B_ASN1_UNIVERSALSTRING|\
                B_ASN1_BMPSTRING|\
                B_ASN1_UTF8STRING|\
                B_ASN1_SEQUENCE|\
                B_ASN1_UNKNOWN

# define B_ASN1_DIRECTORYSTRING \
                B_ASN1_PRINTABLESTRING| \
                B_ASN1_TELETEXSTRING|\
                B_ASN1_BMPSTRING|\
                B_ASN1_UNIVERSALSTRING|\
                B_ASN1_UTF8STRING

# define B_ASN1_DISPLAYTEXT \
                B_ASN1_IA5STRING| \
                B_ASN1_VISIBLESTRING| \
                B_ASN1_BMPSTRING|\
                 B_ASN1_UTF8STRING

DECLARE_ASN1_ALLOC_FUNCTIONS_name(ASN1_TYPE, ASN1_TYPE)
DECLARE_ASN1_ENCODE_FUNCTIONS(ASN1_TYPE, ASN1_ANY, ASN1_TYPE)

int ASN1_TYPE_get(const ASN1_TYPE *a);
void ASN1_TYPE_set(ASN1_TYPE *a, int type, void *value);
int ASN1_TYPE_set1(ASN1_TYPE *a, int type, const void *value);
int ASN1_TYPE_cmp(const ASN1_TYPE *a, const ASN1_TYPE *b);
```

```
ASN1_TYPE *ASN1_TYPE_pack_sequence(const ASN1_ITEM *it, void *s, ASN1_TYPE **t);
void *ASN1_TYPE_unpack_sequence(const ASN1_ITEM *it, const ASN1_TYPE *t);

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_OBJECT, ASN1_OBJECT, ASN1_OBJECT)
#define sk_ASN1_OBJECT_num(sk) OPENSSL_sk_num(ossl_check_const_ASN1_OBJECT_sk_type(sk))
#define sk_ASN1_OBJECT_value(sk, idx) ((ASN1_OBJECT
*)OPENSSL_sk_value(ossl_check_const_ASN1_OBJECT_sk_type(sk), (idx)))
#define sk_ASN1_OBJECT_new(cmp) ((STACK_OF(ASN1_OBJECT)
*)OPENSSL_sk_new(ossl_check_ASN1_OBJECT_compfunc_type(cmp)))
#define sk_ASN1_OBJECT_new_null() ((STACK_OF(ASN1_OBJECT)
 *)OPENSSL_sk_new_null())
#define sk_ASN1_OBJECT_new_reserve(cmp, n) ((STACK_OF(ASN1_OBJECT)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_OBJECT_compfunc_type(cmp), (n)))
#define sk_ASN1_OBJECT_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ASN1_OBJECT_sk_type(sk), (n))
#define sk_ASN1_OBJECT_free(sk) OPENSSL_sk_free(ossl_check_ASN1_OBJECT_sk_type(sk))
#define sk_ASN1_OBJECT_zero(sk) OPENSSL_sk_zero(ossl_check_ASN1_OBJECT_sk_type(sk))
#define sk_ASN1_OBJECT_delete(sk, i) ((ASN1_OBJECT
*)OPENSSL_sk_delete(ossl_check_ASN1_OBJECT_sk_type(sk), (i)))
#define sk_ASN1_OBJECT_delete_ptr(sk, ptr) ((ASN1_OBJECT
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_OBJECT_sk_type(sk), ossl_check_ASN1_OBJECT_type(ptr)))
#define sk_ASN1_OBJECT_push(sk, ptr) OPENSSL_sk_push(ossl_check_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_type(ptr))
#define sk_ASN1_OBJECT_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_type(ptr))
#define sk_ASN1_OBJECT_pop(sk) ((ASN1_OBJECT
*)OPENSSL_sk_pop(ossl_check_ASN1_OBJECT_sk_type(sk)))
#define
 sk_ASN1_OBJECT_shift(sk) ((ASN1_OBJECT *)OPENSSL_sk_shift(ossl_check_ASN1_OBJECT_sk_type(sk)))
#define sk_ASN1_OBJECT_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_OBJECT_sk_type(sk),ossl_check_ASN1_OBJECT_freefunc_type(free
func))
#define sk_ASN1_OBJECT_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_type(ptr), (idx))
#define sk_ASN1_OBJECT_set(sk, idx, ptr) ((ASN1_OBJECT
*)OPENSSL_sk_set(ossl_check_ASN1_OBJECT_sk_type(sk), (idx), ossl_check_ASN1_OBJECT_type(ptr)))
#define sk_ASN1_OBJECT_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_type(ptr))
#define sk_ASN1_OBJECT_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_type(ptr))
#define sk_ASN1_OBJECT_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_OBJECT_sk_type(sk), ossl_check_ASN1_OBJECT_type(ptr), pnum)
#define sk_ASN1_OBJECT_sort(sk)
 OPENSSL_sk_sort(ossl_check_ASN1_OBJECT_sk_type(sk))
#define sk_ASN1_OBJECT_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_ASN1_OBJECT_sk_type(sk))
#define sk_ASN1_OBJECT_dup(sk) ((STACK_OF(ASN1_OBJECT)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_OBJECT_sk_type(sk)))
```

```
#define sk_ASN1_OBJECT_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_OBJECT)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_copyfunc_type(copyfunc), ossl_check_ASN1_OBJECT_freefunc_type(freefunc)))
#define sk_ASN1_OBJECT_set_cmp_func(sk, cmp)
((sk_ASN1_OBJECT_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_OBJECT_sk_type(sk),
ossl_check_ASN1_OBJECT_compfunc_type(cmp)))


DECLARE_ASN1_FUNCTIONS(ASN1_OBJECT)

ASN1_STRING *ASN1_STRING_new(void);
void ASN1_STRING_free(ASN1_STRING *a);
void ASN1_STRING_clear_free(ASN1_STRING *a);
int ASN1_STRING_copy(ASN1_STRING *dst, const ASN1_STRING *str);
DECLARE_ASN1_DUP_FUNCTION(ASN1_STRING)
ASN1_STRING *ASN1_STRING_type_new(int
 type);
int ASN1_STRING_cmp(const ASN1_STRING *a, const ASN1_STRING *b);
 /*
  * Since this is used to store all sorts of things, via macros, for now,
  * make its data void *
  */
int ASN1_STRING_set(ASN1_STRING *str, const void *data, int len);
void ASN1_STRING_set0(ASN1_STRING *str, void *data, int len);
int ASN1_STRING_length(const ASN1_STRING *x);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 void ASN1_STRING_length_set(ASN1_STRING *x, int n);
# endif
int ASN1_STRING_type(const ASN1_STRING *x);
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 unsigned char *ASN1_STRING_data(ASN1_STRING *x);
# endif
const unsigned char *ASN1_STRING_get0_data(const ASN1_STRING *x);

DECLARE_ASN1_FUNCTIONS(ASN1_BIT_STRING)
int ASN1_BIT_STRING_set(ASN1_BIT_STRING *a, unsigned char *d, int length);
int ASN1_BIT_STRING_set_bit(ASN1_BIT_STRING *a, int n, int value);
int ASN1_BIT_STRING_get_bit(const ASN1_BIT_STRING *a, int n);
int ASN1_BIT_STRING_check(const ASN1_BIT_STRING
 *a,
                          const unsigned char *flags, int flags_len);

int ASN1_BIT_STRING_name_print(BIO *out, ASN1_BIT_STRING *bs,
                               BIT_STRING_BITNAME *tbl, int indent);
int ASN1_BIT_STRING_num_asc(const char *name, BIT_STRING_BITNAME *tbl);
int ASN1_BIT_STRING_set_asc(ASN1_BIT_STRING *bs, const char *name, int value,
                            BIT_STRING_BITNAME *tbl);
```

```
SKM_DEFINE_STACK_OF_INTERNAL(ASN1_INTEGER, ASN1_INTEGER, ASN1_INTEGER)
#define sk_ASN1_INTEGER_num(sk) OPENSSL_sk_num(ossl_check_const_ASN1_INTEGER_sk_type(sk))
#define sk_ASN1_INTEGER_value(sk, idx) ((ASN1_INTEGER
*)OPENSSL_sk_value(ossl_check_const_ASN1_INTEGER_sk_type(sk), (idx)))
#define sk_ASN1_INTEGER_new(cmp) ((STACK_OF(ASN1_INTEGER)
*)OPENSSL_sk_new(ossl_check_ASN1_INTEGER_compfunc_type(cmp)))
#define sk_ASN1_INTEGER_new_null() ((STACK_OF(ASN1_INTEGER) *)OPENSSL_sk_new_null())
#define sk_ASN1_INTEGER_new_reserve(cmp, n) ((STACK_OF(ASN1_INTEGER)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_INTEGER_compfunc_type(cmp),
 (n)))
#define sk_ASN1_INTEGER_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ASN1_INTEGER_sk_type(sk),
(n))
#define sk_ASN1_INTEGER_free(sk) OPENSSL_sk_free(ossl_check_ASN1_INTEGER_sk_type(sk))
#define sk_ASN1_INTEGER_zero(sk) OPENSSL_sk_zero(ossl_check_ASN1_INTEGER_sk_type(sk))
#define sk_ASN1_INTEGER_delete(sk, i) ((ASN1_INTEGER
*)OPENSSL_sk_delete(ossl_check_ASN1_INTEGER_sk_type(sk), (i)))
#define sk_ASN1_INTEGER_delete_ptr(sk, ptr) ((ASN1_INTEGER
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_INTEGER_sk_type(sk), ossl_check_ASN1_INTEGER_type(ptr)))
#define sk_ASN1_INTEGER_push(sk, ptr) OPENSSL_sk_push(ossl_check_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_type(ptr))
#define sk_ASN1_INTEGER_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_type(ptr))
#define sk_ASN1_INTEGER_pop(sk) ((ASN1_INTEGER
*)OPENSSL_sk_pop(ossl_check_ASN1_INTEGER_sk_type(sk)))
#define sk_ASN1_INTEGER_shift(sk) ((ASN1_INTEGER
 *)OPENSSL_sk_shift(ossl_check_ASN1_INTEGER_sk_type(sk)))
#define sk_ASN1_INTEGER_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_INTEGER_sk_type(sk),ossl_check_ASN1_INTEGER_freefunc_type(f
reefunc))
#define sk_ASN1_INTEGER_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_type(ptr), (idx))
#define sk_ASN1_INTEGER_set(sk, idx, ptr) ((ASN1_INTEGER
*)OPENSSL_sk_set(ossl_check_ASN1_INTEGER_sk_type(sk), (idx), ossl_check_ASN1_INTEGER_type(ptr)))
#define sk_ASN1_INTEGER_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_type(ptr))
#define sk_ASN1_INTEGER_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_type(ptr))
#define sk_ASN1_INTEGER_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_INTEGER_sk_type(sk), ossl_check_ASN1_INTEGER_type(ptr), pnum)
#define sk_ASN1_INTEGER_sort(sk) OPENSSL_sk_sort(ossl_check_ASN1_INTEGER_sk_type(sk))
#define
 sk_ASN1_INTEGER_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_ASN1_INTEGER_sk_type(sk))
#define sk_ASN1_INTEGER_dup(sk) ((STACK_OF(ASN1_INTEGER)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_INTEGER_sk_type(sk)))
#define sk_ASN1_INTEGER_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_INTEGER)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_copyfunc_type(copyfunc), ossl_check_ASN1_INTEGER_freefunc_type(freefunc)))
#define sk_ASN1_INTEGER_set_cmp_func(sk, cmp)
```

```
((sk_ASN1_INTEGER_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_INTEGER_sk_type(sk),
ossl_check_ASN1_INTEGER_compfunc_type(cmp)))



DECLARE_ASN1_FUNCTIONS(ASN1_INTEGER)
ASN1_INTEGER *d2i_ASN1_UINTEGER(ASN1_INTEGER **a, const unsigned char **pp,
                 long length);
DECLARE_ASN1_DUP_FUNCTION(ASN1_INTEGER)
int ASN1_INTEGER_cmp(const ASN1_INTEGER *x, const ASN1_INTEGER *y);

DECLARE_ASN1_FUNCTIONS(ASN1_ENUMERATED)

int ASN1_UTCTIME_check(const ASN1_UTCTIME *a);
ASN1_UTCTIME
 *ASN1_UTCTIME_set(ASN1_UTCTIME *s, time_t t);
ASN1_UTCTIME *ASN1_UTCTIME_adj(ASN1_UTCTIME *s, time_t t,
                 int offset_day, long offset_sec);
int ASN1_UTCTIME_set_string(ASN1_UTCTIME *s, const char *str);
int ASN1_UTCTIME_cmp_time_t(const ASN1_UTCTIME *s, time_t t);

int ASN1_GENERALIZEDTIME_check(const ASN1_GENERALIZEDTIME *a);
ASN1_GENERALIZEDTIME *ASN1_GENERALIZEDTIME_set(ASN1_GENERALIZEDTIME *s,
                 time_t t);
ASN1_GENERALIZEDTIME *ASN1_GENERALIZEDTIME_adj(ASN1_GENERALIZEDTIME *s,
                 time_t t, int offset_day,
                 long offset_sec);
int ASN1_GENERALIZEDTIME_set_string(ASN1_GENERALIZEDTIME *s, const char *str);

int ASN1_TIME_diff(int *pday, int *psec,
          const ASN1_TIME *from, const ASN1_TIME *to);

DECLARE_ASN1_FUNCTIONS(ASN1_OCTET_STRING)
DECLARE_ASN1_DUP_FUNCTION(ASN1_OCTET_STRING)
int ASN1_OCTET_STRING_cmp(const
 ASN1_OCTET_STRING *a,
                 const ASN1_OCTET_STRING *b);
int ASN1_OCTET_STRING_set(ASN1_OCTET_STRING *str, const unsigned char *data,
                 int len);

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_UTF8STRING, ASN1_UTF8STRING, ASN1_UTF8STRING)
#define sk_ASN1_UTF8STRING_num(sk)
OPENSSL_sk_num(ossl_check_const_ASN1_UTF8STRING_sk_type(sk))
#define sk_ASN1_UTF8STRING_value(sk, idx) ((ASN1_UTF8STRING
*)OPENSSL_sk_value(ossl_check_const_ASN1_UTF8STRING_sk_type(sk), (idx)))
#define sk_ASN1_UTF8STRING_new(cmp) ((STACK_OF(ASN1_UTF8STRING)
*)OPENSSL_sk_new(ossl_check_ASN1_UTF8STRING_compfunc_type(cmp)))
#define sk_ASN1_UTF8STRING_new_null() ((STACK_OF(ASN1_UTF8STRING) *)OPENSSL_sk_new_null())
```

```
#define sk_ASN1_UTF8STRING_new_reserve(cmp, n) ((STACK_OF(ASN1_UTF8STRING)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_UTF8STRING_compfunc_type(cmp), (n)))
#define sk_ASN1_UTF8STRING_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_ASN1_UTF8STRING_sk_type(sk), (n))
#define
 sk_ASN1_UTF8STRING_free(sk) OPENSSL_sk_free(ossl_check_ASN1_UTF8STRING_sk_type(sk))
#define sk_ASN1_UTF8STRING_zero(sk) OPENSSL_sk_zero(ossl_check_ASN1_UTF8STRING_sk_type(sk))
#define sk_ASN1_UTF8STRING_delete(sk, i) ((ASN1_UTF8STRING
*)OPENSSL_sk_delete(ossl_check_ASN1_UTF8STRING_sk_type(sk), (i)))
#define sk_ASN1_UTF8STRING_delete_ptr(sk, ptr) ((ASN1_UTF8STRING
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_UTF8STRING_sk_type(sk),
ossl_check_ASN1_UTF8STRING_type(ptr)))
#define sk_ASN1_UTF8STRING_push(sk, ptr)
OPENSSL_sk_push(ossl_check_ASN1_UTF8STRING_sk_type(sk), ossl_check_ASN1_UTF8STRING_type(ptr))
#define sk_ASN1_UTF8STRING_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_ASN1_UTF8STRING_sk_type(sk),
ossl_check_ASN1_UTF8STRING_type(ptr))
#define sk_ASN1_UTF8STRING_pop(sk) ((ASN1_UTF8STRING
*)OPENSSL_sk_pop(ossl_check_ASN1_UTF8STRING_sk_type(sk)))
#define sk_ASN1_UTF8STRING_shift(sk) ((ASN1_UTF8STRING
*)OPENSSL_sk_shift(ossl_check_ASN1_UTF8STRING_sk_type(sk)))
#define sk_ASN1_UTF8STRING_pop_free(sk,
 freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_UTF8STRING_sk_type(sk),ossl_check_ASN1_UTF8STRING_freefun
c_type(freefunc))
#define sk_ASN1_UTF8STRING_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_ASN1_UTF8STRING_sk_type(sk), ossl_check_ASN1_UTF8STRING_type(ptr),
(idx))
#define sk_ASN1_UTF8STRING_set(sk, idx, ptr) ((ASN1_UTF8STRING
*)OPENSSL_sk_set(ossl_check_ASN1_UTF8STRING_sk_type(sk), (idx),
ossl_check_ASN1_UTF8STRING_type(ptr)))
#define sk_ASN1_UTF8STRING_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASN1_UTF8STRING_sk_type(sk),
ossl_check_ASN1_UTF8STRING_type(ptr))
#define sk_ASN1_UTF8STRING_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_ASN1_UTF8STRING_sk_type(sk),
ossl_check_ASN1_UTF8STRING_type(ptr))
#define sk_ASN1_UTF8STRING_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_UTF8STRING_sk_type(sk),
ossl_check_ASN1_UTF8STRING_type(ptr), pnum)
#define sk_ASN1_UTF8STRING_sort(sk) OPENSSL_sk_sort(ossl_check_ASN1_UTF8STRING_sk_type(sk))
#define sk_ASN1_UTF8STRING_is_sorted(sk)
 OPENSSL_sk_is_sorted(ossl_check_const_ASN1_UTF8STRING_sk_type(sk))
#define sk_ASN1_UTF8STRING_dup(sk) ((STACK_OF(ASN1_UTF8STRING)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_UTF8STRING_sk_type(sk)))
#define sk_ASN1_UTF8STRING_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_UTF8STRING)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_UTF8STRING_sk_type(sk),
ossl_check_ASN1_UTF8STRING_copyfunc_type(copyfunc),
ossl_check_ASN1_UTF8STRING_freefunc_type(freefunc)))
```

```
#define sk_ASN1_UTF8STRING_set_cmp_func(sk, cmp)
((sk_ASN1_UTF8STRING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_UTF8STRING_sk_type(sk
), ossl_check_ASN1_UTF8STRING_compfunc_type(cmp)))


DECLARE_ASN1_FUNCTIONS(ASN1_VISIBLESTRING)
DECLARE_ASN1_FUNCTIONS(ASN1_UNIVERSALSTRING)
DECLARE_ASN1_FUNCTIONS(ASN1_UTF8STRING)
DECLARE_ASN1_FUNCTIONS(ASN1_NULL)
DECLARE_ASN1_FUNCTIONS(ASN1_BMPSTRING)

int UTF8_getc(const unsigned char *str, int len, unsigned long *val);
int UTF8_putc(unsigned char *str, int len, unsigned long value);

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_GENERALSTRING,
 ASN1_GENERALSTRING, ASN1_GENERALSTRING)
#define sk_ASN1_GENERALSTRING_num(sk)
OPENSSL_sk_num(ossl_check_const_ASN1_GENERALSTRING_sk_type(sk))
#define sk_ASN1_GENERALSTRING_value(sk, idx) ((ASN1_GENERALSTRING
*)OPENSSL_sk_value(ossl_check_const_ASN1_GENERALSTRING_sk_type(sk), (idx)))
#define sk_ASN1_GENERALSTRING_new(cmp) ((STACK_OF(ASN1_GENERALSTRING)
*)OPENSSL_sk_new(ossl_check_ASN1_GENERALSTRING_compfunc_type(cmp)))
#define sk_ASN1_GENERALSTRING_new_null() ((STACK_OF(ASN1_GENERALSTRING)
*)OPENSSL_sk_new_null())
#define sk_ASN1_GENERALSTRING_new_reserve(cmp, n) ((STACK_OF(ASN1_GENERALSTRING)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_GENERALSTRING_compfunc_type(cmp), (n)))
#define sk_ASN1_GENERALSTRING_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_ASN1_GENERALSTRING_sk_type(sk), (n))
#define sk_ASN1_GENERALSTRING_free(sk)
OPENSSL_sk_free(ossl_check_ASN1_GENERALSTRING_sk_type(sk))
#define sk_ASN1_GENERALSTRING_zero(sk)
OPENSSL_sk_zero(ossl_check_ASN1_GENERALSTRING_sk_type(sk))
#define
 sk_ASN1_GENERALSTRING_delete(sk, i) ((ASN1_GENERALSTRING
*)OPENSSL_sk_delete(ossl_check_ASN1_GENERALSTRING_sk_type(sk), (i)))
#define sk_ASN1_GENERALSTRING_delete_ptr(sk, ptr) ((ASN1_GENERALSTRING
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr)))
#define sk_ASN1_GENERALSTRING_push(sk, ptr)
OPENSSL_sk_push(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr))
#define sk_ASN1_GENERALSTRING_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr))
#define sk_ASN1_GENERALSTRING_pop(sk) ((ASN1_GENERALSTRING
*)OPENSSL_sk_pop(ossl_check_ASN1_GENERALSTRING_sk_type(sk)))
#define sk_ASN1_GENERALSTRING_shift(sk) ((ASN1_GENERALSTRING
*)OPENSSL_sk_shift(ossl_check_ASN1_GENERALSTRING_sk_type(sk)))
```

#define sk_ASN1_GENERALSTRING_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_GENERALSTRING_sk_type(sk),ossl_check_ASN1_GENERALSTRING_freefunc_type(freefunc))
#define
sk_ASN1_GENERALSTRING_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr), (idx))
#define sk_ASN1_GENERALSTRING_set(sk, idx, ptr) ((ASN1_GENERALSTRING
*)OPENSSL_sk_set(ossl_check_ASN1_GENERALSTRING_sk_type(sk), (idx),
ossl_check_ASN1_GENERALSTRING_type(ptr)))
#define sk_ASN1_GENERALSTRING_find(sk, ptr)
OPENSSL_sk_find(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr))
#define sk_ASN1_GENERALSTRING_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr))
#define sk_ASN1_GENERALSTRING_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_type(ptr), pnum)
#define sk_ASN1_GENERALSTRING_sort(sk)
OPENSSL_sk_sort(ossl_check_ASN1_GENERALSTRING_sk_type(sk))
#define sk_ASN1_GENERALSTRING_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_ASN1_GENERALSTRING_sk_type(sk))
#define sk_ASN1_GENERALSTRING_dup(sk) ((STACK_OF(ASN1_GENERALSTRING)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_GENERALSTRING_sk_type(sk)))
#define sk_ASN1_GENERALSTRING_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(ASN1_GENERALSTRING)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_GENERALSTRING_sk_type(sk),
ossl_check_ASN1_GENERALSTRING_copyfunc_type(copyfunc),
ossl_check_ASN1_GENERALSTRING_freefunc_type(freefunc)))
#define sk_ASN1_GENERALSTRING_set_cmp_func(sk, cmp)
((sk_ASN1_GENERALSTRING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_GENERALSTRING_sk_type(sk), ossl_check_ASN1_GENERALSTRING_compfunc_type(cmp)))

DECLARE_ASN1_FUNCTIONS_name(ASN1_STRING, ASN1_PRINTABLE)

DECLARE_ASN1_FUNCTIONS_name(ASN1_STRING, DIRECTORYSTRING)
DECLARE_ASN1_FUNCTIONS_name(ASN1_STRING, DISPLAYTEXT)
DECLARE_ASN1_FUNCTIONS(ASN1_PRINTABLESTRING)
DECLARE_ASN1_FUNCTIONS(ASN1_T61STRING)
DECLARE_ASN1_FUNCTIONS(ASN1_IA5STRING)
DECLARE_ASN1_FUNCTIONS(ASN1_GENERALSTRING)
DECLARE_ASN1_FUNCTIONS(ASN1_UTCTIME)
DECLARE_ASN1_FUNCTIONS(ASN1_GENERALIZEDTIME)
DECLARE_ASN1_FUNCTIONS(ASN1_TIME)

DECLARE_ASN1_DUP_FUNCTION(ASN1_TIME)

```
DECLARE_ASN1_DUP_FUNCTION(ASN1_UTCTIME)
DECLARE_ASN1_DUP_FUNCTION(ASN1_GENERALIZEDTIME)

DECLARE_ASN1_ITEM(ASN1_OCTET_STRING_NDEF)

ASN1_TIME
 *ASN1_TIME_set(ASN1_TIME *s, time_t t);
ASN1_TIME *ASN1_TIME_adj(ASN1_TIME *s, time_t t,
                         int offset_day, long offset_sec);
int ASN1_TIME_check(const ASN1_TIME *t);
ASN1_GENERALIZEDTIME *ASN1_TIME_to_generalizedtime(const ASN1_TIME *t,
                                   ASN1_GENERALIZEDTIME **out);
int ASN1_TIME_set_string(ASN1_TIME *s, const char *str);
int ASN1_TIME_set_string_X509(ASN1_TIME *s, const char *str);
int ASN1_TIME_to_tm(const ASN1_TIME *s, struct tm *tm);
int ASN1_TIME_normalize(ASN1_TIME *s);
int ASN1_TIME_cmp_time_t(const ASN1_TIME *s, time_t t);
int ASN1_TIME_compare(const ASN1_TIME *a, const ASN1_TIME *b);

int
 i2a_ASN1_INTEGER(BIO *bp, const ASN1_INTEGER *a);
int a2i_ASN1_INTEGER(BIO *bp, ASN1_INTEGER *bs, char *buf, int size);
int i2a_ASN1_ENUMERATED(BIO *bp, const ASN1_ENUMERATED *a);
int a2i_ASN1_ENUMERATED(BIO *bp, ASN1_ENUMERATED *bs, char *buf, int size);
int i2a_ASN1_OBJECT(BIO *bp, const ASN1_OBJECT *a);
int a2i_ASN1_STRING(BIO *bp, ASN1_STRING *bs, char *buf, int size);
int i2a_ASN1_STRING(BIO *bp, const ASN1_STRING *a, int type);
int i2t_ASN1_OBJECT(char *buf, int buf_len, const ASN1_OBJECT *a);

int a2d_ASN1_OBJECT(unsigned char *out, int olen, const char *buf, int num);
ASN1_OBJECT *ASN1_OBJECT_create(int nid, unsigned char *data, int len,
                                const char *sn, const char *ln);

int ASN1_INTEGER_get_int64(int64_t *pr, const ASN1_INTEGER *a);
int ASN1_INTEGER_set_int64(ASN1_INTEGER *a, int64_t r);
int ASN1_INTEGER_get_uint64(uint64_t *pr, const ASN1_INTEGER *a);
int ASN1_INTEGER_set_uint64(ASN1_INTEGER *a, uint64_t r);

int ASN1_INTEGER_set(ASN1_INTEGER
 *a, long v);
long ASN1_INTEGER_get(const ASN1_INTEGER *a);
ASN1_INTEGER *BN_to_ASN1_INTEGER(const BIGNUM *bn, ASN1_INTEGER *ai);
BIGNUM *ASN1_INTEGER_to_BN(const ASN1_INTEGER *ai, BIGNUM *bn);

int ASN1_ENUMERATED_get_int64(int64_t *pr, const ASN1_ENUMERATED *a);
int ASN1_ENUMERATED_set_int64(ASN1_ENUMERATED *a, int64_t r);
```

```
int ASN1_ENUMERATED_set(ASN1_ENUMERATED *a, long v);
long ASN1_ENUMERATED_get(const ASN1_ENUMERATED *a);
ASN1_ENUMERATED *BN_to_ASN1_ENUMERATED(const BIGNUM *bn, ASN1_ENUMERATED *ai);
BIGNUM *ASN1_ENUMERATED_to_BN(const ASN1_ENUMERATED *ai, BIGNUM *bn);

/* General */
/* given a string, return the correct type, max is the maximum length */
int ASN1_PRINTABLE_type(const unsigned char *s, int max);

unsigned long ASN1_tag2bit(int tag);

/* SPECIALS */
int ASN1_get_object(const unsigned char **pp, long *plength, int *ptag,
                    int *pclass, long omax);
int ASN1_check_infinite_end(unsigned char **p, long len);
int ASN1_const_check_infinite_end(const unsigned
 char **p, long len);
void ASN1_put_object(unsigned char **pp, int constructed, int length,
                     int tag, int xclass);
int ASN1_put_eoc(unsigned char **pp);
int ASN1_object_size(int constructed, int length, int tag);

/* Used to implement other functions */
void *ASN1_dup(i2d_of_void *i2d, d2i_of_void *d2i, const void *x);

# define ASN1_dup_of(type,i2d,d2i,x) \
   ((type*)ASN1_dup(CHECKED_I2D_OF(type, i2d), \
                    CHECKED_D2I_OF(type, d2i), \
                    CHECKED_PTR_OF(const type, x)))

void *ASN1_item_dup(const ASN1_ITEM *it, const void *x);
int ASN1_item_sign_ex(const ASN1_ITEM *it, X509_ALGOR *algor1,
                      X509_ALGOR *algor2, ASN1_BIT_STRING *signature,
                      const void *data, const ASN1_OCTET_STRING *id,
                      EVP_PKEY *pkey, const EVP_MD *md, OSSL_LIB_CTX *libctx,
                      const char *propq);
int ASN1_item_verify_ex(const ASN1_ITEM *it, const X509_ALGOR *alg,

                const ASN1_BIT_STRING *signature, const void *data,
                      const ASN1_OCTET_STRING *id, EVP_PKEY *pkey,
                      OSSL_LIB_CTX *libctx, const char *propq);

/* ASN1 alloc/free macros for when a type is only used internally */

# define M_ASN1_new_of(type) (type *)ASN1_item_new(ASN1_ITEM_rptr(type))
# define M_ASN1_free_of(x, type) \
                 ASN1_item_free(CHECKED_PTR_OF(type, x), ASN1_ITEM_rptr(type))
```

```
# ifndef OPENSSL_NO_STDIO
void *ASN1_d2i_fp(void *(*xnew) (void), d2i_of_void *d2i, FILE *in, void **x);

#  define ASN1_d2i_fp_of(type,xnew,d2i,in,x) \
  ((type*)ASN1_d2i_fp(CHECKED_NEW_OF(type, xnew), \
                 CHECKED_D2I_OF(type, d2i), \
                 in, \
                 CHECKED_PPTR_OF(type, x)))

void *ASN1_item_d2i_fp_ex(const ASN1_ITEM *it, FILE *in, void *x,
                  OSSL_LIB_CTX *libctx, const char *propq);
void *ASN1_item_d2i_fp(const ASN1_ITEM *it, FILE *in, void *x);
int
 ASN1_i2d_fp(i2d_of_void *i2d, FILE *out, const void *x);

#  define ASN1_i2d_fp_of(type,i2d,out,x) \
  (ASN1_i2d_fp(CHECKED_I2D_OF(type, i2d), \
             out, \
             CHECKED_PTR_OF(const type, x)))

int ASN1_item_i2d_fp(const ASN1_ITEM *it, FILE *out, const void *x);
int ASN1_STRING_print_ex_fp(FILE *fp, const ASN1_STRING *str, unsigned long flags);
# endif

int ASN1_STRING_to_UTF8(unsigned char **out, const ASN1_STRING *in);

void *ASN1_d2i_bio(void *(*xnew) (void), d2i_of_void *d2i, BIO *in, void **x);

#  define ASN1_d2i_bio_of(type,xnew,d2i,in,x) \
  ((type*)ASN1_d2i_bio( CHECKED_NEW_OF(type, xnew), \
                 CHECKED_D2I_OF(type, d2i), \
                 in, \
                 CHECKED_PPTR_OF(type, x)))

void *ASN1_item_d2i_bio_ex(const ASN1_ITEM *it, BIO *in, void *pval,
                  OSSL_LIB_CTX *libctx, const char *propq);
void *ASN1_item_d2i_bio(const ASN1_ITEM *it, BIO *in, void *pval);
int ASN1_i2d_bio(i2d_of_void
 *i2d, BIO *out, const void *x);

#  define ASN1_i2d_bio_of(type,i2d,out,x) \
  (ASN1_i2d_bio(CHECKED_I2D_OF(type, i2d), \
             out, \
             CHECKED_PTR_OF(const type, x)))

int ASN1_item_i2d_bio(const ASN1_ITEM *it, BIO *out, const void *x);
BIO *ASN1_item_i2d_mem_bio(const ASN1_ITEM *it, const ASN1_VALUE *val);
int ASN1_UTCTIME_print(BIO *fp, const ASN1_UTCTIME *a);
```

```
int ASN1_GENERALIZEDTIME_print(BIO *fp, const ASN1_GENERALIZEDTIME *a);
int ASN1_TIME_print(BIO *bp, const ASN1_TIME *tm);
int ASN1_TIME_print_ex(BIO *bp, const ASN1_TIME *tm, unsigned long flags);
int ASN1_STRING_print(BIO *bp, const ASN1_STRING *v);
int ASN1_STRING_print_ex(BIO *out, const ASN1_STRING *str, unsigned long flags);
int ASN1_buf_print(BIO *bp, const unsigned char *buf, size_t buflen, int off);
int ASN1_bn_print(BIO *bp, const char *number, const BIGNUM *num,
             unsigned char *buf, int off);
int ASN1_parse(BIO *bp, const unsigned char *pp, long len, int indent);
int
 ASN1_parse_dump(BIO *bp, const unsigned char *pp, long len, int indent,
              int dump);
const char *ASN1_tag2str(int tag);

/* Used to load and write Netscape format cert */

int ASN1_UNIVERSALSTRING_to_string(ASN1_UNIVERSALSTRING *s);

int ASN1_TYPE_set_octetstring(ASN1_TYPE *a, unsigned char *data, int len);
int ASN1_TYPE_get_octetstring(const ASN1_TYPE *a, unsigned char *data, int max_len);
int ASN1_TYPE_set_int_octetstring(ASN1_TYPE *a, long num,
                          unsigned char *data, int len);
int ASN1_TYPE_get_int_octetstring(const ASN1_TYPE *a, long *num,
                          unsigned char *data, int max_len);

void *ASN1_item_unpack(const ASN1_STRING *oct, const ASN1_ITEM *it);

ASN1_STRING *ASN1_item_pack(void *obj, const ASN1_ITEM *it,
                    ASN1_OCTET_STRING **oct);

void ASN1_STRING_set_default_mask(unsigned long mask);
int ASN1_STRING_set_default_mask_asc(const char *p);
unsigned long ASN1_STRING_get_default_mask(void);
int
 ASN1_mbstring_copy(ASN1_STRING **out, const unsigned char *in, int len,
                int inform, unsigned long mask);
int ASN1_mbstring_ncopy(ASN1_STRING **out, const unsigned char *in, int len,
                 int inform, unsigned long mask,
                 long minsize, long maxsize);

ASN1_STRING *ASN1_STRING_set_by_NID(ASN1_STRING **out,
                            const unsigned char *in, int inlen,
                            int inform, int nid);
ASN1_STRING_TABLE *ASN1_STRING_TABLE_get(int nid);
int ASN1_STRING_TABLE_add(int, long, long, unsigned long, unsigned long);
void ASN1_STRING_TABLE_cleanup(void);

/* ASN1 template functions */
```

```
/* Old API compatible functions */
ASN1_VALUE *ASN1_item_new(const ASN1_ITEM *it);
ASN1_VALUE *ASN1_item_new_ex(const ASN1_ITEM *it, OSSL_LIB_CTX *libctx,
                             const char *propq);
void ASN1_item_free(ASN1_VALUE *val, const ASN1_ITEM *it);
ASN1_VALUE *ASN1_item_d2i_ex(ASN1_VALUE
 **val, const unsigned char **in,
                             long len, const ASN1_ITEM *it,
                             OSSL_LIB_CTX *libctx, const char *propq);
ASN1_VALUE *ASN1_item_d2i(ASN1_VALUE **val, const unsigned char **in,
                          long len, const ASN1_ITEM *it);
int ASN1_item_i2d(const ASN1_VALUE *val, unsigned char **out, const ASN1_ITEM *it);
int ASN1_item_ndef_i2d(const ASN1_VALUE *val, unsigned char **out,
                       const ASN1_ITEM *it);

void ASN1_add_oid_module(void);
void ASN1_add_stable_module(void);

ASN1_TYPE *ASN1_generate_nconf(const char *str, CONF *nconf);
ASN1_TYPE *ASN1_generate_v3(const char *str, X509V3_CTX *cnf);
int ASN1_str2mask(const char *str, unsigned long *pmask);

/* ASN1 Print flags */

/* Indicate missing OPTIONAL fields */
# define ASN1_PCTX_FLAGS_SHOW_ABSENT            0x001
/* Mark start and end of SEQUENCE */
# define ASN1_PCTX_FLAGS_SHOW_SEQUENCE          0x002
/* Mark start and end
 of SEQUENCE/SET OF */
# define ASN1_PCTX_FLAGS_SHOW_SSOF              0x004
/* Show the ASN1 type of primitives */
# define ASN1_PCTX_FLAGS_SHOW_TYPE              0x008
/* Don't show ASN1 type of ANY */
# define ASN1_PCTX_FLAGS_NO_ANY_TYPE            0x010
/* Don't show ASN1 type of MSTRINGs */
# define ASN1_PCTX_FLAGS_NO_MSTRING_TYPE        0x020
/* Don't show field names in SEQUENCE */
# define ASN1_PCTX_FLAGS_NO_FIELD_NAME          0x040
/* Show structure names of each SEQUENCE field */
# define ASN1_PCTX_FLAGS_SHOW_FIELD_STRUCT_NAME  0x080
/* Don't show structure name even at top level */
# define ASN1_PCTX_FLAGS_NO_STRUCT_NAME         0x100

int ASN1_item_print(BIO *out, const ASN1_VALUE *ifld, int indent,
                    const ASN1_ITEM *it, const ASN1_PCTX *pctx);
ASN1_PCTX *ASN1_PCTX_new(void);
```

```
void ASN1_PCTX_free(ASN1_PCTX *p);
unsigned long ASN1_PCTX_get_flags(const ASN1_PCTX *p);
void ASN1_PCTX_set_flags(ASN1_PCTX *p, unsigned long flags);
unsigned long ASN1_PCTX_get_nm_flags(const
 ASN1_PCTX *p);
void ASN1_PCTX_set_nm_flags(ASN1_PCTX *p, unsigned long flags);
unsigned long ASN1_PCTX_get_cert_flags(const ASN1_PCTX *p);
void ASN1_PCTX_set_cert_flags(ASN1_PCTX *p, unsigned long flags);
unsigned long ASN1_PCTX_get_oid_flags(const ASN1_PCTX *p);
void ASN1_PCTX_set_oid_flags(ASN1_PCTX *p, unsigned long flags);
unsigned long ASN1_PCTX_get_str_flags(const ASN1_PCTX *p);
void ASN1_PCTX_set_str_flags(ASN1_PCTX *p, unsigned long flags);

ASN1_SCTX *ASN1_SCTX_new(int (*scan_cb) (ASN1_SCTX *ctx));
void ASN1_SCTX_free(ASN1_SCTX *p);
const ASN1_ITEM *ASN1_SCTX_get_item(ASN1_SCTX *p);
const ASN1_TEMPLATE *ASN1_SCTX_get_template(ASN1_SCTX *p);
unsigned long ASN1_SCTX_get_flags(ASN1_SCTX *p);
void ASN1_SCTX_set_app_data(ASN1_SCTX *p, void *data);
void *ASN1_SCTX_get_app_data(ASN1_SCTX *p);

const BIO_METHOD *BIO_f_asn1(void);

/* cannot constify val because of CMS_stream() */
BIO *BIO_new_NDEF(BIO *out, ASN1_VALUE *val, const ASN1_ITEM *it);

int i2d_ASN1_bio_stream(BIO
 *out, ASN1_VALUE *val, BIO *in, int flags,
                 const ASN1_ITEM *it);
int PEM_write_bio_ASN1_stream(BIO *out, ASN1_VALUE *val, BIO *in, int flags,
                      const char *hdr, const ASN1_ITEM *it);
/* cannot constify val because of CMS_dataFinal() */
int SMIME_write_ASN1(BIO *bio, ASN1_VALUE *val, BIO *data, int flags,
                int ctype_nid, int econt_nid,
                STACK_OF(X509_ALGOR) *mdalgs, const ASN1_ITEM *it);
int SMIME_write_ASN1_ex(BIO *bio, ASN1_VALUE *val, BIO *data, int flags,
                  int ctype_nid, int econt_nid,
                  STACK_OF(X509_ALGOR) *mdalgs, const ASN1_ITEM *it,
                  OSSL_LIB_CTX *libctx, const char *propq);
ASN1_VALUE *SMIME_read_ASN1(BIO *bio, BIO **bcont, const ASN1_ITEM *it);
ASN1_VALUE *SMIME_read_ASN1_ex(BIO *bio, int flags, BIO **bcont,
                       const ASN1_ITEM *it, ASN1_VALUE **x,
                       OSSL_LIB_CTX
 *libctx, const char *propq);
int SMIME_crlf_copy(BIO *in, BIO *out, int flags);
int SMIME_text(BIO *in, BIO *out);

const ASN1_ITEM *ASN1_ITEM_lookup(const char *name);
```

```
const ASN1_ITEM *ASN1_ITEM_get(size_t i);

/* Legacy compatibility */
# define DECLARE_ASN1_FUNCTIONS_fname(type, itname, name) \
        DECLARE_ASN1_ALLOC_FUNCTIONS_name(type, name) \
        DECLARE_ASN1_ENCODE_FUNCTIONS(type, itname, name)
# define DECLARE_ASN1_FUNCTIONS_const(type) DECLARE_ASN1_FUNCTIONS(type)
# define DECLARE_ASN1_ENCODE_FUNCTIONS_const(type, name) \
        DECLARE_ASN1_ENCODE_FUNCTIONS(type, name)
# define I2D_OF_const(type) I2D_OF(type)
# define ASN1_dup_of_const(type,i2d,d2i,x) ASN1_dup_of(type,i2d,d2i,x)
# define ASN1_i2d_fp_of_const(type,i2d,out,x) ASN1_i2d_fp_of(type,i2d,out,x)
# define ASN1_i2d_bio_of_const(type,i2d,out,x) ASN1_i2d_bio_of(type,i2d,out,x)

# ifdef  __cplusplus
}
# endif
#endif
```

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```
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* https://www.openssl.org/source/license.html
*/

#define PLATFORM "platform: BSD-x86_64"
#define DATE "built on: Wed Mar  5 20:59:39 2025 UTC"

/*
* Generate compiler_flags as an array of individual characters. This is a
* workaround for the situation where CFLAGS gets too long for a C90 string
* literal
*/
static const char compiler_flags[] = {
  'c','o','m','p','i','l','e','r',':',' ','g','c','c',' ','-','f',
  'P','I','C',' ','-','p','t','h','r','e','a','d',' ','-','W','a',
  ',','-','-','n','o','e','x','e','c','s','t','a','c','k',' ','-',
  'W','a','l','l',' ','-','O','3',' ','-','D','L','_','E','N','D',
  'I','A','N',' ','-','D','O','P','E','N','S','S','L','_','P','I',
   'C',' ','-','D','_','T','H','R','E','A','D','_','S','A','F','E',
  ' ','-','D','_','R','E','E','N','T','R','A','N','T',' ','-','D',
  'O','P','E','N','S','S','L','_','B','U','I','L','D','I','N','G',
  '_','O','P','E','N','S','S','L',' ','-','D','N','D','E','B','U',
  'G','\0'
};
```

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/* Generated by Makefile from include/crypto/bn_conf.h.in */
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*/

#ifndef OSSL_CRYPTO_BN_CONF_H
define OSSL_CRYPTO_BN_CONF_H
pragma once

/*
* The contents of this file are not used in the UEFI build, as
* both 32-bit and 64-bit builds are supported from a single run
* of the Configure script.
*/

/* Should we define BN_DIV2W here? */

/* Only one for the following should be defined */
#undef SIXTY_FOUR_BIT_LONG
#undef SIXTY_FOUR_BIT
#define THIRTY_TWO_BIT

#endif
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```
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*/

#include "crypto/rsa.h"
#include "internal/der.h"

/* Well known OIDs precompiled */

/*
* hashAlgs OBJECT IDENTIFIER ::= { nistAlgorithms 2 }
*/
#define DER_OID_V_hashAlgs DER_P_OBJECT, 8, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02
#define DER_OID_SZ_hashAlgs 10
extern const unsigned char ossl_der_oid_hashAlgs[DER_OID_SZ_hashAlgs];

/*
* rsaEncryption    OBJECT IDENTIFIER ::= { pkcs-1 1 }
*/
#define DER_OID_V_rsaEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01, 0x01
#define DER_OID_SZ_rsaEncryption 11
extern const unsigned
 char ossl_der_oid_rsaEncryption[DER_OID_SZ_rsaEncryption];

/*
* id-RSAES-OAEP    OBJECT IDENTIFIER ::= { pkcs-1 7 }
*/
#define DER_OID_V_id_RSAES_OAEP DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01,
0x07
#define DER_OID_SZ_id_RSAES_OAEP 11
extern const unsigned char ossl_der_oid_id_RSAES_OAEP[DER_OID_SZ_id_RSAES_OAEP];
```

```
/*
* id-pSpecified    OBJECT IDENTIFIER ::= { pkcs-1 9 }
*/
#define DER_OID_V_id_pSpecified DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01, 0x09
#define DER_OID_SZ_id_pSpecified 11
extern const unsigned char ossl_der_oid_id_pSpecified[DER_OID_SZ_id_pSpecified];

/*
* id-RSASSA-PSS    OBJECT IDENTIFIER ::= { pkcs-1 10 }
*/
#define DER_OID_V_id_RSASSA_PSS DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01,
0x0A
#define DER_OID_SZ_id_RSASSA_PSS 11
extern const unsigned char ossl_der_oid_id_RSASSA_PSS[DER_OID_SZ_id_RSASSA_PSS];

/*
* md2WithRSAEncryption         OBJECT IDENTIFIER ::= { pkcs-1 2 }
*/
#define DER_OID_V_md2WithRSAEncryption
 DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01, 0x02
#define DER_OID_SZ_md2WithRSAEncryption 11
extern const unsigned char ossl_der_oid_md2WithRSAEncryption[DER_OID_SZ_md2WithRSAEncryption];

/*
* md5WithRSAEncryption         OBJECT IDENTIFIER ::= { pkcs-1 4 }
*/
#define DER_OID_V_md5WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01,
0x01, 0x04
#define DER_OID_SZ_md5WithRSAEncryption 11
extern const unsigned char ossl_der_oid_md5WithRSAEncryption[DER_OID_SZ_md5WithRSAEncryption];

/*
* sha1WithRSAEncryption        OBJECT IDENTIFIER ::= { pkcs-1 5 }
*/
#define DER_OID_V_sha1WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01,
0x01, 0x05
#define DER_OID_SZ_sha1WithRSAEncryption 11
extern const unsigned char ossl_der_oid_sha1WithRSAEncryption[DER_OID_SZ_sha1WithRSAEncryption];

/*
* sha224WithRSAEncryption      OBJECT IDENTIFIER ::= { pkcs-1 14 }
*/
#define DER_OID_V_sha224WithRSAEncryption DER_P_OBJECT,
 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01, 0x0E
#define DER_OID_SZ_sha224WithRSAEncryption 11
extern const unsigned char ossl_der_oid_sha224WithRSAEncryption[DER_OID_SZ_sha224WithRSAEncryption];

/*
```

```
* sha256WithRSAEncryption      OBJECT IDENTIFIER ::= { pkcs-1 11 }
*/
#define DER_OID_V_sha256WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D,
0x01, 0x01, 0x0B
#define DER_OID_SZ_sha256WithRSAEncryption 11
extern const unsigned char ossl_der_oid_sha256WithRSAEncryption[DER_OID_SZ_sha256WithRSAEncryption];

/*
* sha384WithRSAEncryption      OBJECT IDENTIFIER ::= { pkcs-1 12 }
*/
#define DER_OID_V_sha384WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D,
0x01, 0x01, 0x0C
#define DER_OID_SZ_sha384WithRSAEncryption 11
extern const unsigned char ossl_der_oid_sha384WithRSAEncryption[DER_OID_SZ_sha384WithRSAEncryption];

/*
* sha512WithRSAEncryption      OBJECT IDENTIFIER ::= { pkcs-1 13 }
*/
#define DER_OID_V_sha512WithRSAEncryption
 DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01, 0x0D
#define DER_OID_SZ_sha512WithRSAEncryption 11
extern const unsigned char ossl_der_oid_sha512WithRSAEncryption[DER_OID_SZ_sha512WithRSAEncryption];

/*
* sha512-224WithRSAEncryption  OBJECT IDENTIFIER ::= { pkcs-1 15 }
*/
#define DER_OID_V_sha512_224WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D,
0x01, 0x01, 0x0F
#define DER_OID_SZ_sha512_224WithRSAEncryption 11
extern const unsigned char
ossl_der_oid_sha512_224WithRSAEncryption[DER_OID_SZ_sha512_224WithRSAEncryption];

/*
* sha512-256WithRSAEncryption  OBJECT IDENTIFIER ::= { pkcs-1 16 }
*/
#define DER_OID_V_sha512_256WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D,
0x01, 0x01, 0x10
#define DER_OID_SZ_sha512_256WithRSAEncryption 11
extern const unsigned char
ossl_der_oid_sha512_256WithRSAEncryption[DER_OID_SZ_sha512_256WithRSAEncryption];

/*
* id-mgf1    OBJECT IDENTIFIER ::= { pkcs-1 8 }
*/
#define DER_OID_V_id_mgf1
 DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01, 0x01, 0x08
#define DER_OID_SZ_id_mgf1 11
extern const unsigned char ossl_der_oid_id_mgf1[DER_OID_SZ_id_mgf1];
```

```
/*
* id-rsassa-pkcs1-v1_5-with-sha3-224 OBJECT IDENTIFIER ::= { sigAlgs 13 }
*/
#define DER_OID_V_id_rsassa_pkcs1_v1_5_with_sha3_224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65,
0x03, 0x04, 0x03, 0x0D
#define DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_224 11
extern const unsigned char
ossl_der_oid_id_rsassa_pkcs1_v1_5_with_sha3_224[DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_224];

/*
* id-rsassa-pkcs1-v1_5-with-sha3-256 OBJECT IDENTIFIER ::= { sigAlgs 14 }
*/
#define DER_OID_V_id_rsassa_pkcs1_v1_5_with_sha3_256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65,
0x03, 0x04, 0x03, 0x0E
#define DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_256 11
extern const unsigned char
ossl_der_oid_id_rsassa_pkcs1_v1_5_with_sha3_256[DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_256];

/*
* id-rsassa-pkcs1-v1_5-with-sha3-384 OBJECT IDENTIFIER
 ::= { sigAlgs 15 }
*/
#define DER_OID_V_id_rsassa_pkcs1_v1_5_with_sha3_384 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65,
0x03, 0x04, 0x03, 0x0F
#define DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_384 11
extern const unsigned char
ossl_der_oid_id_rsassa_pkcs1_v1_5_with_sha3_384[DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_384];

/*
* id-rsassa-pkcs1-v1_5-with-sha3-512 OBJECT IDENTIFIER ::= { sigAlgs 16 }
*/
#define DER_OID_V_id_rsassa_pkcs1_v1_5_with_sha3_512 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65,
0x03, 0x04, 0x03, 0x10
#define DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_512 11
extern const unsigned char
ossl_der_oid_id_rsassa_pkcs1_v1_5_with_sha3_512[DER_OID_SZ_id_rsassa_pkcs1_v1_5_with_sha3_512];

/*
* md4WithRSAEncryption OBJECT IDENTIFIER ::= { pkcs-1 3 }
*/
#define DER_OID_V_md4WithRSAEncryption DER_P_OBJECT, 9, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x01,
0x01, 0x03
#define DER_OID_SZ_md4WithRSAEncryption 11
extern const unsigned char ossl_der_oid_md4WithRSAEncryption[DER_OID_SZ_md4WithRSAEncryption];

/*
```

```
 * ripemd160WithRSAEncryption    OBJECT IDENTIFIER ::= {
*     iso(1) identified-organization(3) teletrust(36) algorithm(3) signatureAlgorithm(3) rsaSignature(1) 2
* }
*/
#define DER_OID_V_ripemd160WithRSAEncryption DER_P_OBJECT, 6, 0x2B, 0x24, 0x03, 0x03, 0x01, 0x02
#define DER_OID_SZ_ripemd160WithRSAEncryption 8
extern const unsigned char
ossl_der_oid_ripemd160WithRSAEncryption[DER_OID_SZ_ripemd160WithRSAEncryption];

/*
* mdc2WithRSASignature OBJECT IDENTIFIER ::= {
*     iso(1) identified-organization(3) oiw(14) secsig(3) algorithms(2) mdc2WithRSASignature(14)
* }
*/
#define DER_OID_V_mdc2WithRSASignature DER_P_OBJECT, 5, 0x2B, 0x0E, 0x03, 0x02, 0x0E
#define DER_OID_SZ_mdc2WithRSASignature 7
extern const unsigned char ossl_der_oid_mdc2WithRSASignature[DER_OID_SZ_mdc2WithRSASignature];


/* PSS parameters */
int ossl_DER_w_RSASSA_PSS_params(WPACKET *pkt, int tag,
                         const RSA_PSS_PARAMS_30 *pss);
/* Subject Public
 Key Info */
int ossl_DER_w_algorithmIdentifier_RSA(WPACKET *pkt, int tag, RSA *rsa);
int ossl_DER_w_algorithmIdentifier_RSA_PSS(WPACKET *pkt, int tag,
                                   int rsa_type,
                                   const RSA_PSS_PARAMS_30 *pss);
/* Signature */
int ossl_DER_w_algorithmIdentifier_MDWithRSAEncryption(WPACKET *pkt, int tag,
                                       int mdnid);
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/opensslv.h.in
*
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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#ifndef OPENSSL_OPENSSLV_H
# define OPENSSL_OPENSSLV_H
# pragma once

# ifdef  __cplusplus
```

```
extern "C" {
# endif

/*
* SECTION 1: VERSION DATA.  These will change for each release
*/

/*
* Base version macros
*
* These macros express version number MAJOR.MINOR.PATCH exactly
*/
# define OPENSSL_VERSION_MAJOR  3
# define OPENSSL_VERSION_MINOR  0
# define OPENSSL_VERSION_PATCH  16

/*
* Additional version information
*
* These are also part of the new version scheme, but aren't part
* of the version number itself.
*/

/* Could be: #define OPENSSL_VERSION_PRE_RELEASE
 "-alpha.1" */
# define OPENSSL_VERSION_PRE_RELEASE ""
/* Could be: #define OPENSSL_VERSION_BUILD_METADATA "+fips" */
/* Could be: #define OPENSSL_VERSION_BUILD_METADATA "+vendor.1" */
# define OPENSSL_VERSION_BUILD_METADATA ""

/*
* Note: The OpenSSL Project will never define OPENSSL_VERSION_BUILD_METADATA
* to be anything but the empty string.  Its use is entirely reserved for
* others
*/

/*
* Shared library version
*
* This is strictly to express ABI version, which may or may not
* be related to the API version expressed with the macros above.
* This is defined in free form.
*/
# define OPENSSL_SHLIB_VERSION 3

/*
* SECTION 2: USEFUL MACROS
*/
```

```
/* For checking general API compatibility when preprocessing */
# define OPENSSL_VERSION_PREREQ(maj,min)                          \
  ((OPENSSL_VERSION_MAJOR << 16) + OPENSSL_VERSION_MINOR >= ((maj) << 16) + (min))

/*
* Macros to get the version in easily digested string form, both the short
* "MAJOR.MINOR.PATCH" variant
 (where MAJOR, MINOR and PATCH are replaced
* with the values from the corresponding OPENSSL_VERSION_ macros) and the
* longer variant with OPENSSL_VERSION_PRE_RELEASE_STR and
* OPENSSL_VERSION_BUILD_METADATA_STR appended.
*/
# define OPENSSL_VERSION_STR "3.0.16"
# define OPENSSL_FULL_VERSION_STR "3.0.16"

/*
* SECTION 3: ADDITIONAL METADATA
*
* These strings are defined separately to allow them to be parsable.
*/
# define OPENSSL_RELEASE_DATE "11 Feb 2025"

/*
* SECTION 4: BACKWARD COMPATIBILITY
*/

# define OPENSSL_VERSION_TEXT "OpenSSL 3.0.16 11 Feb 2025"

/* Synthesize OPENSSL_VERSION_NUMBER with the layout 0xMNN00PPSL */
# ifdef OPENSSL_VERSION_PRE_RELEASE
#  define _OPENSSL_VERSION_PRE_RELEASE 0x0L
# else
#  define _OPENSSL_VERSION_PRE_RELEASE 0xfL
# endif
# define OPENSSL_VERSION_NUMBER         \
  ( (OPENSSL_VERSION_MAJOR<<28)       \
    |(OPENSSL_VERSION_MINOR<<20)      \
    |(OPENSSL_VERSION_PATCH<<4)       \
    |_OPENSSL_VERSION_PRE_RELEASE )

#
 ifdef  __cplusplus
}
# endif

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
```

define HEADER_OPENSSLV_H
endif

#endif /* OPENSSL_OPENSSLV_H */
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Note: This is a derivative work based on "node-fetch" by David Frank,
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https://github.com/bitinn/node-fetch

```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/x509v3.h.in
*
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*
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* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_X509V3_H
# define OPENSSL_X509V3_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_X509V3_H
# endif

# include <openssl/bio.h>
# include <openssl/x509.h>
# include <openssl/conf.h>
# include <openssl/x509v3err.h>

#ifdef __cplusplus
extern "C" {
#endif

/* Forward reference */
struct v3_ext_method;
struct v3_ext_ctx;

/* Useful typedefs */

typedef void *(*X509V3_EXT_NEW)(void);
typedef void (*X509V3_EXT_FREE) (void *);
typedef void *(*X509V3_EXT_D2I)(void *, const unsigned char **, long);
typedef int (*X509V3_EXT_I2D)
 (const void *, unsigned char **);
typedef STACK_OF(CONF_VALUE) *
   (*X509V3_EXT_I2V) (const struct v3_ext_method *method, void *ext,
                      STACK_OF(CONF_VALUE) *extlist);
typedef void *(*X509V3_EXT_V2I)(const struct v3_ext_method *method,
```

```
                        struct v3_ext_ctx *ctx,
                        STACK_OF(CONF_VALUE) *values);
typedef char *(*X509V3_EXT_I2S)(const struct v3_ext_method *method,
                        void *ext);
typedef void *(*X509V3_EXT_S2I)(const struct v3_ext_method *method,
                        struct v3_ext_ctx *ctx, const char *str);
typedef int (*X509V3_EXT_I2R) (const struct v3_ext_method *method, void *ext,
                       BIO *out, int indent);
typedef void *(*X509V3_EXT_R2I)(const struct v3_ext_method *method,
                        struct v3_ext_ctx *ctx, const char *str);

/* V3 extension structure */

struct v3_ext_method {
  int ext_nid;
  int ext_flags;
/*
 If this is set the following four fields are ignored */
  ASN1_ITEM_EXP *it;
/* Old style ASN1 calls */
  X509V3_EXT_NEW ext_new;
  X509V3_EXT_FREE ext_free;
  X509V3_EXT_D2I d2i;
  X509V3_EXT_I2D i2d;
/* The following pair is used for string extensions */
  X509V3_EXT_I2S i2s;
  X509V3_EXT_S2I s2i;
/* The following pair is used for multi-valued extensions */
  X509V3_EXT_I2V i2v;
  X509V3_EXT_V2I v2i;
/* The following are used for raw extensions */
  X509V3_EXT_I2R i2r;
  X509V3_EXT_R2I r2i;
  void *usr_data;           /* Any extension specific data */
};

typedef struct X509V3_CONF_METHOD_st {
  char *(*get_string) (void *db, const char *section, const char *value);
  STACK_OF(CONF_VALUE) *(*get_section) (void *db, const char *section);
  void (*free_string) (void *db, char *string);
  void (*free_section) (void *db, STACK_OF(CONF_VALUE) *section);
} X509V3_CONF_METHOD;

/* Context specific info for producing X509 v3 extensions*/
struct v3_ext_ctx
 {
# define X509V3_CTX_TEST 0x1
# ifndef OPENSSL_NO_DEPRECATED_3_0
```

```
#  define CTX_TEST X509V3_CTX_TEST
# endif
# define X509V3_CTX_REPLACE 0x2
  int flags;
  X509 *issuer_cert;
  X509 *subject_cert;
  X509_REQ *subject_req;
  X509_CRL *crl;
  X509V3_CONF_METHOD *db_meth;
  void *db;
  EVP_PKEY *issuer_pkey;
/* Maybe more here */
};

typedef struct v3_ext_method X509V3_EXT_METHOD;

SKM_DEFINE_STACK_OF_INTERNAL(X509V3_EXT_METHOD, X509V3_EXT_METHOD,
X509V3_EXT_METHOD)
#define sk_X509V3_EXT_METHOD_num(sk)
OPENSSL_sk_num(ossl_check_const_X509V3_EXT_METHOD_sk_type(sk))
#define sk_X509V3_EXT_METHOD_value(sk, idx) ((X509V3_EXT_METHOD
*)OPENSSL_sk_value(ossl_check_const_X509V3_EXT_METHOD_sk_type(sk), (idx)))
#define sk_X509V3_EXT_METHOD_new(cmp) ((STACK_OF(X509V3_EXT_METHOD)
*)OPENSSL_sk_new(ossl_check_X509V3_EXT_METHOD_compfunc_type(cmp)))
#define sk_X509V3_EXT_METHOD_new_null() ((STACK_OF(X509V3_EXT_METHOD)
*)OPENSSL_sk_new_null())
#define sk_X509V3_EXT_METHOD_new_reserve(cmp,
 n) ((STACK_OF(X509V3_EXT_METHOD)
*)OPENSSL_sk_new_reserve(ossl_check_X509V3_EXT_METHOD_compfunc_type(cmp), (n)))
#define sk_X509V3_EXT_METHOD_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_X509V3_EXT_METHOD_sk_type(sk), (n))
#define sk_X509V3_EXT_METHOD_free(sk)
OPENSSL_sk_free(ossl_check_X509V3_EXT_METHOD_sk_type(sk))
#define sk_X509V3_EXT_METHOD_zero(sk)
OPENSSL_sk_zero(ossl_check_X509V3_EXT_METHOD_sk_type(sk))
#define sk_X509V3_EXT_METHOD_delete(sk, i) ((X509V3_EXT_METHOD
*)OPENSSL_sk_delete(ossl_check_X509V3_EXT_METHOD_sk_type(sk), (i)))
#define sk_X509V3_EXT_METHOD_delete_ptr(sk, ptr) ((X509V3_EXT_METHOD
*)OPENSSL_sk_delete_ptr(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_type(ptr)))
#define sk_X509V3_EXT_METHOD_push(sk, ptr)
OPENSSL_sk_push(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_type(ptr))
#define sk_X509V3_EXT_METHOD_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_type(ptr))
#define
```

```
 sk_X509V3_EXT_METHOD_pop(sk) ((X509V3_EXT_METHOD
*)OPENSSL_sk_pop(ossl_check_X509V3_EXT_METHOD_sk_type(sk)))
#define sk_X509V3_EXT_METHOD_shift(sk) ((X509V3_EXT_METHOD
*)OPENSSL_sk_shift(ossl_check_X509V3_EXT_METHOD_sk_type(sk)))
#define sk_X509V3_EXT_METHOD_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509V3_EXT_METHOD_sk_type(sk),ossl_check_X509V3_EXT_METHOD
_freefunc_type(freefunc))
#define sk_X509V3_EXT_METHOD_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_type(ptr), (idx))
#define sk_X509V3_EXT_METHOD_set(sk, idx, ptr) ((X509V3_EXT_METHOD
*)OPENSSL_sk_set(ossl_check_X509V3_EXT_METHOD_sk_type(sk), (idx),
ossl_check_X509V3_EXT_METHOD_type(ptr)))
#define sk_X509V3_EXT_METHOD_find(sk, ptr)
OPENSSL_sk_find(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_type(ptr))
#define sk_X509V3_EXT_METHOD_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
 ossl_check_X509V3_EXT_METHOD_type(ptr))
#define sk_X509V3_EXT_METHOD_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_type(ptr), pnum)
#define sk_X509V3_EXT_METHOD_sort(sk)
OPENSSL_sk_sort(ossl_check_X509V3_EXT_METHOD_sk_type(sk))
#define sk_X509V3_EXT_METHOD_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509V3_EXT_METHOD_sk_type(sk))
#define sk_X509V3_EXT_METHOD_dup(sk) ((STACK_OF(X509V3_EXT_METHOD)
*)OPENSSL_sk_dup(ossl_check_const_X509V3_EXT_METHOD_sk_type(sk)))
#define sk_X509V3_EXT_METHOD_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(X509V3_EXT_METHOD)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509V3_EXT_METHOD_sk_type(sk),
ossl_check_X509V3_EXT_METHOD_copyfunc_type(copyfunc),
ossl_check_X509V3_EXT_METHOD_freefunc_type(freefunc)))
#define sk_X509V3_EXT_METHOD_set_cmp_func(sk, cmp)
((sk_X509V3_EXT_METHOD_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509V3_EXT_METHOD_sk
_type(sk), ossl_check_X509V3_EXT_METHOD_compfunc_type(cmp)))


/*
 ext_flags values */
# define X509V3_EXT_DYNAMIC      0x1
# define X509V3_EXT_CTX_DEP      0x2
# define X509V3_EXT_MULTILINE    0x4

typedef BIT_STRING_BITNAME ENUMERATED_NAMES;

typedef struct BASIC_CONSTRAINTS_st {
  int ca;
```

```
  ASN1_INTEGER *pathlen;
} BASIC_CONSTRAINTS;

typedef struct PKEY_USAGE_PERIOD_st {
  ASN1_GENERALIZEDTIME *notBefore;
  ASN1_GENERALIZEDTIME *notAfter;
} PKEY_USAGE_PERIOD;

typedef struct otherName_st {
  ASN1_OBJECT *type_id;
  ASN1_TYPE *value;
} OTHERNAME;

typedef struct EDIPartyName_st {
  ASN1_STRING *nameAssigner;
  ASN1_STRING *partyName;
} EDIPARTYNAME;

typedef struct GENERAL_NAME_st {
# define GEN_OTHERNAME   0
# define GEN_EMAIL       1
# define GEN_DNS         2
# define GEN_X400        3
# define GEN_DIRNAME     4
# define GEN_EDIPARTY    5
# define GEN_URI         6
# define GEN_IPADD       7
# define GEN_RID         8
  int type;
  union {
     char *ptr;
     OTHERNAME *otherName;   /* otherName */
      ASN1_IA5STRING *rfc822Name;
     ASN1_IA5STRING *dNSName;
     ASN1_STRING *x400Address;
     X509_NAME *directoryName;
     EDIPARTYNAME *ediPartyName;
     ASN1_IA5STRING *uniformResourceIdentifier;
     ASN1_OCTET_STRING *iPAddress;
     ASN1_OBJECT *registeredID;
     /* Old names */
     ASN1_OCTET_STRING *ip;  /* iPAddress */
     X509_NAME *dirn;        /* dirn */
     ASN1_IA5STRING *ia5;    /* rfc822Name, dNSName,
                              * uniformResourceIdentifier */
     ASN1_OBJECT *rid;       /* registeredID */
     ASN1_TYPE *other;       /* x400Address */
  } d;
```

```
} GENERAL_NAME;

typedef struct ACCESS_DESCRIPTION_st {
  ASN1_OBJECT *method;
  GENERAL_NAME *location;
} ACCESS_DESCRIPTION;

SKM_DEFINE_STACK_OF_INTERNAL(ACCESS_DESCRIPTION, ACCESS_DESCRIPTION,
ACCESS_DESCRIPTION)
#define sk_ACCESS_DESCRIPTION_num(sk)
OPENSSL_sk_num(ossl_check_const_ACCESS_DESCRIPTION_sk_type(sk))
#define sk_ACCESS_DESCRIPTION_value(sk,
 idx) ((ACCESS_DESCRIPTION
*)OPENSSL_sk_value(ossl_check_const_ACCESS_DESCRIPTION_sk_type(sk), (idx)))
#define sk_ACCESS_DESCRIPTION_new(cmp) ((STACK_OF(ACCESS_DESCRIPTION)
*)OPENSSL_sk_new(ossl_check_ACCESS_DESCRIPTION_compfunc_type(cmp)))
#define sk_ACCESS_DESCRIPTION_new_null() ((STACK_OF(ACCESS_DESCRIPTION)
*)OPENSSL_sk_new_null())
#define sk_ACCESS_DESCRIPTION_new_reserve(cmp, n) ((STACK_OF(ACCESS_DESCRIPTION)
*)OPENSSL_sk_new_reserve(ossl_check_ACCESS_DESCRIPTION_compfunc_type(cmp), (n)))
#define sk_ACCESS_DESCRIPTION_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_ACCESS_DESCRIPTION_sk_type(sk), (n))
#define sk_ACCESS_DESCRIPTION_free(sk)
OPENSSL_sk_free(ossl_check_ACCESS_DESCRIPTION_sk_type(sk))
#define sk_ACCESS_DESCRIPTION_zero(sk)
OPENSSL_sk_zero(ossl_check_ACCESS_DESCRIPTION_sk_type(sk))
#define sk_ACCESS_DESCRIPTION_delete(sk, i) ((ACCESS_DESCRIPTION
*)OPENSSL_sk_delete(ossl_check_ACCESS_DESCRIPTION_sk_type(sk), (i)))
#define sk_ACCESS_DESCRIPTION_delete_ptr(sk, ptr) ((ACCESS_DESCRIPTION
 *)OPENSSL_sk_delete_ptr(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr)))
#define sk_ACCESS_DESCRIPTION_push(sk, ptr)
OPENSSL_sk_push(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr))
#define sk_ACCESS_DESCRIPTION_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr))
#define sk_ACCESS_DESCRIPTION_pop(sk) ((ACCESS_DESCRIPTION
*)OPENSSL_sk_pop(ossl_check_ACCESS_DESCRIPTION_sk_type(sk)))
#define sk_ACCESS_DESCRIPTION_shift(sk) ((ACCESS_DESCRIPTION
*)OPENSSL_sk_shift(ossl_check_ACCESS_DESCRIPTION_sk_type(sk)))
#define sk_ACCESS_DESCRIPTION_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),ossl_check_ACCESS_DESCRIPTIO
N_freefunc_type(freefunc))
#define sk_ACCESS_DESCRIPTION_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr), (idx))
#define
```

```
 sk_ACCESS_DESCRIPTION_set(sk, idx, ptr) ((ACCESS_DESCRIPTION
*)OPENSSL_sk_set(ossl_check_ACCESS_DESCRIPTION_sk_type(sk), (idx),
ossl_check_ACCESS_DESCRIPTION_type(ptr)))
#define sk_ACCESS_DESCRIPTION_find(sk, ptr)
OPENSSL_sk_find(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr))
#define sk_ACCESS_DESCRIPTION_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr))
#define sk_ACCESS_DESCRIPTION_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_type(ptr), pnum)
#define sk_ACCESS_DESCRIPTION_sort(sk)
OPENSSL_sk_sort(ossl_check_ACCESS_DESCRIPTION_sk_type(sk))
#define sk_ACCESS_DESCRIPTION_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_ACCESS_DESCRIPTION_sk_type(sk))
#define sk_ACCESS_DESCRIPTION_dup(sk) ((STACK_OF(ACCESS_DESCRIPTION)
*)OPENSSL_sk_dup(ossl_check_const_ACCESS_DESCRIPTION_sk_type(sk)))
#define sk_ACCESS_DESCRIPTION_deep_copy(sk,
 copyfunc, freefunc) ((STACK_OF(ACCESS_DESCRIPTION)
*)OPENSSL_sk_deep_copy(ossl_check_const_ACCESS_DESCRIPTION_sk_type(sk),
ossl_check_ACCESS_DESCRIPTION_copyfunc_type(copyfunc),
ossl_check_ACCESS_DESCRIPTION_freefunc_type(freefunc)))
#define sk_ACCESS_DESCRIPTION_set_cmp_func(sk, cmp)
((sk_ACCESS_DESCRIPTION_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ACCESS_DESCRIPTION_s
k_type(sk), ossl_check_ACCESS_DESCRIPTION_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(GENERAL_NAME, GENERAL_NAME, GENERAL_NAME)
#define sk_GENERAL_NAME_num(sk) OPENSSL_sk_num(ossl_check_const_GENERAL_NAME_sk_type(sk))
#define sk_GENERAL_NAME_value(sk, idx) ((GENERAL_NAME
*)OPENSSL_sk_value(ossl_check_const_GENERAL_NAME_sk_type(sk), (idx)))
#define sk_GENERAL_NAME_new(cmp) ((STACK_OF(GENERAL_NAME)
*)OPENSSL_sk_new(ossl_check_GENERAL_NAME_compfunc_type(cmp)))
#define sk_GENERAL_NAME_new_null() ((STACK_OF(GENERAL_NAME) *)OPENSSL_sk_new_null())
#define sk_GENERAL_NAME_new_reserve(cmp, n) ((STACK_OF(GENERAL_NAME)
 *)OPENSSL_sk_new_reserve(ossl_check_GENERAL_NAME_compfunc_type(cmp), (n)))
#define sk_GENERAL_NAME_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_GENERAL_NAME_sk_type(sk),
(n))
#define sk_GENERAL_NAME_free(sk) OPENSSL_sk_free(ossl_check_GENERAL_NAME_sk_type(sk))
#define sk_GENERAL_NAME_zero(sk) OPENSSL_sk_zero(ossl_check_GENERAL_NAME_sk_type(sk))
#define sk_GENERAL_NAME_delete(sk, i) ((GENERAL_NAME
*)OPENSSL_sk_delete(ossl_check_GENERAL_NAME_sk_type(sk), (i)))
#define sk_GENERAL_NAME_delete_ptr(sk, ptr) ((GENERAL_NAME
*)OPENSSL_sk_delete_ptr(ossl_check_GENERAL_NAME_sk_type(sk),
ossl_check_GENERAL_NAME_type(ptr)))
#define sk_GENERAL_NAME_push(sk, ptr) OPENSSL_sk_push(ossl_check_GENERAL_NAME_sk_type(sk),
ossl_check_GENERAL_NAME_type(ptr))
#define sk_GENERAL_NAME_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_GENERAL_NAME_sk_type(sk), ossl_check_GENERAL_NAME_type(ptr))
```

```
#define sk_GENERAL_NAME_pop(sk) ((GENERAL_NAME
*)OPENSSL_sk_pop(ossl_check_GENERAL_NAME_sk_type(sk)))
#define
 sk_GENERAL_NAME_shift(sk) ((GENERAL_NAME
*)OPENSSL_sk_shift(ossl_check_GENERAL_NAME_sk_type(sk)))
#define sk_GENERAL_NAME_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_GENERAL_NAME_sk_type(sk),ossl_check_GENERAL_NAME_freefunc_ty
pe(freefunc))
#define sk_GENERAL_NAME_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_GENERAL_NAME_sk_type(sk), ossl_check_GENERAL_NAME_type(ptr),
(idx))
#define sk_GENERAL_NAME_set(sk, idx, ptr) ((GENERAL_NAME
*)OPENSSL_sk_set(ossl_check_GENERAL_NAME_sk_type(sk), (idx),
ossl_check_GENERAL_NAME_type(ptr)))
#define sk_GENERAL_NAME_find(sk, ptr) OPENSSL_sk_find(ossl_check_GENERAL_NAME_sk_type(sk),
ossl_check_GENERAL_NAME_type(ptr))
#define sk_GENERAL_NAME_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_GENERAL_NAME_sk_type(sk), ossl_check_GENERAL_NAME_type(ptr))
#define sk_GENERAL_NAME_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_GENERAL_NAME_sk_type(sk), ossl_check_GENERAL_NAME_type(ptr),
pnum)
#define sk_GENERAL_NAME_sort(sk) OPENSSL_sk_sort(ossl_check_GENERAL_NAME_sk_type(sk))
#define
 sk_GENERAL_NAME_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_GENERAL_NAME_sk_type(sk))
#define sk_GENERAL_NAME_dup(sk) ((STACK_OF(GENERAL_NAME)
*)OPENSSL_sk_dup(ossl_check_const_GENERAL_NAME_sk_type(sk)))
#define sk_GENERAL_NAME_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(GENERAL_NAME)
*)OPENSSL_sk_deep_copy(ossl_check_const_GENERAL_NAME_sk_type(sk),
ossl_check_GENERAL_NAME_copyfunc_type(copyfunc),
ossl_check_GENERAL_NAME_freefunc_type(freefunc)))
#define sk_GENERAL_NAME_set_cmp_func(sk, cmp)
((sk_GENERAL_NAME_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_GENERAL_NAME_sk_type(sk),
ossl_check_GENERAL_NAME_compfunc_type(cmp)))


typedef STACK_OF(ACCESS_DESCRIPTION) AUTHORITY_INFO_ACCESS;
typedef STACK_OF(ASN1_OBJECT) EXTENDED_KEY_USAGE;
typedef STACK_OF(ASN1_INTEGER) TLS_FEATURE;
typedef STACK_OF(GENERAL_NAME) GENERAL_NAMES;

SKM_DEFINE_STACK_OF_INTERNAL(GENERAL_NAMES, GENERAL_NAMES, GENERAL_NAMES)
#define sk_GENERAL_NAMES_num(sk)
OPENSSL_sk_num(ossl_check_const_GENERAL_NAMES_sk_type(sk))
#define
 sk_GENERAL_NAMES_value(sk, idx) ((GENERAL_NAMES
*)OPENSSL_sk_value(ossl_check_const_GENERAL_NAMES_sk_type(sk), (idx)))
#define sk_GENERAL_NAMES_new(cmp) ((STACK_OF(GENERAL_NAMES)
```

*)OPENSSL_sk_new(ossl_check_GENERAL_NAMES_compfunc_type(cmp)))
#define sk_GENERAL_NAMES_new_null() ((STACK_OF(GENERAL_NAMES) *)OPENSSL_sk_new_null())
#define sk_GENERAL_NAMES_new_reserve(cmp, n) ((STACK_OF(GENERAL_NAMES)
*)OPENSSL_sk_new_reserve(ossl_check_GENERAL_NAMES_compfunc_type(cmp), (n)))
#define sk_GENERAL_NAMES_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_GENERAL_NAMES_sk_type(sk), (n))
#define sk_GENERAL_NAMES_free(sk) OPENSSL_sk_free(ossl_check_GENERAL_NAMES_sk_type(sk))
#define sk_GENERAL_NAMES_zero(sk) OPENSSL_sk_zero(ossl_check_GENERAL_NAMES_sk_type(sk))
#define sk_GENERAL_NAMES_delete(sk, i) ((GENERAL_NAMES
*)OPENSSL_sk_delete(ossl_check_GENERAL_NAMES_sk_type(sk), (i)))
#define sk_GENERAL_NAMES_delete_ptr(sk, ptr) ((GENERAL_NAMES
*)OPENSSL_sk_delete_ptr(ossl_check_GENERAL_NAMES_sk_type(sk),
ossl_check_GENERAL_NAMES_type(ptr)))
#define sk_GENERAL_NAMES_push(sk, ptr) OPENSSL_sk_push(ossl_check_GENERAL_NAMES_sk_type(sk),
ossl_check_GENERAL_NAMES_type(ptr))
#define sk_GENERAL_NAMES_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_GENERAL_NAMES_sk_type(sk), ossl_check_GENERAL_NAMES_type(ptr))
#define sk_GENERAL_NAMES_pop(sk) ((GENERAL_NAMES
*)OPENSSL_sk_pop(ossl_check_GENERAL_NAMES_sk_type(sk)))
#define sk_GENERAL_NAMES_shift(sk) ((GENERAL_NAMES
*)OPENSSL_sk_shift(ossl_check_GENERAL_NAMES_sk_type(sk)))
#define sk_GENERAL_NAMES_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_GENERAL_NAMES_sk_type(sk),ossl_check_GENERAL_NAMES_freefunc
_type(freefunc))
#define sk_GENERAL_NAMES_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_GENERAL_NAMES_sk_type(sk), ossl_check_GENERAL_NAMES_type(ptr),
(idx))
#define sk_GENERAL_NAMES_set(sk, idx, ptr) ((GENERAL_NAMES
*)OPENSSL_sk_set(ossl_check_GENERAL_NAMES_sk_type(sk), (idx),
ossl_check_GENERAL_NAMES_type(ptr)))
#define
sk_GENERAL_NAMES_find(sk, ptr) OPENSSL_sk_find(ossl_check_GENERAL_NAMES_sk_type(sk),
ossl_check_GENERAL_NAMES_type(ptr))
#define sk_GENERAL_NAMES_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_GENERAL_NAMES_sk_type(sk), ossl_check_GENERAL_NAMES_type(ptr))
#define sk_GENERAL_NAMES_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_GENERAL_NAMES_sk_type(sk), ossl_check_GENERAL_NAMES_type(ptr),
pnum)
#define sk_GENERAL_NAMES_sort(sk) OPENSSL_sk_sort(ossl_check_GENERAL_NAMES_sk_type(sk))
#define sk_GENERAL_NAMES_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_GENERAL_NAMES_sk_type(sk))
#define sk_GENERAL_NAMES_dup(sk) ((STACK_OF(GENERAL_NAMES)
*)OPENSSL_sk_dup(ossl_check_const_GENERAL_NAMES_sk_type(sk)))
#define sk_GENERAL_NAMES_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(GENERAL_NAMES)
*)OPENSSL_sk_deep_copy(ossl_check_const_GENERAL_NAMES_sk_type(sk),
ossl_check_GENERAL_NAMES_copyfunc_type(copyfunc),
ossl_check_GENERAL_NAMES_freefunc_type(freefunc)))
#define

```
 sk_GENERAL_NAMES_set_cmp_func(sk, cmp)
((sk_GENERAL_NAMES_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_GENERAL_NAMES_sk_type(sk),
ossl_check_GENERAL_NAMES_compfunc_type(cmp)))


typedef struct DIST_POINT_NAME_st {
  int type;
  union {
     GENERAL_NAMES *fullname;
     STACK_OF(X509_NAME_ENTRY) *relativename;
  } name;
/* If relativename then this contains the full distribution point name */
  X509_NAME *dpname;
} DIST_POINT_NAME;
/* All existing reasons */
# define CRLDP_ALL_REASONS       0x807f

# define CRL_REASON_NONE                    -1
# define CRL_REASON_UNSPECIFIED              0
# define CRL_REASON_KEY_COMPROMISE           1
# define CRL_REASON_CA_COMPROMISE            2
# define CRL_REASON_AFFILIATION_CHANGED      3
# define CRL_REASON_SUPERSEDED               4
# define CRL_REASON_CESSATION_OF_OPERATION   5
# define CRL_REASON_CERTIFICATE_HOLD         6
# define CRL_REASON_REMOVE_FROM_CRL          8
#
 define CRL_REASON_PRIVILEGE_WITHDRAWN      9
# define CRL_REASON_AA_COMPROMISE           10

struct DIST_POINT_st {
  DIST_POINT_NAME *distpoint;
  ASN1_BIT_STRING *reasons;
  GENERAL_NAMES *CRLissuer;
  int dp_reasons;
};

SKM_DEFINE_STACK_OF_INTERNAL(DIST_POINT, DIST_POINT, DIST_POINT)
#define sk_DIST_POINT_num(sk) OPENSSL_sk_num(ossl_check_const_DIST_POINT_sk_type(sk))
#define sk_DIST_POINT_value(sk, idx) ((DIST_POINT
*)OPENSSL_sk_value(ossl_check_const_DIST_POINT_sk_type(sk), (idx)))
#define sk_DIST_POINT_new(cmp) ((STACK_OF(DIST_POINT)
*)OPENSSL_sk_new(ossl_check_DIST_POINT_compfunc_type(cmp)))
#define sk_DIST_POINT_new_null() ((STACK_OF(DIST_POINT) *)OPENSSL_sk_new_null())
#define sk_DIST_POINT_new_reserve(cmp, n) ((STACK_OF(DIST_POINT)
*)OPENSSL_sk_new_reserve(ossl_check_DIST_POINT_compfunc_type(cmp), (n)))
#define sk_DIST_POINT_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_DIST_POINT_sk_type(sk), (n))
#define sk_DIST_POINT_free(sk) OPENSSL_sk_free(ossl_check_DIST_POINT_sk_type(sk))
```

```
#define
 sk_DIST_POINT_zero(sk) OPENSSL_sk_zero(ossl_check_DIST_POINT_sk_type(sk))
#define sk_DIST_POINT_delete(sk, i) ((DIST_POINT
*)OPENSSL_sk_delete(ossl_check_DIST_POINT_sk_type(sk), (i)))
#define sk_DIST_POINT_delete_ptr(sk, ptr) ((DIST_POINT
*)OPENSSL_sk_delete_ptr(ossl_check_DIST_POINT_sk_type(sk), ossl_check_DIST_POINT_type(ptr)))
#define sk_DIST_POINT_push(sk, ptr) OPENSSL_sk_push(ossl_check_DIST_POINT_sk_type(sk),
ossl_check_DIST_POINT_type(ptr))
#define sk_DIST_POINT_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_DIST_POINT_sk_type(sk),
ossl_check_DIST_POINT_type(ptr))
#define sk_DIST_POINT_pop(sk) ((DIST_POINT *)OPENSSL_sk_pop(ossl_check_DIST_POINT_sk_type(sk)))
#define sk_DIST_POINT_shift(sk) ((DIST_POINT *)OPENSSL_sk_shift(ossl_check_DIST_POINT_sk_type(sk)))
#define sk_DIST_POINT_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_DIST_POINT_sk_type(sk),ossl_check_DIST_POINT_freefunc_type(freefunc)
)
#define sk_DIST_POINT_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_DIST_POINT_sk_type(sk),
 ossl_check_DIST_POINT_type(ptr), (idx))
#define sk_DIST_POINT_set(sk, idx, ptr) ((DIST_POINT
*)OPENSSL_sk_set(ossl_check_DIST_POINT_sk_type(sk), (idx), ossl_check_DIST_POINT_type(ptr)))
#define sk_DIST_POINT_find(sk, ptr) OPENSSL_sk_find(ossl_check_DIST_POINT_sk_type(sk),
ossl_check_DIST_POINT_type(ptr))
#define sk_DIST_POINT_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_DIST_POINT_sk_type(sk),
ossl_check_DIST_POINT_type(ptr))
#define sk_DIST_POINT_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_DIST_POINT_sk_type(sk),
ossl_check_DIST_POINT_type(ptr), pnum)
#define sk_DIST_POINT_sort(sk) OPENSSL_sk_sort(ossl_check_DIST_POINT_sk_type(sk))
#define sk_DIST_POINT_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_DIST_POINT_sk_type(sk))
#define sk_DIST_POINT_dup(sk) ((STACK_OF(DIST_POINT)
*)OPENSSL_sk_dup(ossl_check_const_DIST_POINT_sk_type(sk)))
#define sk_DIST_POINT_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(DIST_POINT)
*)OPENSSL_sk_deep_copy(ossl_check_const_DIST_POINT_sk_type(sk),
 ossl_check_DIST_POINT_copyfunc_type(copyfunc), ossl_check_DIST_POINT_freefunc_type(freefunc)))
#define sk_DIST_POINT_set_cmp_func(sk, cmp)
((sk_DIST_POINT_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_DIST_POINT_sk_type(sk),
ossl_check_DIST_POINT_compfunc_type(cmp)))


typedef STACK_OF(DIST_POINT) CRL_DIST_POINTS;

struct AUTHORITY_KEYID_st {
  ASN1_OCTET_STRING *keyid;
  GENERAL_NAMES *issuer;
  ASN1_INTEGER *serial;
};

/* Strong extranet structures */

typedef struct SXNET_ID_st {
```

```
  ASN1_INTEGER *zone;
  ASN1_OCTET_STRING *user;
} SXNETID;

SKM_DEFINE_STACK_OF_INTERNAL(SXNETID, SXNETID, SXNETID)
#define sk_SXNETID_num(sk) OPENSSL_sk_num(ossl_check_const_SXNETID_sk_type(sk))
#define sk_SXNETID_value(sk, idx) ((SXNETID
*)OPENSSL_sk_value(ossl_check_const_SXNETID_sk_type(sk), (idx)))
#define sk_SXNETID_new(cmp) ((STACK_OF(SXNETID)
*)OPENSSL_sk_new(ossl_check_SXNETID_compfunc_type(cmp)))
#define sk_SXNETID_new_null() ((STACK_OF(SXNETID)
 *)OPENSSL_sk_new_null())
#define sk_SXNETID_new_reserve(cmp, n) ((STACK_OF(SXNETID)
*)OPENSSL_sk_new_reserve(ossl_check_SXNETID_compfunc_type(cmp), (n)))
#define sk_SXNETID_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_SXNETID_sk_type(sk), (n))
#define sk_SXNETID_free(sk) OPENSSL_sk_free(ossl_check_SXNETID_sk_type(sk))
#define sk_SXNETID_zero(sk) OPENSSL_sk_zero(ossl_check_SXNETID_sk_type(sk))
#define sk_SXNETID_delete(sk, i) ((SXNETID *)OPENSSL_sk_delete(ossl_check_SXNETID_sk_type(sk), (i)))
#define sk_SXNETID_delete_ptr(sk, ptr) ((SXNETID
*)OPENSSL_sk_delete_ptr(ossl_check_SXNETID_sk_type(sk), ossl_check_SXNETID_type(ptr)))
#define sk_SXNETID_push(sk, ptr) OPENSSL_sk_push(ossl_check_SXNETID_sk_type(sk),
ossl_check_SXNETID_type(ptr))
#define sk_SXNETID_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_SXNETID_sk_type(sk),
ossl_check_SXNETID_type(ptr))
#define sk_SXNETID_pop(sk) ((SXNETID *)OPENSSL_sk_pop(ossl_check_SXNETID_sk_type(sk)))
#define sk_SXNETID_shift(sk) ((SXNETID *)OPENSSL_sk_shift(ossl_check_SXNETID_sk_type(sk)))
#define
 sk_SXNETID_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SXNETID_sk_type(sk),ossl_check_SXNETID_freefunc_type(freefunc))
#define sk_SXNETID_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SXNETID_sk_type(sk),
ossl_check_SXNETID_type(ptr), (idx))
#define sk_SXNETID_set(sk, idx, ptr) ((SXNETID *)OPENSSL_sk_set(ossl_check_SXNETID_sk_type(sk), (idx),
ossl_check_SXNETID_type(ptr)))
#define sk_SXNETID_find(sk, ptr) OPENSSL_sk_find(ossl_check_SXNETID_sk_type(sk),
ossl_check_SXNETID_type(ptr))
#define sk_SXNETID_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SXNETID_sk_type(sk),
ossl_check_SXNETID_type(ptr))
#define sk_SXNETID_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_SXNETID_sk_type(sk),
ossl_check_SXNETID_type(ptr), pnum)
#define sk_SXNETID_sort(sk) OPENSSL_sk_sort(ossl_check_SXNETID_sk_type(sk))
#define sk_SXNETID_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SXNETID_sk_type(sk))
#define sk_SXNETID_dup(sk)
 ((STACK_OF(SXNETID) *)OPENSSL_sk_dup(ossl_check_const_SXNETID_sk_type(sk)))
#define sk_SXNETID_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(SXNETID)
*)OPENSSL_sk_deep_copy(ossl_check_const_SXNETID_sk_type(sk),
ossl_check_SXNETID_copyfunc_type(copyfunc), ossl_check_SXNETID_freefunc_type(freefunc)))
#define sk_SXNETID_set_cmp_func(sk, cmp)
((sk_SXNETID_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SXNETID_sk_type(sk),
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```
ossl_check_SXNETID_compfunc_type(cmp)))



typedef struct SXNET_st {
  ASN1_INTEGER *version;
  STACK_OF(SXNETID) *ids;
} SXNET;

typedef struct ISSUER_SIGN_TOOL_st {
  ASN1_UTF8STRING *signTool;
  ASN1_UTF8STRING *cATool;
  ASN1_UTF8STRING *signToolCert;
  ASN1_UTF8STRING *cAToolCert;
} ISSUER_SIGN_TOOL;

typedef struct NOTICEREF_st {
  ASN1_STRING *organization;
  STACK_OF(ASN1_INTEGER) *noticenos;
} NOTICEREF;

typedef struct USERNOTICE_st {
  NOTICEREF *noticeref;
  ASN1_STRING *exptext;
} USERNOTICE;

typedef struct POLICYQUALINFO_st {
  ASN1_OBJECT
 *pqualid;
  union {
     ASN1_IA5STRING *cpsuri;
     USERNOTICE *usernotice;
     ASN1_TYPE *other;
  } d;
} POLICYQUALINFO;

SKM_DEFINE_STACK_OF_INTERNAL(POLICYQUALINFO, POLICYQUALINFO, POLICYQUALINFO)
#define sk_POLICYQUALINFO_num(sk)
OPENSSL_sk_num(ossl_check_const_POLICYQUALINFO_sk_type(sk))
#define sk_POLICYQUALINFO_value(sk, idx) ((POLICYQUALINFO
*)OPENSSL_sk_value(ossl_check_const_POLICYQUALINFO_sk_type(sk), (idx)))
#define sk_POLICYQUALINFO_new(cmp) ((STACK_OF(POLICYQUALINFO)
*)OPENSSL_sk_new(ossl_check_POLICYQUALINFO_compfunc_type(cmp)))
#define sk_POLICYQUALINFO_new_null() ((STACK_OF(POLICYQUALINFO) *)OPENSSL_sk_new_null())
#define sk_POLICYQUALINFO_new_reserve(cmp, n) ((STACK_OF(POLICYQUALINFO)
*)OPENSSL_sk_new_reserve(ossl_check_POLICYQUALINFO_compfunc_type(cmp), (n)))
#define sk_POLICYQUALINFO_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_POLICYQUALINFO_sk_type(sk), (n))
```

#define sk_POLICYQUALINFO_free(sk) OPENSSL_sk_free(ossl_check_POLICYQUALINFO_sk_type(sk))
#define
sk_POLICYQUALINFO_zero(sk) OPENSSL_sk_zero(ossl_check_POLICYQUALINFO_sk_type(sk))
#define sk_POLICYQUALINFO_delete(sk, i) ((POLICYQUALINFO
*)OPENSSL_sk_delete(ossl_check_POLICYQUALINFO_sk_type(sk), (i)))
#define sk_POLICYQUALINFO_delete_ptr(sk, ptr) ((POLICYQUALINFO
*)OPENSSL_sk_delete_ptr(ossl_check_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_type(ptr)))
#define sk_POLICYQUALINFO_push(sk, ptr) OPENSSL_sk_push(ossl_check_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_type(ptr))
#define sk_POLICYQUALINFO_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_POLICYQUALINFO_sk_type(sk), ossl_check_POLICYQUALINFO_type(ptr))
#define sk_POLICYQUALINFO_pop(sk) ((POLICYQUALINFO
*)OPENSSL_sk_pop(ossl_check_POLICYQUALINFO_sk_type(sk)))
#define sk_POLICYQUALINFO_shift(sk) ((POLICYQUALINFO
*)OPENSSL_sk_shift(ossl_check_POLICYQUALINFO_sk_type(sk)))
#define sk_POLICYQUALINFO_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_POLICYQUALINFO_sk_type(sk),ossl_check_POLICYQUALINFO_freefunc
_type(freefunc))
#define
sk_POLICYQUALINFO_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_type(ptr), (idx))
#define sk_POLICYQUALINFO_set(sk, idx, ptr) ((POLICYQUALINFO
*)OPENSSL_sk_set(ossl_check_POLICYQUALINFO_sk_type(sk), (idx),
ossl_check_POLICYQUALINFO_type(ptr)))
#define sk_POLICYQUALINFO_find(sk, ptr) OPENSSL_sk_find(ossl_check_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_type(ptr))
#define sk_POLICYQUALINFO_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_type(ptr))
#define sk_POLICYQUALINFO_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_POLICYQUALINFO_sk_type(sk), ossl_check_POLICYQUALINFO_type(ptr),
pnum)
#define sk_POLICYQUALINFO_sort(sk) OPENSSL_sk_sort(ossl_check_POLICYQUALINFO_sk_type(sk))
#define sk_POLICYQUALINFO_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_POLICYQUALINFO_sk_type(sk))
#define sk_POLICYQUALINFO_dup(sk) ((STACK_OF(POLICYQUALINFO)
*)OPENSSL_sk_dup(ossl_check_const_POLICYQUALINFO_sk_type(sk)))
#define sk_POLICYQUALINFO_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(POLICYQUALINFO)
*)OPENSSL_sk_deep_copy(ossl_check_const_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_copyfunc_type(copyfunc),
ossl_check_POLICYQUALINFO_freefunc_type(freefunc)))
#define sk_POLICYQUALINFO_set_cmp_func(sk, cmp)
((sk_POLICYQUALINFO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_POLICYQUALINFO_sk_type(sk),
ossl_check_POLICYQUALINFO_compfunc_type(cmp)))

```
typedef struct POLICYINFO_st {
  ASN1_OBJECT *policyid;
  STACK_OF(POLICYQUALINFO) *qualifiers;
} POLICYINFO;

SKM_DEFINE_STACK_OF_INTERNAL(POLICYINFO, POLICYINFO, POLICYINFO)
#define sk_POLICYINFO_num(sk) OPENSSL_sk_num(ossl_check_const_POLICYINFO_sk_type(sk))
#define sk_POLICYINFO_value(sk, idx) ((POLICYINFO
*)OPENSSL_sk_value(ossl_check_const_POLICYINFO_sk_type(sk), (idx)))
#define sk_POLICYINFO_new(cmp) ((STACK_OF(POLICYINFO)
*)OPENSSL_sk_new(ossl_check_POLICYINFO_compfunc_type(cmp)))
#define
 sk_POLICYINFO_new_null() ((STACK_OF(POLICYINFO) *)OPENSSL_sk_new_null())
#define sk_POLICYINFO_new_reserve(cmp, n) ((STACK_OF(POLICYINFO)
*)OPENSSL_sk_new_reserve(ossl_check_POLICYINFO_compfunc_type(cmp), (n)))
#define sk_POLICYINFO_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_POLICYINFO_sk_type(sk), (n))
#define sk_POLICYINFO_free(sk) OPENSSL_sk_free(ossl_check_POLICYINFO_sk_type(sk))
#define sk_POLICYINFO_zero(sk) OPENSSL_sk_zero(ossl_check_POLICYINFO_sk_type(sk))
#define sk_POLICYINFO_delete(sk, i) ((POLICYINFO
*)OPENSSL_sk_delete(ossl_check_POLICYINFO_sk_type(sk), (i)))
#define sk_POLICYINFO_delete_ptr(sk, ptr) ((POLICYINFO
*)OPENSSL_sk_delete_ptr(ossl_check_POLICYINFO_sk_type(sk), ossl_check_POLICYINFO_type(ptr)))
#define sk_POLICYINFO_push(sk, ptr) OPENSSL_sk_push(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_type(ptr))
#define sk_POLICYINFO_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_type(ptr))
#define
 sk_POLICYINFO_pop(sk) ((POLICYINFO *)OPENSSL_sk_pop(ossl_check_POLICYINFO_sk_type(sk)))
#define sk_POLICYINFO_shift(sk) ((POLICYINFO
*)OPENSSL_sk_shift(ossl_check_POLICYINFO_sk_type(sk)))
#define sk_POLICYINFO_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_POLICYINFO_sk_type(sk),ossl_check_POLICYINFO_freefunc_type(freefun
c))
#define sk_POLICYINFO_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_type(ptr), (idx))
#define sk_POLICYINFO_set(sk, idx, ptr) ((POLICYINFO
*)OPENSSL_sk_set(ossl_check_POLICYINFO_sk_type(sk), (idx), ossl_check_POLICYINFO_type(ptr)))
#define sk_POLICYINFO_find(sk, ptr) OPENSSL_sk_find(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_type(ptr))
#define sk_POLICYINFO_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_type(ptr))
#define sk_POLICYINFO_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_type(ptr),
 pnum)
#define sk_POLICYINFO_sort(sk) OPENSSL_sk_sort(ossl_check_POLICYINFO_sk_type(sk))
#define sk_POLICYINFO_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_POLICYINFO_sk_type(sk))
#define sk_POLICYINFO_dup(sk) ((STACK_OF(POLICYINFO)
*)OPENSSL_sk_dup(ossl_check_const_POLICYINFO_sk_type(sk)))
```

```
#define sk_POLICYINFO_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(POLICYINFO)
*)OPENSSL_sk_deep_copy(ossl_check_const_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_copyfunc_type(copyfunc), ossl_check_POLICYINFO_freefunc_type(freefunc)))
#define sk_POLICYINFO_set_cmp_func(sk, cmp)
((sk_POLICYINFO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_POLICYINFO_sk_type(sk),
ossl_check_POLICYINFO_compfunc_type(cmp)))


typedef STACK_OF(POLICYINFO) CERTIFICATEPOLICIES;

typedef struct POLICY_MAPPING_st {
  ASN1_OBJECT *issuerDomainPolicy;
  ASN1_OBJECT *subjectDomainPolicy;
} POLICY_MAPPING;

SKM_DEFINE_STACK_OF_INTERNAL(POLICY_MAPPING, POLICY_MAPPING, POLICY_MAPPING)
#define sk_POLICY_MAPPING_num(sk)
 OPENSSL_sk_num(ossl_check_const_POLICY_MAPPING_sk_type(sk))
#define sk_POLICY_MAPPING_value(sk, idx) ((POLICY_MAPPING
*)OPENSSL_sk_value(ossl_check_const_POLICY_MAPPING_sk_type(sk), (idx)))
#define sk_POLICY_MAPPING_new(cmp) ((STACK_OF(POLICY_MAPPING)
*)OPENSSL_sk_new(ossl_check_POLICY_MAPPING_compfunc_type(cmp)))
#define sk_POLICY_MAPPING_new_null() ((STACK_OF(POLICY_MAPPING) *)OPENSSL_sk_new_null())
#define sk_POLICY_MAPPING_new_reserve(cmp, n) ((STACK_OF(POLICY_MAPPING)
*)OPENSSL_sk_new_reserve(ossl_check_POLICY_MAPPING_compfunc_type(cmp), (n)))
#define sk_POLICY_MAPPING_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_POLICY_MAPPING_sk_type(sk), (n))
#define sk_POLICY_MAPPING_free(sk) OPENSSL_sk_free(ossl_check_POLICY_MAPPING_sk_type(sk))
#define sk_POLICY_MAPPING_zero(sk) OPENSSL_sk_zero(ossl_check_POLICY_MAPPING_sk_type(sk))
#define sk_POLICY_MAPPING_delete(sk, i) ((POLICY_MAPPING
*)OPENSSL_sk_delete(ossl_check_POLICY_MAPPING_sk_type(sk), (i)))
#define sk_POLICY_MAPPING_delete_ptr(sk,
 ptr) ((POLICY_MAPPING *)OPENSSL_sk_delete_ptr(ossl_check_POLICY_MAPPING_sk_type(sk),
ossl_check_POLICY_MAPPING_type(ptr)))
#define sk_POLICY_MAPPING_push(sk, ptr) OPENSSL_sk_push(ossl_check_POLICY_MAPPING_sk_type(sk),
ossl_check_POLICY_MAPPING_type(ptr))
#define sk_POLICY_MAPPING_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_POLICY_MAPPING_sk_type(sk), ossl_check_POLICY_MAPPING_type(ptr))
#define sk_POLICY_MAPPING_pop(sk) ((POLICY_MAPPING
*)OPENSSL_sk_pop(ossl_check_POLICY_MAPPING_sk_type(sk)))
#define sk_POLICY_MAPPING_shift(sk) ((POLICY_MAPPING
*)OPENSSL_sk_shift(ossl_check_POLICY_MAPPING_sk_type(sk)))
#define sk_POLICY_MAPPING_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_POLICY_MAPPING_sk_type(sk),ossl_check_POLICY_MAPPING_freefunc
_type(freefunc))
#define sk_POLICY_MAPPING_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_POLICY_MAPPING_sk_type(sk), ossl_check_POLICY_MAPPING_type(ptr),
(idx))
```

```
#define sk_POLICY_MAPPING_set(sk, idx, ptr) ((POLICY_MAPPING
*)OPENSSL_sk_set(ossl_check_POLICY_MAPPING_sk_type(sk),
 (idx), ossl_check_POLICY_MAPPING_type(ptr)))
#define sk_POLICY_MAPPING_find(sk, ptr) OPENSSL_sk_find(ossl_check_POLICY_MAPPING_sk_type(sk),
ossl_check_POLICY_MAPPING_type(ptr))
#define sk_POLICY_MAPPING_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_POLICY_MAPPING_sk_type(sk), ossl_check_POLICY_MAPPING_type(ptr))
#define sk_POLICY_MAPPING_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_POLICY_MAPPING_sk_type(sk), ossl_check_POLICY_MAPPING_type(ptr),
pnum)
#define sk_POLICY_MAPPING_sort(sk) OPENSSL_sk_sort(ossl_check_POLICY_MAPPING_sk_type(sk))
#define sk_POLICY_MAPPING_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_POLICY_MAPPING_sk_type(sk))
#define sk_POLICY_MAPPING_dup(sk) ((STACK_OF(POLICY_MAPPING)
*)OPENSSL_sk_dup(ossl_check_const_POLICY_MAPPING_sk_type(sk)))
#define sk_POLICY_MAPPING_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(POLICY_MAPPING)
*)OPENSSL_sk_deep_copy(ossl_check_const_POLICY_MAPPING_sk_type(sk),
ossl_check_POLICY_MAPPING_copyfunc_type(copyfunc),
 ossl_check_POLICY_MAPPING_freefunc_type(freefunc)))
#define sk_POLICY_MAPPING_set_cmp_func(sk, cmp)
((sk_POLICY_MAPPING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_POLICY_MAPPING_sk_type(sk),
ossl_check_POLICY_MAPPING_compfunc_type(cmp)))


typedef STACK_OF(POLICY_MAPPING) POLICY_MAPPINGS;

typedef struct GENERAL_SUBTREE_st {
  GENERAL_NAME *base;
  ASN1_INTEGER *minimum;
  ASN1_INTEGER *maximum;
} GENERAL_SUBTREE;

SKM_DEFINE_STACK_OF_INTERNAL(GENERAL_SUBTREE, GENERAL_SUBTREE,
GENERAL_SUBTREE)
#define sk_GENERAL_SUBTREE_num(sk)
OPENSSL_sk_num(ossl_check_const_GENERAL_SUBTREE_sk_type(sk))
#define sk_GENERAL_SUBTREE_value(sk, idx) ((GENERAL_SUBTREE
*)OPENSSL_sk_value(ossl_check_const_GENERAL_SUBTREE_sk_type(sk), (idx)))
#define sk_GENERAL_SUBTREE_new(cmp) ((STACK_OF(GENERAL_SUBTREE)
*)OPENSSL_sk_new(ossl_check_GENERAL_SUBTREE_compfunc_type(cmp)))
#define sk_GENERAL_SUBTREE_new_null() ((STACK_OF(GENERAL_SUBTREE)
*)OPENSSL_sk_new_null())
#define
 sk_GENERAL_SUBTREE_new_reserve(cmp, n) ((STACK_OF(GENERAL_SUBTREE)
*)OPENSSL_sk_new_reserve(ossl_check_GENERAL_SUBTREE_compfunc_type(cmp), (n)))
#define sk_GENERAL_SUBTREE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_GENERAL_SUBTREE_sk_type(sk), (n))
#define sk_GENERAL_SUBTREE_free(sk) OPENSSL_sk_free(ossl_check_GENERAL_SUBTREE_sk_type(sk))
```

```
#define sk_GENERAL_SUBTREE_zero(sk) OPENSSL_sk_zero(ossl_check_GENERAL_SUBTREE_sk_type(sk))
#define sk_GENERAL_SUBTREE_delete(sk, i) ((GENERAL_SUBTREE
*)OPENSSL_sk_delete(ossl_check_GENERAL_SUBTREE_sk_type(sk), (i)))
#define sk_GENERAL_SUBTREE_delete_ptr(sk, ptr) ((GENERAL_SUBTREE
*)OPENSSL_sk_delete_ptr(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr)))
#define sk_GENERAL_SUBTREE_push(sk, ptr)
OPENSSL_sk_push(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr))
#define sk_GENERAL_SUBTREE_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr))
#define
 sk_GENERAL_SUBTREE_pop(sk) ((GENERAL_SUBTREE
*)OPENSSL_sk_pop(ossl_check_GENERAL_SUBTREE_sk_type(sk)))
#define sk_GENERAL_SUBTREE_shift(sk) ((GENERAL_SUBTREE
*)OPENSSL_sk_shift(ossl_check_GENERAL_SUBTREE_sk_type(sk)))
#define sk_GENERAL_SUBTREE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_GENERAL_SUBTREE_sk_type(sk),ossl_check_GENERAL_SUBTREE_free
func_type(freefunc))
#define sk_GENERAL_SUBTREE_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr), (idx))
#define sk_GENERAL_SUBTREE_set(sk, idx, ptr) ((GENERAL_SUBTREE
*)OPENSSL_sk_set(ossl_check_GENERAL_SUBTREE_sk_type(sk), (idx),
ossl_check_GENERAL_SUBTREE_type(ptr)))
#define sk_GENERAL_SUBTREE_find(sk, ptr)
OPENSSL_sk_find(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr))
#define sk_GENERAL_SUBTREE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr))
#define sk_GENERAL_SUBTREE_find_all(sk,
 ptr, pnum) OPENSSL_sk_find_all(ossl_check_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_type(ptr), pnum)
#define sk_GENERAL_SUBTREE_sort(sk) OPENSSL_sk_sort(ossl_check_GENERAL_SUBTREE_sk_type(sk))
#define sk_GENERAL_SUBTREE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_GENERAL_SUBTREE_sk_type(sk))
#define sk_GENERAL_SUBTREE_dup(sk) ((STACK_OF(GENERAL_SUBTREE)
*)OPENSSL_sk_dup(ossl_check_const_GENERAL_SUBTREE_sk_type(sk)))
#define sk_GENERAL_SUBTREE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(GENERAL_SUBTREE)
*)OPENSSL_sk_deep_copy(ossl_check_const_GENERAL_SUBTREE_sk_type(sk),
ossl_check_GENERAL_SUBTREE_copyfunc_type(copyfunc),
ossl_check_GENERAL_SUBTREE_freefunc_type(freefunc)))
#define sk_GENERAL_SUBTREE_set_cmp_func(sk, cmp)
((sk_GENERAL_SUBTREE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_GENERAL_SUBTREE_sk_type
(sk), ossl_check_GENERAL_SUBTREE_compfunc_type(cmp)))
```

```
struct NAME_CONSTRAINTS_st {
  STACK_OF(GENERAL_SUBTREE) *permittedSubtrees;
   STACK_OF(GENERAL_SUBTREE) *excludedSubtrees;
};

typedef struct POLICY_CONSTRAINTS_st {
  ASN1_INTEGER *requireExplicitPolicy;
  ASN1_INTEGER *inhibitPolicyMapping;
} POLICY_CONSTRAINTS;

/* Proxy certificate structures, see RFC 3820 */
typedef struct PROXY_POLICY_st {
  ASN1_OBJECT *policyLanguage;
  ASN1_OCTET_STRING *policy;
} PROXY_POLICY;

typedef struct PROXY_CERT_INFO_EXTENSION_st {
  ASN1_INTEGER *pcPathLengthConstraint;
  PROXY_POLICY *proxyPolicy;
} PROXY_CERT_INFO_EXTENSION;

DECLARE_ASN1_FUNCTIONS(PROXY_POLICY)
DECLARE_ASN1_FUNCTIONS(PROXY_CERT_INFO_EXTENSION)

struct ISSUING_DIST_POINT_st {
  DIST_POINT_NAME *distpoint;
  int onlyuser;
  int onlyCA;
  ASN1_BIT_STRING *onlysomereasons;
  int indirectCRL;
  int onlyattr;
};

/* Values in idp_flags field */
/* IDP present */
# define IDP_PRESENT     0x1
/* IDP values inconsistent */
# define IDP_INVALID     0x2
/* onlyuser true */
# define IDP_ONLYUSER    0x4
/* onlyCA true */
# define IDP_ONLYCA
     0x8
/* onlyattr true */
# define IDP_ONLYATTR    0x10
/* indirectCRL true */
# define IDP_INDIRECT    0x20
```

```
/* onlysomereasons present */
# define IDP_REASONS     0x40

# define X509V3_conf_err(val) ERR_add_error_data(6, \
                "section:", (val)->section, \
                ",name:", (val)->name, ",value:", (val)->value)

# define X509V3_set_ctx_test(ctx) \
  X509V3_set_ctx(ctx, NULL, NULL, NULL, NULL, X509V3_CTX_TEST)
# define X509V3_set_ctx_nodb(ctx) (ctx)->db = NULL;

# define EXT_BITSTRING(nid, table) { nid, 0, ASN1_ITEM_ref(ASN1_BIT_STRING), \
                0,0,0,0, \
                0,0, \
                (X509V3_EXT_I2V)i2v_ASN1_BIT_STRING, \
                (X509V3_EXT_V2I)v2i_ASN1_BIT_STRING, \
                NULL, NULL, \
                table}

# define EXT_IA5STRING(nid) { nid, 0, ASN1_ITEM_ref(ASN1_IA5STRING), \
                0,0,0,0, \
                (X509V3_EXT_I2S)i2s_ASN1_IA5STRING,
 \
                (X509V3_EXT_S2I)s2i_ASN1_IA5STRING, \
                0,0,0,0, \
                NULL}

#define EXT_UTF8STRING(nid) { nid, 0, ASN1_ITEM_ref(ASN1_UTF8STRING), \
                0,0,0,0, \
                (X509V3_EXT_I2S)i2s_ASN1_UTF8STRING, \
                (X509V3_EXT_S2I)s2i_ASN1_UTF8STRING, \
                0,0,0,0, \
                NULL}

# define EXT_END { -1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0}

/* X509_PURPOSE stuff */

# define EXFLAG_BCONS           0x1
# define EXFLAG_KUSAGE          0x2
# define EXFLAG_XKUSAGE         0x4
# define EXFLAG_NSCERT          0x8

# define EXFLAG_CA              0x10
# define EXFLAG_SI              0x20 /* self-issued, maybe not self-signed */
# define EXFLAG_V1              0x40
# define EXFLAG_INVALID         0x80
/* EXFLAG_SET is set to indicate that some values have been precomputed */
```

```
# define EXFLAG_SET              0x100
# define
 EXFLAG_CRITICAL         0x200
# define EXFLAG_PROXY            0x400

# define EXFLAG_INVALID_POLICY   0x800
# define EXFLAG_FRESHEST         0x1000
# define EXFLAG_SS               0x2000 /* cert is apparently self-signed */

# define EXFLAG_BCONS_CRITICAL   0x10000
# define EXFLAG_AKID_CRITICAL    0x20000
# define EXFLAG_SKID_CRITICAL    0x40000
# define EXFLAG_SAN_CRITICAL     0x80000
# define EXFLAG_NO_FINGERPRINT   0x100000

# define KU_DIGITAL_SIGNATURE    0x0080
# define KU_NON_REPUDIATION      0x0040
# define KU_KEY_ENCIPHERMENT     0x0020
# define KU_DATA_ENCIPHERMENT    0x0010
# define KU_KEY_AGREEMENT        0x0008
# define KU_KEY_CERT_SIGN        0x0004
# define KU_CRL_SIGN             0x0002
# define KU_ENCIPHER_ONLY        0x0001
# define KU_DECIPHER_ONLY        0x8000

# define NS_SSL_CLIENT           0x80
# define NS_SSL_SERVER           0x40
# define NS_SMIME                0x20
# define NS_OBJSIGN              0x10
# define NS_SSL_CA               0x04
# define NS_SMIME_CA
          0x02
# define NS_OBJSIGN_CA           0x01
# define NS_ANY_CA               (NS_SSL_CA|NS_SMIME_CA|NS_OBJSIGN_CA)

# define XKU_SSL_SERVER          0x1
# define XKU_SSL_CLIENT          0x2
# define XKU_SMIME               0x4
# define XKU_CODE_SIGN           0x8
# define XKU_SGC                 0x10 /* Netscape or MS Server-Gated Crypto */
# define XKU_OCSP_SIGN           0x20
# define XKU_TIMESTAMP           0x40
# define XKU_DVCS                0x80
# define XKU_ANYEKU              0x100

# define X509_PURPOSE_DYNAMIC    0x1
# define X509_PURPOSE_DYNAMIC_NAME       0x2
```

```
typedef struct x509_purpose_st {
  int purpose;
  int trust;                /* Default trust ID */
  int flags;
  int (*check_purpose) (const struct x509_purpose_st *, const X509 *, int);
  char *name;
  char *sname;
  void *usr_data;
} X509_PURPOSE;

SKM_DEFINE_STACK_OF_INTERNAL(X509_PURPOSE, X509_PURPOSE, X509_PURPOSE)
#define sk_X509_PURPOSE_num(sk) OPENSSL_sk_num(ossl_check_const_X509_PURPOSE_sk_type(sk))
#define
 sk_X509_PURPOSE_value(sk, idx) ((X509_PURPOSE
*)OPENSSL_sk_value(ossl_check_const_X509_PURPOSE_sk_type(sk), (idx)))
#define sk_X509_PURPOSE_new(cmp) ((STACK_OF(X509_PURPOSE)
*)OPENSSL_sk_new(ossl_check_X509_PURPOSE_compfunc_type(cmp)))
#define sk_X509_PURPOSE_new_null() ((STACK_OF(X509_PURPOSE) *)OPENSSL_sk_new_null())
#define sk_X509_PURPOSE_new_reserve(cmp, n) ((STACK_OF(X509_PURPOSE)
*)OPENSSL_sk_new_reserve(ossl_check_X509_PURPOSE_compfunc_type(cmp), (n)))
#define sk_X509_PURPOSE_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_PURPOSE_sk_type(sk), (n))
#define sk_X509_PURPOSE_free(sk) OPENSSL_sk_free(ossl_check_X509_PURPOSE_sk_type(sk))
#define sk_X509_PURPOSE_zero(sk) OPENSSL_sk_zero(ossl_check_X509_PURPOSE_sk_type(sk))
#define sk_X509_PURPOSE_delete(sk, i) ((X509_PURPOSE
*)OPENSSL_sk_delete(ossl_check_X509_PURPOSE_sk_type(sk), (i)))
#define sk_X509_PURPOSE_delete_ptr(sk, ptr) ((X509_PURPOSE
*)OPENSSL_sk_delete_ptr(ossl_check_X509_PURPOSE_sk_type(sk),
 ossl_check_X509_PURPOSE_type(ptr)))
#define sk_X509_PURPOSE_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_PURPOSE_sk_type(sk),
ossl_check_X509_PURPOSE_type(ptr))
#define sk_X509_PURPOSE_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_PURPOSE_sk_type(sk),
ossl_check_X509_PURPOSE_type(ptr))
#define sk_X509_PURPOSE_pop(sk) ((X509_PURPOSE
*)OPENSSL_sk_pop(ossl_check_X509_PURPOSE_sk_type(sk)))
#define sk_X509_PURPOSE_shift(sk) ((X509_PURPOSE
*)OPENSSL_sk_shift(ossl_check_X509_PURPOSE_sk_type(sk)))
#define sk_X509_PURPOSE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_PURPOSE_sk_type(sk),ossl_check_X509_PURPOSE_freefunc_type(fr
eefunc))
#define sk_X509_PURPOSE_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_PURPOSE_sk_type(sk),
ossl_check_X509_PURPOSE_type(ptr), (idx))
#define sk_X509_PURPOSE_set(sk, idx, ptr) ((X509_PURPOSE
*)OPENSSL_sk_set(ossl_check_X509_PURPOSE_sk_type(sk), (idx), ossl_check_X509_PURPOSE_type(ptr)))
#define sk_X509_PURPOSE_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_PURPOSE_sk_type(sk),
 ossl_check_X509_PURPOSE_type(ptr))
#define sk_X509_PURPOSE_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_PURPOSE_sk_type(sk),
ossl_check_X509_PURPOSE_type(ptr))
#define sk_X509_PURPOSE_find_all(sk, ptr, pnum)
```

```
OPENSSL_sk_find_all(ossl_check_X509_PURPOSE_sk_type(sk), ossl_check_X509_PURPOSE_type(ptr), pnum)
#define sk_X509_PURPOSE_sort(sk) OPENSSL_sk_sort(ossl_check_X509_PURPOSE_sk_type(sk))
#define sk_X509_PURPOSE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_PURPOSE_sk_type(sk))
#define sk_X509_PURPOSE_dup(sk) ((STACK_OF(X509_PURPOSE)
*)OPENSSL_sk_dup(ossl_check_const_X509_PURPOSE_sk_type(sk)))
#define sk_X509_PURPOSE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_PURPOSE)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_PURPOSE_sk_type(sk),
ossl_check_X509_PURPOSE_copyfunc_type(copyfunc), ossl_check_X509_PURPOSE_freefunc_type(freefunc)))
#define sk_X509_PURPOSE_set_cmp_func(sk, cmp)
((sk_X509_PURPOSE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_PURPOSE_sk_type(sk),
 ossl_check_X509_PURPOSE_compfunc_type(cmp)))



# define X509_PURPOSE_SSL_CLIENT        1
# define X509_PURPOSE_SSL_SERVER        2
# define X509_PURPOSE_NS_SSL_SERVER     3
# define X509_PURPOSE_SMIME_SIGN        4
# define X509_PURPOSE_SMIME_ENCRYPT     5
# define X509_PURPOSE_CRL_SIGN          6
# define X509_PURPOSE_ANY               7
# define X509_PURPOSE_OCSP_HELPER       8
# define X509_PURPOSE_TIMESTAMP_SIGN    9

# define X509_PURPOSE_MIN               1
# define X509_PURPOSE_MAX               9

/* Flags for X509V3_EXT_print() */

# define X509V3_EXT_UNKNOWN_MASK        (0xfL << 16)
/* Return error for unknown extensions */
# define X509V3_EXT_DEFAULT             0
/* Print error for unknown extensions */
# define X509V3_EXT_ERROR_UNKNOWN       (1L << 16)
/* ASN1 parse unknown extensions */
# define X509V3_EXT_PARSE_UNKNOWN       (2L << 16)
/* BIO_dump unknown extensions */
# define X509V3_EXT_DUMP_UNKNOWN
      (3L << 16)

/* Flags for X509V3_add1_i2d */

# define X509V3_ADD_OP_MASK             0xfL
# define X509V3_ADD_DEFAULT             0L
# define X509V3_ADD_APPEND              1L
# define X509V3_ADD_REPLACE             2L
# define X509V3_ADD_REPLACE_EXISTING    3L
```

```
# define X509V3_ADD_KEEP_EXISTING       4L
# define X509V3_ADD_DELETE              5L
# define X509V3_ADD_SILENT              0x10

DECLARE_ASN1_FUNCTIONS(BASIC_CONSTRAINTS)

DECLARE_ASN1_FUNCTIONS(SXNET)
DECLARE_ASN1_FUNCTIONS(SXNETID)

DECLARE_ASN1_FUNCTIONS(ISSUER_SIGN_TOOL)

int SXNET_add_id_asc(SXNET **psx, const char *zone, const char *user, int userlen);
int SXNET_add_id_ulong(SXNET **psx, unsigned long lzone, const char *user,
                int userlen);
int SXNET_add_id_INTEGER(SXNET **psx, ASN1_INTEGER *izone, const char *user,
                 int userlen);

ASN1_OCTET_STRING *SXNET_get_id_asc(SXNET *sx, const char *zone);
ASN1_OCTET_STRING *SXNET_get_id_ulong(SXNET *sx, unsigned long lzone);
ASN1_OCTET_STRING
 *SXNET_get_id_INTEGER(SXNET *sx, ASN1_INTEGER *zone);

DECLARE_ASN1_FUNCTIONS(AUTHORITY_KEYID)

DECLARE_ASN1_FUNCTIONS(PKEY_USAGE_PERIOD)

DECLARE_ASN1_FUNCTIONS(GENERAL_NAME)
DECLARE_ASN1_DUP_FUNCTION(GENERAL_NAME)
int GENERAL_NAME_cmp(GENERAL_NAME *a, GENERAL_NAME *b);

ASN1_BIT_STRING *v2i_ASN1_BIT_STRING(X509V3_EXT_METHOD *method,
                            X509V3_CTX *ctx,
                            STACK_OF(CONF_VALUE) *nval);
STACK_OF(CONF_VALUE) *i2v_ASN1_BIT_STRING(X509V3_EXT_METHOD *method,
                              ASN1_BIT_STRING *bits,
                              STACK_OF(CONF_VALUE) *extlist);
char *i2s_ASN1_IA5STRING(X509V3_EXT_METHOD *method, ASN1_IA5STRING *ia5);
ASN1_IA5STRING *s2i_ASN1_IA5STRING(X509V3_EXT_METHOD *method,
                           X509V3_CTX *ctx, const char *str);
char *i2s_ASN1_UTF8STRING(X509V3_EXT_METHOD *method, ASN1_UTF8STRING *utf8);
ASN1_UTF8STRING *s2i_ASN1_UTF8STRING(X509V3_EXT_METHOD
 *method,
                           X509V3_CTX *ctx, const char *str);

STACK_OF(CONF_VALUE) *i2v_GENERAL_NAME(X509V3_EXT_METHOD *method,
                              GENERAL_NAME *gen,
                              STACK_OF(CONF_VALUE) *ret);
int GENERAL_NAME_print(BIO *out, GENERAL_NAME *gen);
```

```
DECLARE_ASN1_FUNCTIONS(GENERAL_NAMES)

STACK_OF(CONF_VALUE) *i2v_GENERAL_NAMES(X509V3_EXT_METHOD *method,
                                        GENERAL_NAMES *gen,
                                        STACK_OF(CONF_VALUE) *extlist);
GENERAL_NAMES *v2i_GENERAL_NAMES(const X509V3_EXT_METHOD *method,
                                 X509V3_CTX *ctx, STACK_OF(CONF_VALUE) *nval);

DECLARE_ASN1_FUNCTIONS(OTHERNAME)
DECLARE_ASN1_FUNCTIONS(EDIPARTYNAME)
int OTHERNAME_cmp(OTHERNAME *a, OTHERNAME *b);
void GENERAL_NAME_set0_value(GENERAL_NAME *a, int type, void *value);
void *GENERAL_NAME_get0_value(const GENERAL_NAME *a, int *ptype);
int GENERAL_NAME_set0_othername(GENERAL_NAME
 *gen,
                                ASN1_OBJECT *oid, ASN1_TYPE *value);
int GENERAL_NAME_get0_otherName(const GENERAL_NAME *gen,
                                ASN1_OBJECT **poid, ASN1_TYPE **pvalue);

char *i2s_ASN1_OCTET_STRING(X509V3_EXT_METHOD *method,
                            const ASN1_OCTET_STRING *ia5);
ASN1_OCTET_STRING *s2i_ASN1_OCTET_STRING(X509V3_EXT_METHOD *method,
                                         X509V3_CTX *ctx, const char *str);

DECLARE_ASN1_FUNCTIONS(EXTENDED_KEY_USAGE)
int i2a_ACCESS_DESCRIPTION(BIO *bp, const ACCESS_DESCRIPTION *a);

DECLARE_ASN1_ALLOC_FUNCTIONS(TLS_FEATURE)

DECLARE_ASN1_FUNCTIONS(CERTIFICATEPOLICIES)
DECLARE_ASN1_FUNCTIONS(POLICYINFO)
DECLARE_ASN1_FUNCTIONS(POLICYQUALINFO)
DECLARE_ASN1_FUNCTIONS(USERNOTICE)
DECLARE_ASN1_FUNCTIONS(NOTICEREF)

DECLARE_ASN1_FUNCTIONS(CRL_DIST_POINTS)
DECLARE_ASN1_FUNCTIONS(DIST_POINT)
DECLARE_ASN1_FUNCTIONS(DIST_POINT_NAME)
DECLARE_ASN1_FUNCTIONS(ISSUING_DIST_POINT)

int
 DIST_POINT_set_dpname(DIST_POINT_NAME *dpn, const X509_NAME *iname);

int NAME_CONSTRAINTS_check(X509 *x, NAME_CONSTRAINTS *nc);
int NAME_CONSTRAINTS_check_CN(X509 *x, NAME_CONSTRAINTS *nc);

DECLARE_ASN1_FUNCTIONS(ACCESS_DESCRIPTION)
```

```
DECLARE_ASN1_FUNCTIONS(AUTHORITY_INFO_ACCESS)

DECLARE_ASN1_ITEM(POLICY_MAPPING)
DECLARE_ASN1_ALLOC_FUNCTIONS(POLICY_MAPPING)
DECLARE_ASN1_ITEM(POLICY_MAPPINGS)

DECLARE_ASN1_ITEM(GENERAL_SUBTREE)
DECLARE_ASN1_ALLOC_FUNCTIONS(GENERAL_SUBTREE)

DECLARE_ASN1_ITEM(NAME_CONSTRAINTS)
DECLARE_ASN1_ALLOC_FUNCTIONS(NAME_CONSTRAINTS)

DECLARE_ASN1_ALLOC_FUNCTIONS(POLICY_CONSTRAINTS)
DECLARE_ASN1_ITEM(POLICY_CONSTRAINTS)

GENERAL_NAME *a2i_GENERAL_NAME(GENERAL_NAME *out,
                        const X509V3_EXT_METHOD *method,
                        X509V3_CTX *ctx, int gen_type,
                        const char *value, int is_nc);

# ifdef OPENSSL_CONF_H
GENERAL_NAME *v2i_GENERAL_NAME(const X509V3_EXT_METHOD *method,

            X509V3_CTX *ctx, CONF_VALUE *cnf);
GENERAL_NAME *v2i_GENERAL_NAME_ex(GENERAL_NAME *out,
                          const X509V3_EXT_METHOD *method,
                          X509V3_CTX *ctx, CONF_VALUE *cnf,
                          int is_nc);

void X509V3_conf_free(CONF_VALUE *val);

X509_EXTENSION *X509V3_EXT_nconf_nid(CONF *conf, X509V3_CTX *ctx, int ext_nid,
                           const char *value);
X509_EXTENSION *X509V3_EXT_nconf(CONF *conf, X509V3_CTX *ctx, const char *name,
                         const char *value);
int X509V3_EXT_add_nconf_sk(CONF *conf, X509V3_CTX *ctx, const char *section,
                      STACK_OF(X509_EXTENSION) **sk);
int X509V3_EXT_add_nconf(CONF *conf, X509V3_CTX *ctx, const char *section,
                    X509 *cert);
int X509V3_EXT_REQ_add_nconf(CONF *conf, X509V3_CTX *ctx, const char *section,
                       X509_REQ *req);
int X509V3_EXT_CRL_add_nconf(CONF
 *conf, X509V3_CTX *ctx, const char *section,
                       X509_CRL *crl);

X509_EXTENSION *X509V3_EXT_conf_nid(LHASH_OF(CONF_VALUE) *conf,
                           X509V3_CTX *ctx, int ext_nid,
                           const char *value);
```

```
X509_EXTENSION *X509V3_EXT_conf(LHASH_OF(CONF_VALUE) *conf, X509V3_CTX *ctx,
                                const char *name, const char *value);
int X509V3_EXT_add_conf(LHASH_OF(CONF_VALUE) *conf, X509V3_CTX *ctx,
                        const char *section, X509 *cert);
int X509V3_EXT_REQ_add_conf(LHASH_OF(CONF_VALUE) *conf, X509V3_CTX *ctx,
                            const char *section, X509_REQ *req);
int X509V3_EXT_CRL_add_conf(LHASH_OF(CONF_VALUE) *conf, X509V3_CTX *ctx,
                            const char *section, X509_CRL *crl);

int X509V3_add_value_bool_nf(const char *name, int asn1_bool,
                             STACK_OF(CONF_VALUE) **extlist);
int X509V3_get_value_bool(const CONF_VALUE *value,
 int *asn1_bool);
int X509V3_get_value_int(const CONF_VALUE *value, ASN1_INTEGER **aint);
void X509V3_set_nconf(X509V3_CTX *ctx, CONF *conf);
void X509V3_set_conf_lhash(X509V3_CTX *ctx, LHASH_OF(CONF_VALUE) *lhash);
# endif

char *X509V3_get_string(X509V3_CTX *ctx, const char *name, const char *section);
STACK_OF(CONF_VALUE) *X509V3_get_section(X509V3_CTX *ctx, const char *section);
void X509V3_string_free(X509V3_CTX *ctx, char *str);
void X509V3_section_free(X509V3_CTX *ctx, STACK_OF(CONF_VALUE) *section);
void X509V3_set_ctx(X509V3_CTX *ctx, X509 *issuer, X509 *subject,
                    X509_REQ *req, X509_CRL *crl, int flags);
/* For API backward compatibility, this is separate from X509V3_set_ctx(): */
int X509V3_set_issuer_pkey(X509V3_CTX *ctx, EVP_PKEY *pkey);

int X509V3_add_value(const char *name, const char *value,
                     STACK_OF(CONF_VALUE) **extlist);
int X509V3_add_value_uchar(const char *name, const unsigned char *value,
                           STACK_OF(CONF_VALUE)
 **extlist);
int X509V3_add_value_bool(const char *name, int asn1_bool,
                          STACK_OF(CONF_VALUE) **extlist);
int X509V3_add_value_int(const char *name, const ASN1_INTEGER *aint,
                         STACK_OF(CONF_VALUE) **extlist);
char *i2s_ASN1_INTEGER(X509V3_EXT_METHOD *meth, const ASN1_INTEGER *aint);
ASN1_INTEGER *s2i_ASN1_INTEGER(X509V3_EXT_METHOD *meth, const char *value);
char *i2s_ASN1_ENUMERATED(X509V3_EXT_METHOD *meth, const ASN1_ENUMERATED *aint);
char *i2s_ASN1_ENUMERATED_TABLE(X509V3_EXT_METHOD *meth,
                                const ASN1_ENUMERATED *aint);
int X509V3_EXT_add(X509V3_EXT_METHOD *ext);
int X509V3_EXT_add_list(X509V3_EXT_METHOD *extlist);
int X509V3_EXT_add_alias(int nid_to, int nid_from);
void X509V3_EXT_cleanup(void);

const X509V3_EXT_METHOD *X509V3_EXT_get(X509_EXTENSION *ext);
const X509V3_EXT_METHOD *X509V3_EXT_get_nid(int nid);
```

```
int X509V3_add_standard_extensions(void);
STACK_OF(CONF_VALUE) *X509V3_parse_list(const
 char *line);
void *X509V3_EXT_d2i(X509_EXTENSION *ext);
void *X509V3_get_d2i(const STACK_OF(X509_EXTENSION) *x, int nid, int *crit,
                int *idx);

X509_EXTENSION *X509V3_EXT_i2d(int ext_nid, int crit, void *ext_struc);
int X509V3_add1_i2d(STACK_OF(X509_EXTENSION) **x, int nid, void *value,
                int crit, unsigned long flags);

#ifndef OPENSSL_NO_DEPRECATED_1_1_0
/* The new declarations are in crypto.h, but the old ones were here. */
# define hex_to_string OPENSSL_buf2hexstr
# define string_to_hex OPENSSL_hexstr2buf
#endif

void X509V3_EXT_val_prn(BIO *out, STACK_OF(CONF_VALUE) *val, int indent,
                  int ml);
int X509V3_EXT_print(BIO *out, X509_EXTENSION *ext, unsigned long flag,
                int indent);
#ifndef OPENSSL_NO_STDIO
int X509V3_EXT_print_fp(FILE *out, X509_EXTENSION *ext, int flag, int indent);
#endif
int X509V3_extensions_print(BIO *out, const char *title,
                    const STACK_OF(X509_EXTENSION)
 *exts,
                    unsigned long flag, int indent);

int X509_check_ca(X509 *x);
int X509_check_purpose(X509 *x, int id, int ca);
int X509_supported_extension(X509_EXTENSION *ex);
int X509_PURPOSE_set(int *p, int purpose);
int X509_check_issued(X509 *issuer, X509 *subject);
int X509_check_akid(const X509 *issuer, const AUTHORITY_KEYID *akid);
void X509_set_proxy_flag(X509 *x);
void X509_set_proxy_pathlen(X509 *x, long l);
long X509_get_proxy_pathlen(X509 *x);

uint32_t X509_get_extension_flags(X509 *x);
uint32_t X509_get_key_usage(X509 *x);
uint32_t X509_get_extended_key_usage(X509 *x);
const ASN1_OCTET_STRING *X509_get0_subject_key_id(X509 *x);
const ASN1_OCTET_STRING *X509_get0_authority_key_id(X509 *x);
const GENERAL_NAMES *X509_get0_authority_issuer(X509 *x);
const ASN1_INTEGER *X509_get0_authority_serial(X509 *x);

int X509_PURPOSE_get_count(void);
```

```
X509_PURPOSE *X509_PURPOSE_get0(int idx);
int X509_PURPOSE_get_by_sname(const char *sname);
int X509_PURPOSE_get_by_id(int
 id);
int X509_PURPOSE_add(int id, int trust, int flags,
                int (*ck) (const X509_PURPOSE *, const X509 *, int),
                const char *name, const char *sname, void *arg);
char *X509_PURPOSE_get0_name(const X509_PURPOSE *xp);
char *X509_PURPOSE_get0_sname(const X509_PURPOSE *xp);
int X509_PURPOSE_get_trust(const X509_PURPOSE *xp);
void X509_PURPOSE_cleanup(void);
int X509_PURPOSE_get_id(const X509_PURPOSE *);

STACK_OF(OPENSSL_STRING) *X509_get1_email(X509 *x);
STACK_OF(OPENSSL_STRING) *X509_REQ_get1_email(X509_REQ *x);
void X509_email_free(STACK_OF(OPENSSL_STRING) *sk);
STACK_OF(OPENSSL_STRING) *X509_get1_ocsp(X509 *x);
/* Flags for X509_check_* functions */

/*
* Always check subject name for host match even if subject alt names present
*/
# define X509_CHECK_FLAG_ALWAYS_CHECK_SUBJECT    0x1
/* Disable wildcard matching for dnsName fields and common name. */
# define X509_CHECK_FLAG_NO_WILDCARDS    0x2
/* Wildcards must not match a partial
 label. */
# define X509_CHECK_FLAG_NO_PARTIAL_WILDCARDS 0x4
/* Allow (non-partial) wildcards to match multiple labels. */
# define X509_CHECK_FLAG_MULTI_LABEL_WILDCARDS 0x8
/* Constraint verifier subdomain patterns to match a single labels. */
# define X509_CHECK_FLAG_SINGLE_LABEL_SUBDOMAINS 0x10
/* Never check the subject CN */
# define X509_CHECK_FLAG_NEVER_CHECK_SUBJECT    0x20
/*
* Match reference identifiers starting with "." to any sub-domain.
* This is a non-public flag, turned on implicitly when the subject
* reference identity is a DNS name.
*/
# define _X509_CHECK_FLAG_DOT_SUBDOMAINS 0x8000

int X509_check_host(X509 *x, const char *chk, size_t chklen,
                unsigned int flags, char **peername);
int X509_check_email(X509 *x, const char *chk, size_t chklen,
                 unsigned int flags);
int X509_check_ip(X509 *x, const unsigned char *chk, size_t chklen,
              unsigned int flags);
int X509_check_ip_asc(X509 *x, const char *ipasc, unsigned
```

```
 int flags);

ASN1_OCTET_STRING *a2i_IPADDRESS(const char *ipasc);
ASN1_OCTET_STRING *a2i_IPADDRESS_NC(const char *ipasc);
int X509V3_NAME_from_section(X509_NAME *nm, STACK_OF(CONF_VALUE) *dn_sk,
                             unsigned long chtype);

void X509_POLICY_NODE_print(BIO *out, X509_POLICY_NODE *node, int indent);
SKM_DEFINE_STACK_OF_INTERNAL(X509_POLICY_NODE, X509_POLICY_NODE,
X509_POLICY_NODE)
#define sk_X509_POLICY_NODE_num(sk)
OPENSSL_sk_num(ossl_check_const_X509_POLICY_NODE_sk_type(sk))
#define sk_X509_POLICY_NODE_value(sk, idx) ((X509_POLICY_NODE
*)OPENSSL_sk_value(ossl_check_const_X509_POLICY_NODE_sk_type(sk), (idx)))
#define sk_X509_POLICY_NODE_new(cmp) ((STACK_OF(X509_POLICY_NODE)
*)OPENSSL_sk_new(ossl_check_X509_POLICY_NODE_compfunc_type(cmp)))
#define sk_X509_POLICY_NODE_new_null() ((STACK_OF(X509_POLICY_NODE)
*)OPENSSL_sk_new_null())
#define sk_X509_POLICY_NODE_new_reserve(cmp, n) ((STACK_OF(X509_POLICY_NODE)
*)OPENSSL_sk_new_reserve(ossl_check_X509_POLICY_NODE_compfunc_type(cmp),
 (n)))
#define sk_X509_POLICY_NODE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_X509_POLICY_NODE_sk_type(sk), (n))
#define sk_X509_POLICY_NODE_free(sk) OPENSSL_sk_free(ossl_check_X509_POLICY_NODE_sk_type(sk))
#define sk_X509_POLICY_NODE_zero(sk) OPENSSL_sk_zero(ossl_check_X509_POLICY_NODE_sk_type(sk))
#define sk_X509_POLICY_NODE_delete(sk, i) ((X509_POLICY_NODE
*)OPENSSL_sk_delete(ossl_check_X509_POLICY_NODE_sk_type(sk), (i)))
#define sk_X509_POLICY_NODE_delete_ptr(sk, ptr) ((X509_POLICY_NODE
*)OPENSSL_sk_delete_ptr(ossl_check_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_type(ptr)))
#define sk_X509_POLICY_NODE_push(sk, ptr)
OPENSSL_sk_push(ossl_check_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_type(ptr))
#define sk_X509_POLICY_NODE_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_type(ptr))
#define sk_X509_POLICY_NODE_pop(sk) ((X509_POLICY_NODE
*)OPENSSL_sk_pop(ossl_check_X509_POLICY_NODE_sk_type(sk)))
#define
 sk_X509_POLICY_NODE_shift(sk) ((X509_POLICY_NODE
*)OPENSSL_sk_shift(ossl_check_X509_POLICY_NODE_sk_type(sk)))
#define sk_X509_POLICY_NODE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_POLICY_NODE_sk_type(sk),ossl_check_X509_POLICY_NODE_free
func_type(freefunc))
#define sk_X509_POLICY_NODE_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_type(ptr), (idx))
#define sk_X509_POLICY_NODE_set(sk, idx, ptr) ((X509_POLICY_NODE
```

```
*)OPENSSL_sk_set(ossl_check_X509_POLICY_NODE_sk_type(sk), (idx),
ossl_check_X509_POLICY_NODE_type(ptr)))
#define sk_X509_POLICY_NODE_find(sk, ptr)
OPENSSL_sk_find(ossl_check_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_type(ptr))
#define sk_X509_POLICY_NODE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_type(ptr))
#define sk_X509_POLICY_NODE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_POLICY_NODE_sk_type(sk),
 ossl_check_X509_POLICY_NODE_type(ptr), pnum)
#define sk_X509_POLICY_NODE_sort(sk) OPENSSL_sk_sort(ossl_check_X509_POLICY_NODE_sk_type(sk))
#define sk_X509_POLICY_NODE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_POLICY_NODE_sk_type(sk))
#define sk_X509_POLICY_NODE_dup(sk) ((STACK_OF(X509_POLICY_NODE)
*)OPENSSL_sk_dup(ossl_check_const_X509_POLICY_NODE_sk_type(sk)))
#define sk_X509_POLICY_NODE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_POLICY_NODE)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_POLICY_NODE_sk_type(sk),
ossl_check_X509_POLICY_NODE_copyfunc_type(copyfunc),
ossl_check_X509_POLICY_NODE_freefunc_type(freefunc)))
#define sk_X509_POLICY_NODE_set_cmp_func(sk, cmp)
((sk_X509_POLICY_NODE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_POLICY_NODE_sk_type
(sk), ossl_check_X509_POLICY_NODE_compfunc_type(cmp)))



#ifndef OPENSSL_NO_RFC3779
typedef struct ASRange_st {
  ASN1_INTEGER *min, *max;
} ASRange;

# define ASIdOrRange_id         0
# define
 ASIdOrRange_range      1

typedef struct ASIdOrRange_st {
  int type;
  union {
     ASN1_INTEGER *id;
     ASRange *range;
  } u;
} ASIdOrRange;

SKM_DEFINE_STACK_OF_INTERNAL(ASIdOrRange, ASIdOrRange, ASIdOrRange)
#define sk_ASIdOrRange_num(sk) OPENSSL_sk_num(ossl_check_const_ASIdOrRange_sk_type(sk))
#define sk_ASIdOrRange_value(sk, idx) ((ASIdOrRange
*)OPENSSL_sk_value(ossl_check_const_ASIdOrRange_sk_type(sk), (idx)))
#define sk_ASIdOrRange_new(cmp) ((STACK_OF(ASIdOrRange)
```

```
*)OPENSSL_sk_new(ossl_check_ASIdOrRange_compfunc_type(cmp)))
#define sk_ASIdOrRange_new_null() ((STACK_OF(ASIdOrRange) *)OPENSSL_sk_new_null())
#define sk_ASIdOrRange_new_reserve(cmp, n) ((STACK_OF(ASIdOrRange)
*)OPENSSL_sk_new_reserve(ossl_check_ASIdOrRange_compfunc_type(cmp), (n)))
#define sk_ASIdOrRange_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ASIdOrRange_sk_type(sk), (n))
#define sk_ASIdOrRange_free(sk) OPENSSL_sk_free(ossl_check_ASIdOrRange_sk_type(sk))
#define sk_ASIdOrRange_zero(sk) OPENSSL_sk_zero(ossl_check_ASIdOrRange_sk_type(sk))
#define
 sk_ASIdOrRange_delete(sk, i) ((ASIdOrRange *)OPENSSL_sk_delete(ossl_check_ASIdOrRange_sk_type(sk),
(i)))
#define sk_ASIdOrRange_delete_ptr(sk, ptr) ((ASIdOrRange
*)OPENSSL_sk_delete_ptr(ossl_check_ASIdOrRange_sk_type(sk), ossl_check_ASIdOrRange_type(ptr)))
#define sk_ASIdOrRange_push(sk, ptr) OPENSSL_sk_push(ossl_check_ASIdOrRange_sk_type(sk),
ossl_check_ASIdOrRange_type(ptr))
#define sk_ASIdOrRange_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ASIdOrRange_sk_type(sk),
ossl_check_ASIdOrRange_type(ptr))
#define sk_ASIdOrRange_pop(sk) ((ASIdOrRange *)OPENSSL_sk_pop(ossl_check_ASIdOrRange_sk_type(sk)))
#define sk_ASIdOrRange_shift(sk) ((ASIdOrRange *)OPENSSL_sk_shift(ossl_check_ASIdOrRange_sk_type(sk)))
#define sk_ASIdOrRange_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASIdOrRange_sk_type(sk),ossl_check_ASIdOrRange_freefunc_type(freefunc)
)
#define sk_ASIdOrRange_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ASIdOrRange_sk_type(sk),
 ossl_check_ASIdOrRange_type(ptr), (idx))
#define sk_ASIdOrRange_set(sk, idx, ptr) ((ASIdOrRange
*)OPENSSL_sk_set(ossl_check_ASIdOrRange_sk_type(sk), (idx), ossl_check_ASIdOrRange_type(ptr)))
#define sk_ASIdOrRange_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASIdOrRange_sk_type(sk),
ossl_check_ASIdOrRange_type(ptr))
#define sk_ASIdOrRange_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ASIdOrRange_sk_type(sk),
ossl_check_ASIdOrRange_type(ptr))
#define sk_ASIdOrRange_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_ASIdOrRange_sk_type(sk),
ossl_check_ASIdOrRange_type(ptr), pnum)
#define sk_ASIdOrRange_sort(sk) OPENSSL_sk_sort(ossl_check_ASIdOrRange_sk_type(sk))
#define sk_ASIdOrRange_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_ASIdOrRange_sk_type(sk))
#define sk_ASIdOrRange_dup(sk) ((STACK_OF(ASIdOrRange)
*)OPENSSL_sk_dup(ossl_check_const_ASIdOrRange_sk_type(sk)))
#define sk_ASIdOrRange_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASIdOrRange)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASIdOrRange_sk_type(sk),
 ossl_check_ASIdOrRange_copyfunc_type(copyfunc), ossl_check_ASIdOrRange_freefunc_type(freefunc)))
#define sk_ASIdOrRange_set_cmp_func(sk, cmp)
((sk_ASIdOrRange_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASIdOrRange_sk_type(sk),
ossl_check_ASIdOrRange_compfunc_type(cmp)))


typedef STACK_OF(ASIdOrRange) ASIdOrRanges;

# define ASIdentifierChoice_inherit           0
# define ASIdentifierChoice_asIdsOrRanges     1
```

```
typedef struct ASIdentifierChoice_st {
  int type;
  union {
     ASN1_NULL *inherit;
     ASIdOrRanges *asIdsOrRanges;
  } u;
} ASIdentifierChoice;

typedef struct ASIdentifiers_st {
  ASIdentifierChoice *asnum, *rdi;
} ASIdentifiers;

DECLARE_ASN1_FUNCTIONS(ASRange)
DECLARE_ASN1_FUNCTIONS(ASIdOrRange)
DECLARE_ASN1_FUNCTIONS(ASIdentifierChoice)
DECLARE_ASN1_FUNCTIONS(ASIdentifiers)

typedef struct IPAddressRange_st {
  ASN1_BIT_STRING *min, *max;
} IPAddressRange;

# define IPAddressOrRange_addressPrefix  0
# define
 IPAddressOrRange_addressRange   1

typedef struct IPAddressOrRange_st {
  int type;
  union {
     ASN1_BIT_STRING *addressPrefix;
     IPAddressRange *addressRange;
  } u;
} IPAddressOrRange;

SKM_DEFINE_STACK_OF_INTERNAL(IPAddressOrRange, IPAddressOrRange, IPAddressOrRange)
#define sk_IPAddressOrRange_num(sk) OPENSSL_sk_num(ossl_check_const_IPAddressOrRange_sk_type(sk))
#define sk_IPAddressOrRange_value(sk, idx) ((IPAddressOrRange
*)OPENSSL_sk_value(ossl_check_const_IPAddressOrRange_sk_type(sk), (idx)))
#define sk_IPAddressOrRange_new(cmp) ((STACK_OF(IPAddressOrRange)
*)OPENSSL_sk_new(ossl_check_IPAddressOrRange_compfunc_type(cmp)))
#define sk_IPAddressOrRange_new_null() ((STACK_OF(IPAddressOrRange) *)OPENSSL_sk_new_null())
#define sk_IPAddressOrRange_new_reserve(cmp, n) ((STACK_OF(IPAddressOrRange)
*)OPENSSL_sk_new_reserve(ossl_check_IPAddressOrRange_compfunc_type(cmp), (n)))
#define sk_IPAddressOrRange_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_IPAddressOrRange_sk_type(sk),
 (n))
#define sk_IPAddressOrRange_free(sk) OPENSSL_sk_free(ossl_check_IPAddressOrRange_sk_type(sk))
#define sk_IPAddressOrRange_zero(sk) OPENSSL_sk_zero(ossl_check_IPAddressOrRange_sk_type(sk))
#define sk_IPAddressOrRange_delete(sk, i) ((IPAddressOrRange
*)OPENSSL_sk_delete(ossl_check_IPAddressOrRange_sk_type(sk), (i)))
```

```
#define sk_IPAddressOrRange_delete_ptr(sk, ptr) ((IPAddressOrRange
*)OPENSSL_sk_delete_ptr(ossl_check_IPAddressOrRange_sk_type(sk),
ossl_check_IPAddressOrRange_type(ptr)))
#define sk_IPAddressOrRange_push(sk, ptr) OPENSSL_sk_push(ossl_check_IPAddressOrRange_sk_type(sk),
ossl_check_IPAddressOrRange_type(ptr))
#define sk_IPAddressOrRange_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_IPAddressOrRange_sk_type(sk),
ossl_check_IPAddressOrRange_type(ptr))
#define sk_IPAddressOrRange_pop(sk) ((IPAddressOrRange
*)OPENSSL_sk_pop(ossl_check_IPAddressOrRange_sk_type(sk)))
#define sk_IPAddressOrRange_shift(sk) ((IPAddressOrRange
*)OPENSSL_sk_shift(ossl_check_IPAddressOrRange_sk_type(sk)))
#define
 sk_IPAddressOrRange_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_IPAddressOrRange_sk_type(sk),ossl_check_IPAddressOrRange_freefunc_typ
e(freefunc))
#define sk_IPAddressOrRange_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_IPAddressOrRange_sk_type(sk), ossl_check_IPAddressOrRange_type(ptr), (idx))
#define sk_IPAddressOrRange_set(sk, idx, ptr) ((IPAddressOrRange
*)OPENSSL_sk_set(ossl_check_IPAddressOrRange_sk_type(sk), (idx), ossl_check_IPAddressOrRange_type(ptr)))
#define sk_IPAddressOrRange_find(sk, ptr) OPENSSL_sk_find(ossl_check_IPAddressOrRange_sk_type(sk),
ossl_check_IPAddressOrRange_type(ptr))
#define sk_IPAddressOrRange_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_IPAddressOrRange_sk_type(sk), ossl_check_IPAddressOrRange_type(ptr))
#define sk_IPAddressOrRange_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_IPAddressOrRange_sk_type(sk), ossl_check_IPAddressOrRange_type(ptr),
pnum)
#define sk_IPAddressOrRange_sort(sk) OPENSSL_sk_sort(ossl_check_IPAddressOrRange_sk_type(sk))
#define
 sk_IPAddressOrRange_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_IPAddressOrRange_sk_type(sk))
#define sk_IPAddressOrRange_dup(sk) ((STACK_OF(IPAddressOrRange)
*)OPENSSL_sk_dup(ossl_check_const_IPAddressOrRange_sk_type(sk)))
#define sk_IPAddressOrRange_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(IPAddressOrRange)
*)OPENSSL_sk_deep_copy(ossl_check_const_IPAddressOrRange_sk_type(sk),
ossl_check_IPAddressOrRange_copyfunc_type(copyfunc),
ossl_check_IPAddressOrRange_freefunc_type(freefunc)))
#define sk_IPAddressOrRange_set_cmp_func(sk, cmp)
((sk_IPAddressOrRange_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_IPAddressOrRange_sk_type(sk),
ossl_check_IPAddressOrRange_compfunc_type(cmp)))


typedef STACK_OF(IPAddressOrRange) IPAddressOrRanges;

# define IPAddressChoice_inherit              0
# define IPAddressChoice_addressesOrRanges    1

typedef struct IPAddressChoice_st {
  int type;
  union {
```

```
      ASN1_NULL *inherit;

    IPAddressOrRanges *addressesOrRanges;
   } u;
} IPAddressChoice;

typedef struct IPAddressFamily_st {
   ASN1_OCTET_STRING *addressFamily;
   IPAddressChoice *ipAddressChoice;
} IPAddressFamily;

SKM_DEFINE_STACK_OF_INTERNAL(IPAddressFamily, IPAddressFamily, IPAddressFamily)
#define sk_IPAddressFamily_num(sk) OPENSSL_sk_num(ossl_check_const_IPAddressFamily_sk_type(sk))
#define sk_IPAddressFamily_value(sk, idx) ((IPAddressFamily
*)OPENSSL_sk_value(ossl_check_const_IPAddressFamily_sk_type(sk), (idx)))
#define sk_IPAddressFamily_new(cmp) ((STACK_OF(IPAddressFamily)
*)OPENSSL_sk_new(ossl_check_IPAddressFamily_compfunc_type(cmp)))
#define sk_IPAddressFamily_new_null() ((STACK_OF(IPAddressFamily) *)OPENSSL_sk_new_null())
#define sk_IPAddressFamily_new_reserve(cmp, n) ((STACK_OF(IPAddressFamily)
*)OPENSSL_sk_new_reserve(ossl_check_IPAddressFamily_compfunc_type(cmp), (n)))
#define sk_IPAddressFamily_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_IPAddressFamily_sk_type(sk), (n))
#define sk_IPAddressFamily_free(sk)
 OPENSSL_sk_free(ossl_check_IPAddressFamily_sk_type(sk))
#define sk_IPAddressFamily_zero(sk) OPENSSL_sk_zero(ossl_check_IPAddressFamily_sk_type(sk))
#define sk_IPAddressFamily_delete(sk, i) ((IPAddressFamily
*)OPENSSL_sk_delete(ossl_check_IPAddressFamily_sk_type(sk), (i)))
#define sk_IPAddressFamily_delete_ptr(sk, ptr) ((IPAddressFamily
*)OPENSSL_sk_delete_ptr(ossl_check_IPAddressFamily_sk_type(sk), ossl_check_IPAddressFamily_type(ptr)))
#define sk_IPAddressFamily_push(sk, ptr) OPENSSL_sk_push(ossl_check_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_type(ptr))
#define sk_IPAddressFamily_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_type(ptr))
#define sk_IPAddressFamily_pop(sk) ((IPAddressFamily
*)OPENSSL_sk_pop(ossl_check_IPAddressFamily_sk_type(sk)))
#define sk_IPAddressFamily_shift(sk) ((IPAddressFamily
*)OPENSSL_sk_shift(ossl_check_IPAddressFamily_sk_type(sk)))
#define sk_IPAddressFamily_pop_free(sk,
 freefunc)
OPENSSL_sk_pop_free(ossl_check_IPAddressFamily_sk_type(sk),ossl_check_IPAddressFamily_freefunc_type(fre
efunc))
#define sk_IPAddressFamily_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_type(ptr), (idx))
#define sk_IPAddressFamily_set(sk, idx, ptr) ((IPAddressFamily
*)OPENSSL_sk_set(ossl_check_IPAddressFamily_sk_type(sk), (idx), ossl_check_IPAddressFamily_type(ptr)))
#define sk_IPAddressFamily_find(sk, ptr) OPENSSL_sk_find(ossl_check_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_type(ptr))
#define sk_IPAddressFamily_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_type(ptr))
```

```
#define sk_IPAddressFamily_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_IPAddressFamily_sk_type(sk), ossl_check_IPAddressFamily_type(ptr), pnum)
#define sk_IPAddressFamily_sort(sk) OPENSSL_sk_sort(ossl_check_IPAddressFamily_sk_type(sk))
#define sk_IPAddressFamily_is_sorted(sk)
 OPENSSL_sk_is_sorted(ossl_check_const_IPAddressFamily_sk_type(sk))
#define sk_IPAddressFamily_dup(sk) ((STACK_OF(IPAddressFamily)
*)OPENSSL_sk_dup(ossl_check_const_IPAddressFamily_sk_type(sk)))
#define sk_IPAddressFamily_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(IPAddressFamily)
*)OPENSSL_sk_deep_copy(ossl_check_const_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_copyfunc_type(copyfunc), ossl_check_IPAddressFamily_freefunc_type(freefunc)))
#define sk_IPAddressFamily_set_cmp_func(sk, cmp)
((sk_IPAddressFamily_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_IPAddressFamily_sk_type(sk),
ossl_check_IPAddressFamily_compfunc_type(cmp)))



typedef STACK_OF(IPAddressFamily) IPAddrBlocks;

DECLARE_ASN1_FUNCTIONS(IPAddressRange)
DECLARE_ASN1_FUNCTIONS(IPAddressOrRange)
DECLARE_ASN1_FUNCTIONS(IPAddressChoice)
DECLARE_ASN1_FUNCTIONS(IPAddressFamily)

/*
* API tag for elements of the ASIdentifer SEQUENCE.
*/
# define V3_ASID_ASNUM   0
# define V3_ASID_RDI     1

/*
* AFI values,
 assigned by IANA.  It'd be nice to make the AFI
* handling code totally generic, but there are too many little things
* that would need to be defined for other address families for it to
* be worth the trouble.
*/
# define IANA_AFI_IPV4   1
# define IANA_AFI_IPV6   2

/*
* Utilities to construct and extract values from RFC3779 extensions,
* since some of the encodings (particularly for IP address prefixes
* and ranges) are a bit tedious to work with directly.
*/
int X509v3_asid_add_inherit(ASIdentifiers *asid, int which);
int X509v3_asid_add_id_or_range(ASIdentifiers *asid, int which,
                        ASN1_INTEGER *min, ASN1_INTEGER *max);
int X509v3_addr_add_inherit(IPAddrBlocks *addr,
```

```
                        const unsigned afi, const unsigned *safi);
int X509v3_addr_add_prefix(IPAddrBlocks *addr,
                       const unsigned afi, const unsigned *safi,
                       unsigned char *a, const int prefixlen);
int X509v3_addr_add_range(IPAddrBlocks
 *addr,
                       const unsigned afi, const unsigned *safi,
                       unsigned char *min, unsigned char *max);
unsigned X509v3_addr_get_afi(const IPAddressFamily *f);
int X509v3_addr_get_range(IPAddressOrRange *aor, const unsigned afi,
                       unsigned char *min, unsigned char *max,
                       const int length);

/*
* Canonical forms.
*/
int X509v3_asid_is_canonical(ASIdentifiers *asid);
int X509v3_addr_is_canonical(IPAddrBlocks *addr);
int X509v3_asid_canonize(ASIdentifiers *asid);
int X509v3_addr_canonize(IPAddrBlocks *addr);

/*
* Tests for inheritance and containment.
*/
int X509v3_asid_inherits(ASIdentifiers *asid);
int X509v3_addr_inherits(IPAddrBlocks *addr);
int X509v3_asid_subset(ASIdentifiers *a, ASIdentifiers *b);
int X509v3_addr_subset(IPAddrBlocks *a, IPAddrBlocks *b);

/*
* Check whether RFC 3779 extensions nest properly in chains.
*/
int X509v3_asid_validate_path(X509_STORE_CTX *);
int
 X509v3_addr_validate_path(X509_STORE_CTX *);
int X509v3_asid_validate_resource_set(STACK_OF(X509) *chain,
                              ASIdentifiers *ext,
                              int allow_inheritance);
int X509v3_addr_validate_resource_set(STACK_OF(X509) *chain,
                              IPAddrBlocks *ext, int allow_inheritance);

#endif                      /* OPENSSL_NO_RFC3779 */

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_STRING, ASN1_STRING, ASN1_STRING)
#define sk_ASN1_STRING_num(sk) OPENSSL_sk_num(ossl_check_const_ASN1_STRING_sk_type(sk))
#define sk_ASN1_STRING_value(sk, idx) ((ASN1_STRING
*)OPENSSL_sk_value(ossl_check_const_ASN1_STRING_sk_type(sk), (idx)))
#define sk_ASN1_STRING_new(cmp) ((STACK_OF(ASN1_STRING)
```

```
*)OPENSSL_sk_new(ossl_check_ASN1_STRING_compfunc_type(cmp)))
#define sk_ASN1_STRING_new_null() ((STACK_OF(ASN1_STRING) *)OPENSSL_sk_new_null())
#define sk_ASN1_STRING_new_reserve(cmp, n) ((STACK_OF(ASN1_STRING)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_STRING_compfunc_type(cmp),
 (n)))
#define sk_ASN1_STRING_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ASN1_STRING_sk_type(sk), (n))
#define sk_ASN1_STRING_free(sk) OPENSSL_sk_free(ossl_check_ASN1_STRING_sk_type(sk))
#define sk_ASN1_STRING_zero(sk) OPENSSL_sk_zero(ossl_check_ASN1_STRING_sk_type(sk))
#define sk_ASN1_STRING_delete(sk, i) ((ASN1_STRING
*)OPENSSL_sk_delete(ossl_check_ASN1_STRING_sk_type(sk), (i)))
#define sk_ASN1_STRING_delete_ptr(sk, ptr) ((ASN1_STRING
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_STRING_sk_type(sk), ossl_check_ASN1_STRING_type(ptr)))
#define sk_ASN1_STRING_push(sk, ptr) OPENSSL_sk_push(ossl_check_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_type(ptr))
#define sk_ASN1_STRING_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_type(ptr))
#define sk_ASN1_STRING_pop(sk) ((ASN1_STRING
*)OPENSSL_sk_pop(ossl_check_ASN1_STRING_sk_type(sk)))
#define sk_ASN1_STRING_shift(sk) ((ASN1_STRING
*)OPENSSL_sk_shift(ossl_check_ASN1_STRING_sk_type(sk)))
#define
 sk_ASN1_STRING_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_STRING_sk_type(sk),ossl_check_ASN1_STRING_freefunc_type(freef
unc))
#define sk_ASN1_STRING_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_type(ptr), (idx))
#define sk_ASN1_STRING_set(sk, idx, ptr) ((ASN1_STRING
*)OPENSSL_sk_set(ossl_check_ASN1_STRING_sk_type(sk), (idx), ossl_check_ASN1_STRING_type(ptr)))
#define sk_ASN1_STRING_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_type(ptr))
#define sk_ASN1_STRING_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_type(ptr))
#define sk_ASN1_STRING_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_STRING_sk_type(sk), ossl_check_ASN1_STRING_type(ptr), pnum)
#define sk_ASN1_STRING_sort(sk) OPENSSL_sk_sort(ossl_check_ASN1_STRING_sk_type(sk))
#define sk_ASN1_STRING_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_ASN1_STRING_sk_type(sk))
#define
 sk_ASN1_STRING_dup(sk) ((STACK_OF(ASN1_STRING)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_STRING_sk_type(sk)))
#define sk_ASN1_STRING_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_STRING)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_copyfunc_type(copyfunc), ossl_check_ASN1_STRING_freefunc_type(freefunc)))
#define sk_ASN1_STRING_set_cmp_func(sk, cmp)
((sk_ASN1_STRING_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_STRING_sk_type(sk),
ossl_check_ASN1_STRING_compfunc_type(cmp)))
```

```
/*
* Admission Syntax
*/
typedef struct NamingAuthority_st NAMING_AUTHORITY;
typedef struct ProfessionInfo_st PROFESSION_INFO;
typedef struct Admissions_st ADMISSIONS;
typedef struct AdmissionSyntax_st ADMISSION_SYNTAX;
DECLARE_ASN1_FUNCTIONS(NAMING_AUTHORITY)
DECLARE_ASN1_FUNCTIONS(PROFESSION_INFO)
DECLARE_ASN1_FUNCTIONS(ADMISSIONS)
DECLARE_ASN1_FUNCTIONS(ADMISSION_SYNTAX)
SKM_DEFINE_STACK_OF_INTERNAL(PROFESSION_INFO,
 PROFESSION_INFO, PROFESSION_INFO)
#define sk_PROFESSION_INFO_num(sk)
OPENSSL_sk_num(ossl_check_const_PROFESSION_INFO_sk_type(sk))
#define sk_PROFESSION_INFO_value(sk, idx) ((PROFESSION_INFO
*)OPENSSL_sk_value(ossl_check_const_PROFESSION_INFO_sk_type(sk), (idx)))
#define sk_PROFESSION_INFO_new(cmp) ((STACK_OF(PROFESSION_INFO)
*)OPENSSL_sk_new(ossl_check_PROFESSION_INFO_compfunc_type(cmp)))
#define sk_PROFESSION_INFO_new_null() ((STACK_OF(PROFESSION_INFO) *)OPENSSL_sk_new_null())
#define sk_PROFESSION_INFO_new_reserve(cmp, n) ((STACK_OF(PROFESSION_INFO)
*)OPENSSL_sk_new_reserve(ossl_check_PROFESSION_INFO_compfunc_type(cmp), (n)))
#define sk_PROFESSION_INFO_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_PROFESSION_INFO_sk_type(sk), (n))
#define sk_PROFESSION_INFO_free(sk) OPENSSL_sk_free(ossl_check_PROFESSION_INFO_sk_type(sk))
#define sk_PROFESSION_INFO_zero(sk) OPENSSL_sk_zero(ossl_check_PROFESSION_INFO_sk_type(sk))
#define sk_PROFESSION_INFO_delete(sk, i) ((PROFESSION_INFO
*)OPENSSL_sk_delete(ossl_check_PROFESSION_INFO_sk_type(sk),
 (i)))
#define sk_PROFESSION_INFO_delete_ptr(sk, ptr) ((PROFESSION_INFO
*)OPENSSL_sk_delete_ptr(ossl_check_PROFESSION_INFO_sk_type(sk),
ossl_check_PROFESSION_INFO_type(ptr)))
#define sk_PROFESSION_INFO_push(sk, ptr)
OPENSSL_sk_push(ossl_check_PROFESSION_INFO_sk_type(sk), ossl_check_PROFESSION_INFO_type(ptr))
#define sk_PROFESSION_INFO_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_PROFESSION_INFO_sk_type(sk), ossl_check_PROFESSION_INFO_type(ptr))
#define sk_PROFESSION_INFO_pop(sk) ((PROFESSION_INFO
*)OPENSSL_sk_pop(ossl_check_PROFESSION_INFO_sk_type(sk)))
#define sk_PROFESSION_INFO_shift(sk) ((PROFESSION_INFO
*)OPENSSL_sk_shift(ossl_check_PROFESSION_INFO_sk_type(sk)))
#define sk_PROFESSION_INFO_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_PROFESSION_INFO_sk_type(sk),ossl_check_PROFESSION_INFO_freefun
c_type(freefunc))
#define sk_PROFESSION_INFO_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_PROFESSION_INFO_sk_type(sk), ossl_check_PROFESSION_INFO_type(ptr),
 (idx))
#define sk_PROFESSION_INFO_set(sk, idx, ptr) ((PROFESSION_INFO
*)OPENSSL_sk_set(ossl_check_PROFESSION_INFO_sk_type(sk), (idx),
```

```
ossl_check_PROFESSION_INFO_type(ptr)))
#define sk_PROFESSION_INFO_find(sk, ptr) OPENSSL_sk_find(ossl_check_PROFESSION_INFO_sk_type(sk),
ossl_check_PROFESSION_INFO_type(ptr))
#define sk_PROFESSION_INFO_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_PROFESSION_INFO_sk_type(sk),
ossl_check_PROFESSION_INFO_type(ptr))
#define sk_PROFESSION_INFO_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_PROFESSION_INFO_sk_type(sk),
ossl_check_PROFESSION_INFO_type(ptr), pnum)
#define sk_PROFESSION_INFO_sort(sk) OPENSSL_sk_sort(ossl_check_PROFESSION_INFO_sk_type(sk))
#define sk_PROFESSION_INFO_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_PROFESSION_INFO_sk_type(sk))
#define sk_PROFESSION_INFO_dup(sk) ((STACK_OF(PROFESSION_INFO)
*)OPENSSL_sk_dup(ossl_check_const_PROFESSION_INFO_sk_type(sk)))
#define sk_PROFESSION_INFO_deep_copy(sk,
 copyfunc, freefunc) ((STACK_OF(PROFESSION_INFO)
*)OPENSSL_sk_deep_copy(ossl_check_const_PROFESSION_INFO_sk_type(sk),
ossl_check_PROFESSION_INFO_copyfunc_type(copyfunc),
ossl_check_PROFESSION_INFO_freefunc_type(freefunc)))
#define sk_PROFESSION_INFO_set_cmp_func(sk, cmp)
((sk_PROFESSION_INFO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_PROFESSION_INFO_sk_type(sk)
, ossl_check_PROFESSION_INFO_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(ADMISSIONS, ADMISSIONS, ADMISSIONS)
#define sk_ADMISSIONS_num(sk) OPENSSL_sk_num(ossl_check_const_ADMISSIONS_sk_type(sk))
#define sk_ADMISSIONS_value(sk, idx) ((ADMISSIONS
*)OPENSSL_sk_value(ossl_check_const_ADMISSIONS_sk_type(sk), (idx)))
#define sk_ADMISSIONS_new(cmp) ((STACK_OF(ADMISSIONS)
*)OPENSSL_sk_new(ossl_check_ADMISSIONS_compfunc_type(cmp)))
#define sk_ADMISSIONS_new_null() ((STACK_OF(ADMISSIONS) *)OPENSSL_sk_new_null())
#define sk_ADMISSIONS_new_reserve(cmp, n) ((STACK_OF(ADMISSIONS)
*)OPENSSL_sk_new_reserve(ossl_check_ADMISSIONS_compfunc_type(cmp),
 (n)))
#define sk_ADMISSIONS_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ADMISSIONS_sk_type(sk), (n))
#define sk_ADMISSIONS_free(sk) OPENSSL_sk_free(ossl_check_ADMISSIONS_sk_type(sk))
#define sk_ADMISSIONS_zero(sk) OPENSSL_sk_zero(ossl_check_ADMISSIONS_sk_type(sk))
#define sk_ADMISSIONS_delete(sk, i) ((ADMISSIONS
*)OPENSSL_sk_delete(ossl_check_ADMISSIONS_sk_type(sk), (i)))
#define sk_ADMISSIONS_delete_ptr(sk, ptr) ((ADMISSIONS
*)OPENSSL_sk_delete_ptr(ossl_check_ADMISSIONS_sk_type(sk), ossl_check_ADMISSIONS_type(ptr)))
#define sk_ADMISSIONS_push(sk, ptr) OPENSSL_sk_push(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_type(ptr))
#define sk_ADMISSIONS_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_type(ptr))
#define sk_ADMISSIONS_pop(sk) ((ADMISSIONS
*)OPENSSL_sk_pop(ossl_check_ADMISSIONS_sk_type(sk)))
#define sk_ADMISSIONS_shift(sk) ((ADMISSIONS
*)OPENSSL_sk_shift(ossl_check_ADMISSIONS_sk_type(sk)))
#define sk_ADMISSIONS_pop_free(sk,
```

```
 freefunc)
OPENSSL_sk_pop_free(ossl_check_ADMISSIONS_sk_type(sk),ossl_check_ADMISSIONS_freefunc_type(freefun
c))
#define sk_ADMISSIONS_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_type(ptr), (idx))
#define sk_ADMISSIONS_set(sk, idx, ptr) ((ADMISSIONS
*)OPENSSL_sk_set(ossl_check_ADMISSIONS_sk_type(sk), (idx), ossl_check_ADMISSIONS_type(ptr)))
#define sk_ADMISSIONS_find(sk, ptr) OPENSSL_sk_find(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_type(ptr))
#define sk_ADMISSIONS_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_type(ptr))
#define sk_ADMISSIONS_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_type(ptr), pnum)
#define sk_ADMISSIONS_sort(sk) OPENSSL_sk_sort(ossl_check_ADMISSIONS_sk_type(sk))
#define sk_ADMISSIONS_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_ADMISSIONS_sk_type(sk))
#define sk_ADMISSIONS_dup(sk)
 ((STACK_OF(ADMISSIONS) *)OPENSSL_sk_dup(ossl_check_const_ADMISSIONS_sk_type(sk)))
#define sk_ADMISSIONS_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ADMISSIONS)
*)OPENSSL_sk_deep_copy(ossl_check_const_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_copyfunc_type(copyfunc), ossl_check_ADMISSIONS_freefunc_type(freefunc)))
#define sk_ADMISSIONS_set_cmp_func(sk, cmp)
((sk_ADMISSIONS_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ADMISSIONS_sk_type(sk),
ossl_check_ADMISSIONS_compfunc_type(cmp)))

typedef STACK_OF(PROFESSION_INFO) PROFESSION_INFOS;

const ASN1_OBJECT *NAMING_AUTHORITY_get0_authorityId(
  const NAMING_AUTHORITY *n);
const ASN1_IA5STRING *NAMING_AUTHORITY_get0_authorityURL(
  const NAMING_AUTHORITY *n);
const ASN1_STRING *NAMING_AUTHORITY_get0_authorityText(
  const NAMING_AUTHORITY *n);
void NAMING_AUTHORITY_set0_authorityId(NAMING_AUTHORITY *n,
  ASN1_OBJECT* namingAuthorityId);
void NAMING_AUTHORITY_set0_authorityURL(NAMING_AUTHORITY *n,
  ASN1_IA5STRING* namingAuthorityUrl);
void
 NAMING_AUTHORITY_set0_authorityText(NAMING_AUTHORITY *n,
  ASN1_STRING* namingAuthorityText);

const GENERAL_NAME *ADMISSION_SYNTAX_get0_admissionAuthority(
  const ADMISSION_SYNTAX *as);
void ADMISSION_SYNTAX_set0_admissionAuthority(
  ADMISSION_SYNTAX *as, GENERAL_NAME *aa);
const STACK_OF(ADMISSIONS) *ADMISSION_SYNTAX_get0_contentsOfAdmissions(
  const ADMISSION_SYNTAX *as);
void ADMISSION_SYNTAX_set0_contentsOfAdmissions(
  ADMISSION_SYNTAX *as, STACK_OF(ADMISSIONS) *a);
```

```
const GENERAL_NAME *ADMISSIONS_get0_admissionAuthority(const ADMISSIONS *a);
void ADMISSIONS_set0_admissionAuthority(ADMISSIONS *a, GENERAL_NAME *aa);
const NAMING_AUTHORITY *ADMISSIONS_get0_namingAuthority(const ADMISSIONS *a);
void ADMISSIONS_set0_namingAuthority(ADMISSIONS *a, NAMING_AUTHORITY *na);
const PROFESSION_INFOS *ADMISSIONS_get0_professionInfos(const ADMISSIONS *a);
void ADMISSIONS_set0_professionInfos(ADMISSIONS *a, PROFESSION_INFOS *pi);
const ASN1_OCTET_STRING *PROFESSION_INFO_get0_addProfessionInfo(
   const PROFESSION_INFO *pi);
void PROFESSION_INFO_set0_addProfessionInfo(
  PROFESSION_INFO *pi, ASN1_OCTET_STRING *aos);
const NAMING_AUTHORITY *PROFESSION_INFO_get0_namingAuthority(
  const PROFESSION_INFO *pi);
void PROFESSION_INFO_set0_namingAuthority(
  PROFESSION_INFO *pi, NAMING_AUTHORITY *na);
const STACK_OF(ASN1_STRING) *PROFESSION_INFO_get0_professionItems(
  const PROFESSION_INFO *pi);
void PROFESSION_INFO_set0_professionItems(
  PROFESSION_INFO *pi, STACK_OF(ASN1_STRING) *as);
const STACK_OF(ASN1_OBJECT) *PROFESSION_INFO_get0_professionOIDs(
  const PROFESSION_INFO *pi);
void PROFESSION_INFO_set0_professionOIDs(
  PROFESSION_INFO *pi, STACK_OF(ASN1_OBJECT) *po);
const ASN1_PRINTABLESTRING *PROFESSION_INFO_get0_registrationNumber(
  const PROFESSION_INFO *pi);
void PROFESSION_INFO_set0_registrationNumber(
  PROFESSION_INFO *pi, ASN1_PRINTABLESTRING *rn);

# ifdef  __cplusplus
}
# endif
#endif
```

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```
/*
* WARNING: do not edit!
* Generated by Makefile from providers/common/include/prov/der_ec.h.in
*
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*/

#include "crypto/ec.h"
#include "internal/der.h"

/* Well known OIDs precompiled */

/*
* ecdsa-with-SHA1 OBJECT IDENTIFIER ::= { id-ecSigType 1 }
*/
#define DER_OID_V_ecdsa_with_SHA1 DER_P_OBJECT, 7, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x04, 0x01
#define DER_OID_SZ_ecdsa_with_SHA1 9
extern const unsigned char ossl_der_oid_ecdsa_with_SHA1[DER_OID_SZ_ecdsa_with_SHA1];

/*
* id-ecPublicKey OBJECT IDENTIFIER ::= { id-publicKeyType 1 }
*/
#define DER_OID_V_id_ecPublicKey DER_P_OBJECT, 7, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x02, 0x01
#define DER_OID_SZ_id_ecPublicKey 9
```

```
extern
 const unsigned char ossl_der_oid_id_ecPublicKey[DER_OID_SZ_id_ecPublicKey];

/*
* c2pnb163v1  OBJECT IDENTIFIER  ::=  { c-TwoCurve  1 }
*/
#define DER_OID_V_c2pnb163v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x01
#define DER_OID_SZ_c2pnb163v1 10
extern const unsigned char ossl_der_oid_c2pnb163v1[DER_OID_SZ_c2pnb163v1];

/*
* c2pnb163v2  OBJECT IDENTIFIER  ::=  { c-TwoCurve  2 }
*/
#define DER_OID_V_c2pnb163v2 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x02
#define DER_OID_SZ_c2pnb163v2 10
extern const unsigned char ossl_der_oid_c2pnb163v2[DER_OID_SZ_c2pnb163v2];

/*
* c2pnb163v3  OBJECT IDENTIFIER  ::=  { c-TwoCurve  3 }
*/
#define DER_OID_V_c2pnb163v3 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x03
#define DER_OID_SZ_c2pnb163v3 10
extern const unsigned char ossl_der_oid_c2pnb163v3[DER_OID_SZ_c2pnb163v3];

/*
* c2pnb176w1  OBJECT IDENTIFIER  ::=  { c-TwoCurve  4 }
*/
#define DER_OID_V_c2pnb176w1 DER_P_OBJECT, 8, 0x2A, 0x86,
 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x04
#define DER_OID_SZ_c2pnb176w1 10
extern const unsigned char ossl_der_oid_c2pnb176w1[DER_OID_SZ_c2pnb176w1];

/*
* c2tnb191v1  OBJECT IDENTIFIER  ::=  { c-TwoCurve  5 }
*/
#define DER_OID_V_c2tnb191v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x05
#define DER_OID_SZ_c2tnb191v1 10
extern const unsigned char ossl_der_oid_c2tnb191v1[DER_OID_SZ_c2tnb191v1];

/*
* c2tnb191v2  OBJECT IDENTIFIER  ::=  { c-TwoCurve  6 }
*/
#define DER_OID_V_c2tnb191v2 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x06
#define DER_OID_SZ_c2tnb191v2 10
extern const unsigned char ossl_der_oid_c2tnb191v2[DER_OID_SZ_c2tnb191v2];

/*
* c2tnb191v3  OBJECT IDENTIFIER  ::=  { c-TwoCurve  7 }
```

```
*/
#define DER_OID_V_c2tnb191v3 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x07
#define DER_OID_SZ_c2tnb191v3 10
extern const unsigned char ossl_der_oid_c2tnb191v3[DER_OID_SZ_c2tnb191v3];

/*
* c2onb191v4  OBJECT IDENTIFIER  ::=  { c-TwoCurve
 8 }
*/
#define DER_OID_V_c2onb191v4 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x08
#define DER_OID_SZ_c2onb191v4 10
extern const unsigned char ossl_der_oid_c2onb191v4[DER_OID_SZ_c2onb191v4];

/*
* c2onb191v5  OBJECT IDENTIFIER  ::=  { c-TwoCurve  9 }
*/
#define DER_OID_V_c2onb191v5 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x09
#define DER_OID_SZ_c2onb191v5 10
extern const unsigned char ossl_der_oid_c2onb191v5[DER_OID_SZ_c2onb191v5];

/*
* c2pnb208w1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 10 }
*/
#define DER_OID_V_c2pnb208w1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x0A
#define DER_OID_SZ_c2pnb208w1 10
extern const unsigned char ossl_der_oid_c2pnb208w1[DER_OID_SZ_c2pnb208w1];

/*
* c2tnb239v1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 11 }
*/
#define DER_OID_V_c2tnb239v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x0B
#define DER_OID_SZ_c2tnb239v1 10
extern const unsigned char ossl_der_oid_c2tnb239v1[DER_OID_SZ_c2tnb239v1];

/*
 * c2tnb239v2  OBJECT IDENTIFIER  ::=  { c-TwoCurve 12 }
*/
#define DER_OID_V_c2tnb239v2 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x0C
#define DER_OID_SZ_c2tnb239v2 10
extern const unsigned char ossl_der_oid_c2tnb239v2[DER_OID_SZ_c2tnb239v2];

/*
* c2tnb239v3  OBJECT IDENTIFIER  ::=  { c-TwoCurve 13 }
*/
#define DER_OID_V_c2tnb239v3 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x0D
#define DER_OID_SZ_c2tnb239v3 10
extern const unsigned char ossl_der_oid_c2tnb239v3[DER_OID_SZ_c2tnb239v3];
```

```
/*
* c2onb239v4  OBJECT IDENTIFIER  ::=  { c-TwoCurve 14 }
*/
#define DER_OID_V_c2onb239v4 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x0E
#define DER_OID_SZ_c2onb239v4 10
extern const unsigned char ossl_der_oid_c2onb239v4[DER_OID_SZ_c2onb239v4];

/*
* c2onb239v5  OBJECT IDENTIFIER  ::=  { c-TwoCurve 15 }
*/
#define DER_OID_V_c2onb239v5 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x0F
#define DER_OID_SZ_c2onb239v5 10
extern
 const unsigned char ossl_der_oid_c2onb239v5[DER_OID_SZ_c2onb239v5];

/*
* c2pnb272w1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 16 }
*/
#define DER_OID_V_c2pnb272w1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x10
#define DER_OID_SZ_c2pnb272w1 10
extern const unsigned char ossl_der_oid_c2pnb272w1[DER_OID_SZ_c2pnb272w1];

/*
* c2pnb304w1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 17 }
*/
#define DER_OID_V_c2pnb304w1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x11
#define DER_OID_SZ_c2pnb304w1 10
extern const unsigned char ossl_der_oid_c2pnb304w1[DER_OID_SZ_c2pnb304w1];

/*
* c2tnb359v1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 18 }
*/
#define DER_OID_V_c2tnb359v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x12
#define DER_OID_SZ_c2tnb359v1 10
extern const unsigned char ossl_der_oid_c2tnb359v1[DER_OID_SZ_c2tnb359v1];

/*
* c2pnb368w1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 19 }
*/
#define DER_OID_V_c2pnb368w1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48,
 0xCE, 0x3D, 0x03, 0x00, 0x13
#define DER_OID_SZ_c2pnb368w1 10
extern const unsigned char ossl_der_oid_c2pnb368w1[DER_OID_SZ_c2pnb368w1];

/*
* c2tnb431r1  OBJECT IDENTIFIER  ::=  { c-TwoCurve 20 }
*/
#define DER_OID_V_c2tnb431r1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x00, 0x14
```

```
#define DER_OID_SZ_c2tnb431r1 10
extern const unsigned char ossl_der_oid_c2tnb431r1[DER_OID_SZ_c2tnb431r1];

/*
* prime192v1  OBJECT IDENTIFIER  ::=  { primeCurve  1 }
*/
#define DER_OID_V_prime192v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x01
#define DER_OID_SZ_prime192v1 10
extern const unsigned char ossl_der_oid_prime192v1[DER_OID_SZ_prime192v1];

/*
* prime192v2  OBJECT IDENTIFIER  ::=  { primeCurve  2 }
*/
#define DER_OID_V_prime192v2 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x02
#define DER_OID_SZ_prime192v2 10
extern const unsigned char ossl_der_oid_prime192v2[DER_OID_SZ_prime192v2];

/*
* prime192v3  OBJECT IDENTIFIER  ::=  { primeCurve  3 }
*/
#define
 DER_OID_V_prime192v3 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x03
#define DER_OID_SZ_prime192v3 10
extern const unsigned char ossl_der_oid_prime192v3[DER_OID_SZ_prime192v3];

/*
* prime239v1  OBJECT IDENTIFIER  ::=  { primeCurve  4 }
*/
#define DER_OID_V_prime239v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x04
#define DER_OID_SZ_prime239v1 10
extern const unsigned char ossl_der_oid_prime239v1[DER_OID_SZ_prime239v1];

/*
* prime239v2  OBJECT IDENTIFIER  ::=  { primeCurve  5 }
*/
#define DER_OID_V_prime239v2 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x05
#define DER_OID_SZ_prime239v2 10
extern const unsigned char ossl_der_oid_prime239v2[DER_OID_SZ_prime239v2];

/*
* prime239v3  OBJECT IDENTIFIER  ::=  { primeCurve  6 }
*/
#define DER_OID_V_prime239v3 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x06
#define DER_OID_SZ_prime239v3 10
extern const unsigned char ossl_der_oid_prime239v3[DER_OID_SZ_prime239v3];

/*
```

```
 * prime256v1  OBJECT IDENTIFIER  ::=  { primeCurve  7 }
*/
#define DER_OID_V_prime256v1 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x03, 0x01, 0x07
#define DER_OID_SZ_prime256v1 10
extern const unsigned char ossl_der_oid_prime256v1[DER_OID_SZ_prime256v1];

/*
* ecdsa-with-SHA224 OBJECT IDENTIFIER ::= { iso(1) member-body(2)
*      us(840) ansi-X9-62(10045) signatures(4) ecdsa-with-SHA2(3) 1 }
*/
#define DER_OID_V_ecdsa_with_SHA224 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x04, 0x03,
0x01
#define DER_OID_SZ_ecdsa_with_SHA224 10
extern const unsigned char ossl_der_oid_ecdsa_with_SHA224[DER_OID_SZ_ecdsa_with_SHA224];

/*
* ecdsa-with-SHA256 OBJECT IDENTIFIER ::= { iso(1) member-body(2)
*      us(840) ansi-X9-62(10045) signatures(4) ecdsa-with-SHA2(3) 2 }
*/
#define DER_OID_V_ecdsa_with_SHA256 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x04, 0x03,
0x02
#define DER_OID_SZ_ecdsa_with_SHA256 10
extern const unsigned char ossl_der_oid_ecdsa_with_SHA256[DER_OID_SZ_ecdsa_with_SHA256];

/*
 * ecdsa-with-SHA384 OBJECT IDENTIFIER ::= { iso(1) member-body(2)
*      us(840) ansi-X9-62(10045) signatures(4) ecdsa-with-SHA2(3) 3 }
*/
#define DER_OID_V_ecdsa_with_SHA384 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x04, 0x03,
0x03
#define DER_OID_SZ_ecdsa_with_SHA384 10
extern const unsigned char ossl_der_oid_ecdsa_with_SHA384[DER_OID_SZ_ecdsa_with_SHA384];

/*
* ecdsa-with-SHA512 OBJECT IDENTIFIER ::= { iso(1) member-body(2)
*      us(840) ansi-X9-62(10045) signatures(4) ecdsa-with-SHA2(3) 4 }
*/
#define DER_OID_V_ecdsa_with_SHA512 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0xCE, 0x3D, 0x04, 0x03,
0x04
#define DER_OID_SZ_ecdsa_with_SHA512 10
extern const unsigned char ossl_der_oid_ecdsa_with_SHA512[DER_OID_SZ_ecdsa_with_SHA512];

/*
* id-ecdsa-with-sha3-224 OBJECT IDENTIFIER ::= { sigAlgs 9 }
*/
#define DER_OID_V_id_ecdsa_with_sha3_224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x09
#define DER_OID_SZ_id_ecdsa_with_sha3_224 11
```

```
extern const
 unsigned char ossl_der_oid_id_ecdsa_with_sha3_224[DER_OID_SZ_id_ecdsa_with_sha3_224];

/*
* id-ecdsa-with-sha3-256 OBJECT IDENTIFIER ::= { sigAlgs 10 }
*/
#define DER_OID_V_id_ecdsa_with_sha3_256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x0A
#define DER_OID_SZ_id_ecdsa_with_sha3_256 11
extern const unsigned char ossl_der_oid_id_ecdsa_with_sha3_256[DER_OID_SZ_id_ecdsa_with_sha3_256];

/*
* id-ecdsa-with-sha3-384 OBJECT IDENTIFIER ::= { sigAlgs 11 }
*/
#define DER_OID_V_id_ecdsa_with_sha3_384 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x0B
#define DER_OID_SZ_id_ecdsa_with_sha3_384 11
extern const unsigned char ossl_der_oid_id_ecdsa_with_sha3_384[DER_OID_SZ_id_ecdsa_with_sha3_384];

/*
* id-ecdsa-with-sha3-512 OBJECT IDENTIFIER ::= { sigAlgs 12 }
*/
#define DER_OID_V_id_ecdsa_with_sha3_512 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x0C
#define DER_OID_SZ_id_ecdsa_with_sha3_512 11
extern const unsigned char ossl_der_oid_id_ecdsa_with_sha3_512[DER_OID_SZ_id_ecdsa_with_sha3_512];


/*
 Subject Public Key Info */
int ossl_DER_w_algorithmIdentifier_EC(WPACKET *pkt, int cont, EC_KEY *ec);
/* Signature */
int ossl_DER_w_algorithmIdentifier_ECDSA_with_MD(WPACKET *pkt, int cont,
                                    EC_KEY *ec, int mdnid);
```

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Version 1.0.0

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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/cmp.h.in
*
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* https://www.openssl.org/source/license.html
*/
```

```
#ifndef OPENSSL_CMP_H
# define OPENSSL_CMP_H

# include <openssl/opensslconf.h>
# ifndef OPENSSL_NO_CMP

#  include <openssl/crmf.h>
#  include <openssl/cmperr.h>
#  include <openssl/cmp_util.h>
#  include <openssl/http.h>

/* explicit #includes not strictly needed since implied by the above: */
#  include <openssl/types.h>
#  include <openssl/safestack.h>
#  include <openssl/x509.h>
#  include <openssl/x509v3.h>

#  ifdef __cplusplus
extern "C" {
#  endif

#  define OSSL_CMP_PVNO 2

/*-
*   PKIFailureInfo ::=
 BIT STRING {
*   -- since we can fail in more than one way!
*   -- More codes may be added in the future if/when required.
*       badAlg              (0),
*       -- unrecognized or unsupported Algorithm Identifier
*       badMessageCheck     (1),
*       -- integrity check failed (e.g., signature did not verify)
*       badRequest          (2),
*       -- transaction not permitted or supported
*       badTime             (3),
*       -- messageTime was not sufficiently close to the system time,
*       -- as defined by local policy
*       badCertId           (4),
*       -- no certificate could be found matching the provided criteria
*       badDataFormat       (5),
*       -- the data submitted has the wrong format
*       wrongAuthority      (6),
*       -- the authority indicated in the request is different from the
*       -- one creating the response token
*       incorrectData       (7),
```

```
*       -- the requester's data is incorrect (for notary services)
*
        missingTimeStamp    (8),
*       -- when the timestamp is missing but should be there
*       -- (by policy)
*       badPOP              (9),
*       -- the proof-of-possession failed
*       certRevoked         (10),
*         -- the certificate has already been revoked
*       certConfirmed       (11),
*         -- the certificate has already been confirmed
*       wrongIntegrity      (12),
*         -- invalid integrity, password based instead of signature or
*         -- vice versa
*       badRecipientNonce   (13),
*         -- invalid recipient nonce, either missing or wrong value
*       timeNotAvailable    (14),
*         -- the TSA's time source is not available
*       unacceptedPolicy    (15),
*         -- the requested TSA policy is not supported by the TSA.
*       unacceptedExtension (16),
*         -- the requested extension is not supported by the TSA.
*       addInfoNotAvailable (17),
*         -- the additional information requested
 could not be
*         -- understood or is not available
*       badSenderNonce      (18),
*         -- invalid sender nonce, either missing or wrong size
*       badCertTemplate     (19),
*         -- invalid cert. template or missing mandatory information
*       signerNotTrusted    (20),
*         -- signer of the message unknown or not trusted
*       transactionIdInUse  (21),
*         -- the transaction identifier is already in use
*       unsupportedVersion  (22),
*         -- the version of the message is not supported
*       notAuthorized       (23),
*         -- the sender was not authorized to make the preceding
*         -- request or perform the preceding action
*       systemUnavail       (24),
*       -- the request cannot be handled due to system unavailability
*       systemFailure       (25),
*       -- the request cannot be handled due to system failure
*       duplicateCertReq    (26)
*       -- certificate cannot be issued because a duplicate
 *       -- certificate already exists
*   }
*/
```

```
# define OSSL_CMP_PKIFAILUREINFO_badAlg 0
# define OSSL_CMP_PKIFAILUREINFO_badMessageCheck 1
# define OSSL_CMP_PKIFAILUREINFO_badRequest 2
# define OSSL_CMP_PKIFAILUREINFO_badTime 3
# define OSSL_CMP_PKIFAILUREINFO_badCertId 4
# define OSSL_CMP_PKIFAILUREINFO_badDataFormat 5
# define OSSL_CMP_PKIFAILUREINFO_wrongAuthority 6
# define OSSL_CMP_PKIFAILUREINFO_incorrectData 7
# define OSSL_CMP_PKIFAILUREINFO_missingTimeStamp 8
# define OSSL_CMP_PKIFAILUREINFO_badPOP 9
# define OSSL_CMP_PKIFAILUREINFO_certRevoked 10
# define OSSL_CMP_PKIFAILUREINFO_certConfirmed 11
# define OSSL_CMP_PKIFAILUREINFO_wrongIntegrity 12
# define OSSL_CMP_PKIFAILUREINFO_badRecipientNonce 13
# define OSSL_CMP_PKIFAILUREINFO_timeNotAvailable 14
# define OSSL_CMP_PKIFAILUREINFO_unacceptedPolicy 15
# define OSSL_CMP_PKIFAILUREINFO_unacceptedExtension 16
# define OSSL_CMP_PKIFAILUREINFO_addInfoNotAvailable 17
# define OSSL_CMP_PKIFAILUREINFO_badSenderNonce
 18
# define OSSL_CMP_PKIFAILUREINFO_badCertTemplate 19
# define OSSL_CMP_PKIFAILUREINFO_signerNotTrusted 20
# define OSSL_CMP_PKIFAILUREINFO_transactionIdInUse 21
# define OSSL_CMP_PKIFAILUREINFO_unsupportedVersion 22
# define OSSL_CMP_PKIFAILUREINFO_notAuthorized 23
# define OSSL_CMP_PKIFAILUREINFO_systemUnavail 24
# define OSSL_CMP_PKIFAILUREINFO_systemFailure 25
# define OSSL_CMP_PKIFAILUREINFO_duplicateCertReq 26
# define OSSL_CMP_PKIFAILUREINFO_MAX 26
# define OSSL_CMP_PKIFAILUREINFO_MAX_BIT_PATTERN \
  ((1 << (OSSL_CMP_PKIFAILUREINFO_MAX + 1)) - 1)
# if OSSL_CMP_PKIFAILUREINFO_MAX_BIT_PATTERN > INT_MAX
#  error CMP_PKIFAILUREINFO_MAX bit pattern does not fit in type int
# endif

typedef ASN1_BIT_STRING OSSL_CMP_PKIFAILUREINFO;

# define OSSL_CMP_CTX_FAILINFO_badAlg (1 << 0)
# define OSSL_CMP_CTX_FAILINFO_badMessageCheck (1 << 1)
# define OSSL_CMP_CTX_FAILINFO_badRequest (1 << 2)
# define OSSL_CMP_CTX_FAILINFO_badTime (1 << 3)
# define OSSL_CMP_CTX_FAILINFO_badCertId
 (1 << 4)
# define OSSL_CMP_CTX_FAILINFO_badDataFormat (1 << 5)
# define OSSL_CMP_CTX_FAILINFO_wrongAuthority (1 << 6)
# define OSSL_CMP_CTX_FAILINFO_incorrectData (1 << 7)
# define OSSL_CMP_CTX_FAILINFO_missingTimeStamp (1 << 8)
# define OSSL_CMP_CTX_FAILINFO_badPOP (1 << 9)
```

```
#  define OSSL_CMP_CTX_FAILINFO_certRevoked (1 << 10)
#  define OSSL_CMP_CTX_FAILINFO_certConfirmed (1 << 11)
#  define OSSL_CMP_CTX_FAILINFO_wrongIntegrity (1 << 12)
#  define OSSL_CMP_CTX_FAILINFO_badRecipientNonce (1 << 13)
#  define OSSL_CMP_CTX_FAILINFO_timeNotAvailable (1 << 14)
#  define OSSL_CMP_CTX_FAILINFO_unacceptedPolicy (1 << 15)
#  define OSSL_CMP_CTX_FAILINFO_unacceptedExtension (1 << 16)
#  define OSSL_CMP_CTX_FAILINFO_addInfoNotAvailable (1 << 17)
#  define OSSL_CMP_CTX_FAILINFO_badSenderNonce (1 << 18)
#  define OSSL_CMP_CTX_FAILINFO_badCertTemplate (1 << 19)
#  define OSSL_CMP_CTX_FAILINFO_signerNotTrusted (1 << 20)
#  define OSSL_CMP_CTX_FAILINFO_transactionIdInUse (1
 << 21)
#  define OSSL_CMP_CTX_FAILINFO_unsupportedVersion (1 << 22)
#  define OSSL_CMP_CTX_FAILINFO_notAuthorized (1 << 23)
#  define OSSL_CMP_CTX_FAILINFO_systemUnavail (1 << 24)
#  define OSSL_CMP_CTX_FAILINFO_systemFailure (1 << 25)
#  define OSSL_CMP_CTX_FAILINFO_duplicateCertReq (1 << 26)

/*-
*   PKIStatus ::= INTEGER {
*       accepted              (0),
*       -- you got exactly what you asked for
*       grantedWithMods       (1),
*       -- you got something like what you asked for; the
*       -- requester is responsible for ascertaining the differences
*       rejection             (2),
*       -- you don't get it, more information elsewhere in the message
*       waiting               (3),
*       -- the request body part has not yet been processed; expect to
*       -- hear more later (note: proper handling of this status
*       -- response MAY use the polling req/rep PKIMessages specified
*       -- in Section 5.3.22; alternatively, polling in the underlying
 *       -- transport layer MAY have some utility in this regard)
*       revocationWarning     (4),
*       -- this message contains a warning that a revocation is
*       -- imminent
*       revocationNotification (5),
*       -- notification that a revocation has occurred
*       keyUpdateWarning      (6)
*       -- update already done for the oldCertId specified in
*       -- CertReqMsg
*   }
*/
#  define OSSL_CMP_PKISTATUS_request               -3
#  define OSSL_CMP_PKISTATUS_trans                 -2
#  define OSSL_CMP_PKISTATUS_unspecified           -1
#  define OSSL_CMP_PKISTATUS_accepted               0
```

```
# define OSSL_CMP_PKISTATUS_grantedWithMods       1
# define OSSL_CMP_PKISTATUS_rejection            2
# define OSSL_CMP_PKISTATUS_waiting              3
# define OSSL_CMP_PKISTATUS_revocationWarning     4
# define OSSL_CMP_PKISTATUS_revocationNotification 5
# define OSSL_CMP_PKISTATUS_keyUpdateWarning      6

typedef ASN1_INTEGER OSSL_CMP_PKISTATUS;
DECLARE_ASN1_ITEM(OSSL_CMP_PKISTATUS)

#
 define OSSL_CMP_CERTORENCCERT_CERTIFICATE 0
# define OSSL_CMP_CERTORENCCERT_ENCRYPTEDCERT 1

/* data type declarations */
typedef struct ossl_cmp_ctx_st OSSL_CMP_CTX;
typedef struct ossl_cmp_pkiheader_st OSSL_CMP_PKIHEADER;
DECLARE_ASN1_FUNCTIONS(OSSL_CMP_PKIHEADER)
typedef struct ossl_cmp_msg_st OSSL_CMP_MSG;
DECLARE_ASN1_DUP_FUNCTION(OSSL_CMP_MSG)
DECLARE_ASN1_ENCODE_FUNCTIONS(OSSL_CMP_MSG, OSSL_CMP_MSG, OSSL_CMP_MSG)
typedef struct ossl_cmp_certstatus_st OSSL_CMP_CERTSTATUS;
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CMP_CERTSTATUS, OSSL_CMP_CERTSTATUS,
OSSL_CMP_CERTSTATUS)
#define sk_OSSL_CMP_CERTSTATUS_num(sk)
OPENSSL_sk_num(ossl_check_const_OSSL_CMP_CERTSTATUS_sk_type(sk))
#define sk_OSSL_CMP_CERTSTATUS_value(sk, idx) ((OSSL_CMP_CERTSTATUS
*)OPENSSL_sk_value(ossl_check_const_OSSL_CMP_CERTSTATUS_sk_type(sk), (idx)))
#define sk_OSSL_CMP_CERTSTATUS_new(cmp) ((STACK_OF(OSSL_CMP_CERTSTATUS)
*)OPENSSL_sk_new(ossl_check_OSSL_CMP_CERTSTATUS_compfunc_type(cmp)))
#define
 sk_OSSL_CMP_CERTSTATUS_new_null() ((STACK_OF(OSSL_CMP_CERTSTATUS)
*)OPENSSL_sk_new_null())
#define sk_OSSL_CMP_CERTSTATUS_new_reserve(cmp, n) ((STACK_OF(OSSL_CMP_CERTSTATUS)
*)OPENSSL_sk_new_reserve(ossl_check_OSSL_CMP_CERTSTATUS_compfunc_type(cmp), (n)))
#define sk_OSSL_CMP_CERTSTATUS_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk), (n))
#define sk_OSSL_CMP_CERTSTATUS_free(sk)
OPENSSL_sk_free(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk))
#define sk_OSSL_CMP_CERTSTATUS_zero(sk)
OPENSSL_sk_zero(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk))
#define sk_OSSL_CMP_CERTSTATUS_delete(sk, i) ((OSSL_CMP_CERTSTATUS
*)OPENSSL_sk_delete(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk), (i)))
#define sk_OSSL_CMP_CERTSTATUS_delete_ptr(sk, ptr) ((OSSL_CMP_CERTSTATUS
*)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr)))
#define sk_OSSL_CMP_CERTSTATUS_push(sk, ptr)
OPENSSL_sk_push(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
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 ossl_check_OSSL_CMP_CERTSTATUS_type(ptr))
#define sk_OSSL_CMP_CERTSTATUS_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr))
#define sk_OSSL_CMP_CERTSTATUS_pop(sk) ((OSSL_CMP_CERTSTATUS
*)OPENSSL_sk_pop(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk)))
#define sk_OSSL_CMP_CERTSTATUS_shift(sk) ((OSSL_CMP_CERTSTATUS
*)OPENSSL_sk_shift(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk)))
#define sk_OSSL_CMP_CERTSTATUS_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),ossl_check_OSSL_CMP_CERTST
ATUS_freefunc_type(freefunc))
#define sk_OSSL_CMP_CERTSTATUS_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr), (idx))
#define sk_OSSL_CMP_CERTSTATUS_set(sk, idx, ptr) ((OSSL_CMP_CERTSTATUS
*)OPENSSL_sk_set(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk), (idx),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr)))
#define sk_OSSL_CMP_CERTSTATUS_find(sk,
 ptr) OPENSSL_sk_find(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr))
#define sk_OSSL_CMP_CERTSTATUS_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr))
#define sk_OSSL_CMP_CERTSTATUS_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_type(ptr), pnum)
#define sk_OSSL_CMP_CERTSTATUS_sort(sk)
OPENSSL_sk_sort(ossl_check_OSSL_CMP_CERTSTATUS_sk_type(sk))
#define sk_OSSL_CMP_CERTSTATUS_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CMP_CERTSTATUS_sk_type(sk))
#define sk_OSSL_CMP_CERTSTATUS_dup(sk) ((STACK_OF(OSSL_CMP_CERTSTATUS)
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CMP_CERTSTATUS_sk_type(sk)))
#define sk_OSSL_CMP_CERTSTATUS_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(OSSL_CMP_CERTSTATUS)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CMP_CERTSTATUS_sk_type(sk),
ossl_check_OSSL_CMP_CERTSTATUS_copyfunc_type(copyfunc),
 ossl_check_OSSL_CMP_CERTSTATUS_freefunc_type(freefunc)))
#define sk_OSSL_CMP_CERTSTATUS_set_cmp_func(sk, cmp)
((sk_OSSL_CMP_CERTSTATUS_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CMP_CERTSTAT
US_sk_type(sk), ossl_check_OSSL_CMP_CERTSTATUS_compfunc_type(cmp)))

typedef struct ossl_cmp_itav_st OSSL_CMP_ITAV;
DECLARE_ASN1_DUP_FUNCTION(OSSL_CMP_ITAV)
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CMP_ITAV, OSSL_CMP_ITAV, OSSL_CMP_ITAV)
#define sk_OSSL_CMP_ITAV_num(sk) OPENSSL_sk_num(ossl_check_const_OSSL_CMP_ITAV_sk_type(sk))
#define sk_OSSL_CMP_ITAV_value(sk, idx) ((OSSL_CMP_ITAV
*)OPENSSL_sk_value(ossl_check_const_OSSL_CMP_ITAV_sk_type(sk), (idx)))
#define sk_OSSL_CMP_ITAV_new(cmp) ((STACK_OF(OSSL_CMP_ITAV)
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*)OPENSSL_sk_new(ossl_check_OSSL_CMP_ITAV_compfunc_type(cmp)))
#define sk_OSSL_CMP_ITAV_new_null() ((STACK_OF(OSSL_CMP_ITAV) *)OPENSSL_sk_new_null())
#define sk_OSSL_CMP_ITAV_new_reserve(cmp, n) ((STACK_OF(OSSL_CMP_ITAV)
*)OPENSSL_sk_new_reserve(ossl_check_OSSL_CMP_ITAV_compfunc_type(cmp),
 (n)))
#define sk_OSSL_CMP_ITAV_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_OSSL_CMP_ITAV_sk_type(sk),
(n))
#define sk_OSSL_CMP_ITAV_free(sk) OPENSSL_sk_free(ossl_check_OSSL_CMP_ITAV_sk_type(sk))
#define sk_OSSL_CMP_ITAV_zero(sk) OPENSSL_sk_zero(ossl_check_OSSL_CMP_ITAV_sk_type(sk))
#define sk_OSSL_CMP_ITAV_delete(sk, i) ((OSSL_CMP_ITAV
*)OPENSSL_sk_delete(ossl_check_OSSL_CMP_ITAV_sk_type(sk), (i)))
#define sk_OSSL_CMP_ITAV_delete_ptr(sk, ptr) ((OSSL_CMP_ITAV
*)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CMP_ITAV_sk_type(sk),
ossl_check_OSSL_CMP_ITAV_type(ptr)))
#define sk_OSSL_CMP_ITAV_push(sk, ptr) OPENSSL_sk_push(ossl_check_OSSL_CMP_ITAV_sk_type(sk),
ossl_check_OSSL_CMP_ITAV_type(ptr))
#define sk_OSSL_CMP_ITAV_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OSSL_CMP_ITAV_sk_type(sk), ossl_check_OSSL_CMP_ITAV_type(ptr))
#define sk_OSSL_CMP_ITAV_pop(sk) ((OSSL_CMP_ITAV
*)OPENSSL_sk_pop(ossl_check_OSSL_CMP_ITAV_sk_type(sk)))
#define sk_OSSL_CMP_ITAV_shift(sk) ((OSSL_CMP_ITAV
 *)OPENSSL_sk_shift(ossl_check_OSSL_CMP_ITAV_sk_type(sk)))
#define sk_OSSL_CMP_ITAV_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CMP_ITAV_sk_type(sk),ossl_check_OSSL_CMP_ITAV_freefunc_ty
pe(freefunc))
#define sk_OSSL_CMP_ITAV_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CMP_ITAV_sk_type(sk), ossl_check_OSSL_CMP_ITAV_type(ptr),
(idx))
#define sk_OSSL_CMP_ITAV_set(sk, idx, ptr) ((OSSL_CMP_ITAV
*)OPENSSL_sk_set(ossl_check_OSSL_CMP_ITAV_sk_type(sk), (idx),
ossl_check_OSSL_CMP_ITAV_type(ptr)))
#define sk_OSSL_CMP_ITAV_find(sk, ptr) OPENSSL_sk_find(ossl_check_OSSL_CMP_ITAV_sk_type(sk),
ossl_check_OSSL_CMP_ITAV_type(ptr))
#define sk_OSSL_CMP_ITAV_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CMP_ITAV_sk_type(sk), ossl_check_OSSL_CMP_ITAV_type(ptr))
#define sk_OSSL_CMP_ITAV_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OSSL_CMP_ITAV_sk_type(sk), ossl_check_OSSL_CMP_ITAV_type(ptr),
pnum)
#define sk_OSSL_CMP_ITAV_sort(sk) OPENSSL_sk_sort(ossl_check_OSSL_CMP_ITAV_sk_type(sk))
#define
 sk_OSSL_CMP_ITAV_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CMP_ITAV_sk_type(sk))
#define sk_OSSL_CMP_ITAV_dup(sk) ((STACK_OF(OSSL_CMP_ITAV)
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CMP_ITAV_sk_type(sk)))
#define sk_OSSL_CMP_ITAV_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OSSL_CMP_ITAV)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CMP_ITAV_sk_type(sk),
ossl_check_OSSL_CMP_ITAV_copyfunc_type(copyfunc),
ossl_check_OSSL_CMP_ITAV_freefunc_type(freefunc)))
#define sk_OSSL_CMP_ITAV_set_cmp_func(sk, cmp)
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((sk_OSSL_CMP_ITAV_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CMP_ITAV_sk_type(sk), ossl_check_OSSL_CMP_ITAV_compfunc_type(cmp)))

typedef struct ossl_cmp_revrepcontent_st OSSL_CMP_REVREPCONTENT;
typedef struct ossl_cmp_pkisi_st OSSL_CMP_PKISI;
DECLARE_ASN1_FUNCTIONS(OSSL_CMP_PKISI)
DECLARE_ASN1_DUP_FUNCTION(OSSL_CMP_PKISI)
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CMP_PKISI, OSSL_CMP_PKISI, OSSL_CMP_PKISI)
#define sk_OSSL_CMP_PKISI_num(sk) OPENSSL_sk_num(ossl_check_const_OSSL_CMP_PKISI_sk_type(sk))
#define
sk_OSSL_CMP_PKISI_value(sk, idx) ((OSSL_CMP_PKISI
*)OPENSSL_sk_value(ossl_check_const_OSSL_CMP_PKISI_sk_type(sk), (idx)))
#define sk_OSSL_CMP_PKISI_new(cmp) ((STACK_OF(OSSL_CMP_PKISI)
*)OPENSSL_sk_new(ossl_check_OSSL_CMP_PKISI_compfunc_type(cmp)))
#define sk_OSSL_CMP_PKISI_new_null() ((STACK_OF(OSSL_CMP_PKISI) *)OPENSSL_sk_new_null())
#define sk_OSSL_CMP_PKISI_new_reserve(cmp, n) ((STACK_OF(OSSL_CMP_PKISI)
*)OPENSSL_sk_new_reserve(ossl_check_OSSL_CMP_PKISI_compfunc_type(cmp), (n)))
#define sk_OSSL_CMP_PKISI_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_OSSL_CMP_PKISI_sk_type(sk), (n))
#define sk_OSSL_CMP_PKISI_free(sk) OPENSSL_sk_free(ossl_check_OSSL_CMP_PKISI_sk_type(sk))
#define sk_OSSL_CMP_PKISI_zero(sk) OPENSSL_sk_zero(ossl_check_OSSL_CMP_PKISI_sk_type(sk))
#define sk_OSSL_CMP_PKISI_delete(sk, i) ((OSSL_CMP_PKISI
*)OPENSSL_sk_delete(ossl_check_OSSL_CMP_PKISI_sk_type(sk), (i)))
#define sk_OSSL_CMP_PKISI_delete_ptr(sk, ptr)
((OSSL_CMP_PKISI *)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr)))
#define sk_OSSL_CMP_PKISI_push(sk, ptr) OPENSSL_sk_push(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr))
#define sk_OSSL_CMP_PKISI_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr))
#define sk_OSSL_CMP_PKISI_pop(sk) ((OSSL_CMP_PKISI
*)OPENSSL_sk_pop(ossl_check_OSSL_CMP_PKISI_sk_type(sk)))
#define sk_OSSL_CMP_PKISI_shift(sk) ((OSSL_CMP_PKISI
*)OPENSSL_sk_shift(ossl_check_OSSL_CMP_PKISI_sk_type(sk)))
#define sk_OSSL_CMP_PKISI_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CMP_PKISI_sk_type(sk),ossl_check_OSSL_CMP_PKISI_freefunc_type(freefunc))
#define sk_OSSL_CMP_PKISI_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr), (idx))
#define sk_OSSL_CMP_PKISI_set(sk, idx, ptr) ((OSSL_CMP_PKISI
*)OPENSSL_sk_set(ossl_check_OSSL_CMP_PKISI_sk_type(sk),
(idx), ossl_check_OSSL_CMP_PKISI_type(ptr)))
#define sk_OSSL_CMP_PKISI_find(sk, ptr) OPENSSL_sk_find(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr))
#define sk_OSSL_CMP_PKISI_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr))
#define sk_OSSL_CMP_PKISI_find_all(sk, ptr, pnum)

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OPENSSL_sk_find_all(ossl_check_OSSL_CMP_PKISI_sk_type(sk), ossl_check_OSSL_CMP_PKISI_type(ptr),
pnum)
#define sk_OSSL_CMP_PKISI_sort(sk) OPENSSL_sk_sort(ossl_check_OSSL_CMP_PKISI_sk_type(sk))
#define sk_OSSL_CMP_PKISI_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CMP_PKISI_sk_type(sk))
#define sk_OSSL_CMP_PKISI_dup(sk) ((STACK_OF(OSSL_CMP_PKISI)
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CMP_PKISI_sk_type(sk)))
#define sk_OSSL_CMP_PKISI_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(OSSL_CMP_PKISI)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CMP_PKISI_sk_type(sk),
ossl_check_OSSL_CMP_PKISI_copyfunc_type(copyfunc),
 ossl_check_OSSL_CMP_PKISI_freefunc_type(freefunc)))
#define sk_OSSL_CMP_PKISI_set_cmp_func(sk, cmp)
((sk_OSSL_CMP_PKISI_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CMP_PKISI_sk_type(sk),
ossl_check_OSSL_CMP_PKISI_compfunc_type(cmp)))

typedef struct ossl_cmp_certrepmessage_st OSSL_CMP_CERTREPMESSAGE;
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CMP_CERTREPMESSAGE,
OSSL_CMP_CERTREPMESSAGE, OSSL_CMP_CERTREPMESSAGE)
#define sk_OSSL_CMP_CERTREPMESSAGE_num(sk)
OPENSSL_sk_num(ossl_check_const_OSSL_CMP_CERTREPMESSAGE_sk_type(sk))
#define sk_OSSL_CMP_CERTREPMESSAGE_value(sk, idx) ((OSSL_CMP_CERTREPMESSAGE
*)OPENSSL_sk_value(ossl_check_const_OSSL_CMP_CERTREPMESSAGE_sk_type(sk), (idx)))
#define sk_OSSL_CMP_CERTREPMESSAGE_new(cmp) ((STACK_OF(OSSL_CMP_CERTREPMESSAGE)
*)OPENSSL_sk_new(ossl_check_OSSL_CMP_CERTREPMESSAGE_compfunc_type(cmp)))
#define sk_OSSL_CMP_CERTREPMESSAGE_new_null() ((STACK_OF(OSSL_CMP_CERTREPMESSAGE)
*)OPENSSL_sk_new_null())
#define sk_OSSL_CMP_CERTREPMESSAGE_new_reserve(cmp,
 n) ((STACK_OF(OSSL_CMP_CERTREPMESSAGE)
*)OPENSSL_sk_new_reserve(ossl_check_OSSL_CMP_CERTREPMESSAGE_compfunc_type(cmp), (n)))
#define sk_OSSL_CMP_CERTREPMESSAGE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk), (n))
#define sk_OSSL_CMP_CERTREPMESSAGE_free(sk)
OPENSSL_sk_free(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk))
#define sk_OSSL_CMP_CERTREPMESSAGE_zero(sk)
OPENSSL_sk_zero(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk))
#define sk_OSSL_CMP_CERTREPMESSAGE_delete(sk, i) ((OSSL_CMP_CERTREPMESSAGE
*)OPENSSL_sk_delete(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk), (i)))
#define sk_OSSL_CMP_CERTREPMESSAGE_delete_ptr(sk, ptr) ((OSSL_CMP_CERTREPMESSAGE
*)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr)))
#define sk_OSSL_CMP_CERTREPMESSAGE_push(sk, ptr)
OPENSSL_sk_push(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr))
#define sk_OSSL_CMP_CERTREPMESSAGE_unshift(sk,
 ptr) OPENSSL_sk_unshift(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr))
#define sk_OSSL_CMP_CERTREPMESSAGE_pop(sk) ((OSSL_CMP_CERTREPMESSAGE
*)OPENSSL_sk_pop(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk)))
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#define sk_OSSL_CMP_CERTREPMESSAGE_shift(sk) ((OSSL_CMP_CERTREPMESSAGE
*)OPENSSL_sk_shift(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk)))
#define sk_OSSL_CMP_CERTREPMESSAGE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),ossl_check_OSSL_CMP_CE
RTREPMESSAGE_freefunc_type(freefunc))
#define sk_OSSL_CMP_CERTREPMESSAGE_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr), (idx))
#define sk_OSSL_CMP_CERTREPMESSAGE_set(sk, idx, ptr) ((OSSL_CMP_CERTREPMESSAGE
*)OPENSSL_sk_set(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk), (idx),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr)))
#define sk_OSSL_CMP_CERTREPMESSAGE_find(sk,
 ptr) OPENSSL_sk_find(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr))
#define sk_OSSL_CMP_CERTREPMESSAGE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr))
#define sk_OSSL_CMP_CERTREPMESSAGE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
ossl_check_OSSL_CMP_CERTREPMESSAGE_type(ptr), pnum)
#define sk_OSSL_CMP_CERTREPMESSAGE_sort(sk)
OPENSSL_sk_sort(ossl_check_OSSL_CMP_CERTREPMESSAGE_sk_type(sk))
#define sk_OSSL_CMP_CERTREPMESSAGE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CMP_CERTREPMESSAGE_sk_type(sk))
#define sk_OSSL_CMP_CERTREPMESSAGE_dup(sk) ((STACK_OF(OSSL_CMP_CERTREPMESSAGE)
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CMP_CERTREPMESSAGE_sk_type(sk)))
#define sk_OSSL_CMP_CERTREPMESSAGE_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(OSSL_CMP_CERTREPMESSAGE)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CMP_CERTREPMESSAGE_sk_type(sk),
 ossl_check_OSSL_CMP_CERTREPMESSAGE_copyfunc_type(copyfunc),
ossl_check_OSSL_CMP_CERTREPMESSAGE_freefunc_type(freefunc)))
#define sk_OSSL_CMP_CERTREPMESSAGE_set_cmp_func(sk, cmp)
((sk_OSSL_CMP_CERTREPMESSAGE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CMP_CERT
REPMESSAGE_sk_type(sk), ossl_check_OSSL_CMP_CERTREPMESSAGE_compfunc_type(cmp)))

typedef struct ossl_cmp_pollrep_st OSSL_CMP_POLLREP;
typedef STACK_OF(OSSL_CMP_POLLREP) OSSL_CMP_POLLREPCONTENT;
typedef struct ossl_cmp_certresponse_st OSSL_CMP_CERTRESPONSE;
SKM_DEFINE_STACK_OF_INTERNAL(OSSL_CMP_CERTRESPONSE, OSSL_CMP_CERTRESPONSE,
OSSL_CMP_CERTRESPONSE)
#define sk_OSSL_CMP_CERTRESPONSE_num(sk)
OPENSSL_sk_num(ossl_check_const_OSSL_CMP_CERTRESPONSE_sk_type(sk))
#define sk_OSSL_CMP_CERTRESPONSE_value(sk, idx) ((OSSL_CMP_CERTRESPONSE
*)OPENSSL_sk_value(ossl_check_const_OSSL_CMP_CERTRESPONSE_sk_type(sk), (idx)))
#define sk_OSSL_CMP_CERTRESPONSE_new(cmp) ((STACK_OF(OSSL_CMP_CERTRESPONSE)
 *)OPENSSL_sk_new(ossl_check_OSSL_CMP_CERTRESPONSE_compfunc_type(cmp)))
#define sk_OSSL_CMP_CERTRESPONSE_new_null() ((STACK_OF(OSSL_CMP_CERTRESPONSE)
*)OPENSSL_sk_new_null())
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#define sk_OSSL_CMP_CERTRESPONSE_new_reserve(cmp, n) ((STACK_OF(OSSL_CMP_CERTRESPONSE)
*)OPENSSL_sk_new_reserve(ossl_check_OSSL_CMP_CERTRESPONSE_compfunc_type(cmp), (n)))
#define sk_OSSL_CMP_CERTRESPONSE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk), (n))
#define sk_OSSL_CMP_CERTRESPONSE_free(sk)
OPENSSL_sk_free(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk))
#define sk_OSSL_CMP_CERTRESPONSE_zero(sk)
OPENSSL_sk_zero(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk))
#define sk_OSSL_CMP_CERTRESPONSE_delete(sk, i) ((OSSL_CMP_CERTRESPONSE
*)OPENSSL_sk_delete(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk), (i)))
#define sk_OSSL_CMP_CERTRESPONSE_delete_ptr(sk, ptr) ((OSSL_CMP_CERTRESPONSE
*)OPENSSL_sk_delete_ptr(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr)))
#define
 sk_OSSL_CMP_CERTRESPONSE_push(sk, ptr)
OPENSSL_sk_push(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr))
#define sk_OSSL_CMP_CERTRESPONSE_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr))
#define sk_OSSL_CMP_CERTRESPONSE_pop(sk) ((OSSL_CMP_CERTRESPONSE
*)OPENSSL_sk_pop(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk)))
#define sk_OSSL_CMP_CERTRESPONSE_shift(sk) ((OSSL_CMP_CERTRESPONSE
*)OPENSSL_sk_shift(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk)))
#define sk_OSSL_CMP_CERTRESPONSE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),ossl_check_OSSL_CMP_CERT
RESPONSE_freefunc_type(freefunc))
#define sk_OSSL_CMP_CERTRESPONSE_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr), (idx))
#define sk_OSSL_CMP_CERTRESPONSE_set(sk, idx, ptr) ((OSSL_CMP_CERTRESPONSE
 *)OPENSSL_sk_set(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk), (idx),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr)))
#define sk_OSSL_CMP_CERTRESPONSE_find(sk, ptr)
OPENSSL_sk_find(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr))
#define sk_OSSL_CMP_CERTRESPONSE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr))
#define sk_OSSL_CMP_CERTRESPONSE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_type(ptr), pnum)
#define sk_OSSL_CMP_CERTRESPONSE_sort(sk)
OPENSSL_sk_sort(ossl_check_OSSL_CMP_CERTRESPONSE_sk_type(sk))
#define sk_OSSL_CMP_CERTRESPONSE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_OSSL_CMP_CERTRESPONSE_sk_type(sk))
#define sk_OSSL_CMP_CERTRESPONSE_dup(sk) ((STACK_OF(OSSL_CMP_CERTRESPONSE)
*)OPENSSL_sk_dup(ossl_check_const_OSSL_CMP_CERTRESPONSE_sk_type(sk)))
```

```
#define sk_OSSL_CMP_CERTRESPONSE_deep_copy(sk,
 copyfunc, freefunc) ((STACK_OF(OSSL_CMP_CERTRESPONSE)
*)OPENSSL_sk_deep_copy(ossl_check_const_OSSL_CMP_CERTRESPONSE_sk_type(sk),
ossl_check_OSSL_CMP_CERTRESPONSE_copyfunc_type(copyfunc),
ossl_check_OSSL_CMP_CERTRESPONSE_freefunc_type(freefunc)))
#define sk_OSSL_CMP_CERTRESPONSE_set_cmp_func(sk, cmp)
((sk_OSSL_CMP_CERTRESPONSE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_OSSL_CMP_CERTRE
SPONSE_sk_type(sk), ossl_check_OSSL_CMP_CERTRESPONSE_compfunc_type(cmp)))

typedef STACK_OF(ASN1_UTF8STRING) OSSL_CMP_PKIFREETEXT;

/*
* function DECLARATIONS
*/

/* from cmp_asn.c */
OSSL_CMP_ITAV *OSSL_CMP_ITAV_create(ASN1_OBJECT *type, ASN1_TYPE *value);
void OSSL_CMP_ITAV_set0(OSSL_CMP_ITAV *itav, ASN1_OBJECT *type,
                        ASN1_TYPE *value);
ASN1_OBJECT *OSSL_CMP_ITAV_get0_type(const OSSL_CMP_ITAV *itav);
ASN1_TYPE *OSSL_CMP_ITAV_get0_value(const OSSL_CMP_ITAV *itav);
int OSSL_CMP_ITAV_push0_stack_item(STACK_OF(OSSL_CMP_ITAV) **itav_sk_p,

                    OSSL_CMP_ITAV *itav);
void OSSL_CMP_ITAV_free(OSSL_CMP_ITAV *itav);
void OSSL_CMP_MSG_free(OSSL_CMP_MSG *msg);

/* from cmp_ctx.c */
OSSL_CMP_CTX *OSSL_CMP_CTX_new(OSSL_LIB_CTX *libctx, const char *propq);
void OSSL_CMP_CTX_free(OSSL_CMP_CTX *ctx);
int OSSL_CMP_CTX_reinit(OSSL_CMP_CTX *ctx);
/* CMP general options: */
#  define OSSL_CMP_OPT_LOG_VERBOSITY 0
/* CMP transfer options: */
#  define OSSL_CMP_OPT_KEEP_ALIVE 10
#  define OSSL_CMP_OPT_MSG_TIMEOUT 11
#  define OSSL_CMP_OPT_TOTAL_TIMEOUT 12
/* CMP request options: */
#  define OSSL_CMP_OPT_VALIDITY_DAYS 20
#  define OSSL_CMP_OPT_SUBJECTALTNAME_NODEFAULT 21
#  define OSSL_CMP_OPT_SUBJECTALTNAME_CRITICAL 22
#  define OSSL_CMP_OPT_POLICIES_CRITICAL 23
#  define OSSL_CMP_OPT_POPO_METHOD 24
#  define OSSL_CMP_OPT_IMPLICIT_CONFIRM 25
#  define OSSL_CMP_OPT_DISABLE_CONFIRM 26
#  define OSSL_CMP_OPT_REVOCATION_REASON 27
/* CMP protection options: */
#  define OSSL_CMP_OPT_UNPROTECTED_SEND 30
```

```
# define OSSL_CMP_OPT_UNPROTECTED_ERRORS
 31
# define OSSL_CMP_OPT_OWF_ALGNID 32
# define OSSL_CMP_OPT_MAC_ALGNID 33
# define OSSL_CMP_OPT_DIGEST_ALGNID 34
# define OSSL_CMP_OPT_IGNORE_KEYUSAGE 35
# define OSSL_CMP_OPT_PERMIT_TA_IN_EXTRACERTS_FOR_IR 36
int OSSL_CMP_CTX_set_option(OSSL_CMP_CTX *ctx, int opt, int val);
int OSSL_CMP_CTX_get_option(const OSSL_CMP_CTX *ctx, int opt);
/* CMP-specific callback for logging and outputting the error queue: */
int OSSL_CMP_CTX_set_log_cb(OSSL_CMP_CTX *ctx, OSSL_CMP_log_cb_t cb);
# define OSSL_CMP_CTX_set_log_verbosity(ctx, level) \
  OSSL_CMP_CTX_set_option(ctx, OSSL_CMP_OPT_LOG_VERBOSITY, level)
void OSSL_CMP_CTX_print_errors(const OSSL_CMP_CTX *ctx);
/* message transfer: */
int OSSL_CMP_CTX_set1_serverPath(OSSL_CMP_CTX *ctx, const char *path);
int OSSL_CMP_CTX_set1_server(OSSL_CMP_CTX *ctx, const char *address);
int OSSL_CMP_CTX_set_serverPort(OSSL_CMP_CTX *ctx, int port);
int OSSL_CMP_CTX_set1_proxy(OSSL_CMP_CTX *ctx, const char *name);
int OSSL_CMP_CTX_set1_no_proxy(OSSL_CMP_CTX
 *ctx, const char *names);
int OSSL_CMP_CTX_set_http_cb(OSSL_CMP_CTX *ctx, OSSL_HTTP_bio_cb_t cb);
int OSSL_CMP_CTX_set_http_cb_arg(OSSL_CMP_CTX *ctx, void *arg);
void *OSSL_CMP_CTX_get_http_cb_arg(const OSSL_CMP_CTX *ctx);
typedef OSSL_CMP_MSG *(*OSSL_CMP_transfer_cb_t) (OSSL_CMP_CTX *ctx,
                                  const OSSL_CMP_MSG *req);
int OSSL_CMP_CTX_set_transfer_cb(OSSL_CMP_CTX *ctx, OSSL_CMP_transfer_cb_t cb);
int OSSL_CMP_CTX_set_transfer_cb_arg(OSSL_CMP_CTX *ctx, void *arg);
void *OSSL_CMP_CTX_get_transfer_cb_arg(const OSSL_CMP_CTX *ctx);
/* server authentication: */
int OSSL_CMP_CTX_set1_srvCert(OSSL_CMP_CTX *ctx, X509 *cert);
int OSSL_CMP_CTX_set1_expected_sender(OSSL_CMP_CTX *ctx, const X509_NAME *name);
int OSSL_CMP_CTX_set0_trustedStore(OSSL_CMP_CTX *ctx, X509_STORE *store);
X509_STORE *OSSL_CMP_CTX_get0_trustedStore(const OSSL_CMP_CTX *ctx);
int OSSL_CMP_CTX_set1_untrusted(OSSL_CMP_CTX *ctx, STACK_OF(X509) *certs);
STACK_OF(X509)
 *OSSL_CMP_CTX_get0_untrusted(const OSSL_CMP_CTX *ctx);
/* client authentication: */
int OSSL_CMP_CTX_set1_cert(OSSL_CMP_CTX *ctx, X509 *cert);
int OSSL_CMP_CTX_build_cert_chain(OSSL_CMP_CTX *ctx, X509_STORE *own_trusted,
                          STACK_OF(X509) *candidates);
int OSSL_CMP_CTX_set1_pkey(OSSL_CMP_CTX *ctx, EVP_PKEY *pkey);
int OSSL_CMP_CTX_set1_referenceValue(OSSL_CMP_CTX *ctx,
                            const unsigned char *ref, int len);
int OSSL_CMP_CTX_set1_secretValue(OSSL_CMP_CTX *ctx,
                          const unsigned char *sec, int len);
/* CMP message header and extra certificates: */
int OSSL_CMP_CTX_set1_recipient(OSSL_CMP_CTX *ctx, const X509_NAME *name);
```

```
int OSSL_CMP_CTX_push0_geninfo_ITAV(OSSL_CMP_CTX *ctx, OSSL_CMP_ITAV *itav);
int OSSL_CMP_CTX_reset_geninfo_ITAVs(OSSL_CMP_CTX *ctx);
int OSSL_CMP_CTX_set1_extraCertsOut(OSSL_CMP_CTX *ctx,
                            STACK_OF(X509) *extraCertsOut);
/* certificate template:
 */
int OSSL_CMP_CTX_set0_newPkey(OSSL_CMP_CTX *ctx, int priv, EVP_PKEY *pkey);
EVP_PKEY *OSSL_CMP_CTX_get0_newPkey(const OSSL_CMP_CTX *ctx, int priv);
int OSSL_CMP_CTX_set1_issuer(OSSL_CMP_CTX *ctx, const X509_NAME *name);
int OSSL_CMP_CTX_set1_subjectName(OSSL_CMP_CTX *ctx, const X509_NAME *name);
int OSSL_CMP_CTX_push1_subjectAltName(OSSL_CMP_CTX *ctx,
                              const GENERAL_NAME *name);
int OSSL_CMP_CTX_set0_reqExtensions(OSSL_CMP_CTX *ctx, X509_EXTENSIONS *exts);
int OSSL_CMP_CTX_reqExtensions_have_SAN(OSSL_CMP_CTX *ctx);
int OSSL_CMP_CTX_push0_policy(OSSL_CMP_CTX *ctx, POLICYINFO *pinfo);
int OSSL_CMP_CTX_set1_oldCert(OSSL_CMP_CTX *ctx, X509 *cert);
int OSSL_CMP_CTX_set1_p10CSR(OSSL_CMP_CTX *ctx, const X509_REQ *csr);
/* misc body contents: */
int OSSL_CMP_CTX_push0_genm_ITAV(OSSL_CMP_CTX *ctx, OSSL_CMP_ITAV *itav);
/* certificate confirmation: */
typedef int (*OSSL_CMP_certConf_cb_t) (OSSL_CMP_CTX *ctx, X509 *cert,

        int fail_info, const char **txt);
int OSSL_CMP_certConf_cb(OSSL_CMP_CTX *ctx, X509 *cert, int fail_info,
                 const char **text);
int OSSL_CMP_CTX_set_certConf_cb(OSSL_CMP_CTX *ctx, OSSL_CMP_certConf_cb_t cb);
int OSSL_CMP_CTX_set_certConf_cb_arg(OSSL_CMP_CTX *ctx, void *arg);
void *OSSL_CMP_CTX_get_certConf_cb_arg(const OSSL_CMP_CTX *ctx);
/* result fetching: */
int OSSL_CMP_CTX_get_status(const OSSL_CMP_CTX *ctx);
OSSL_CMP_PKIFREETEXT *OSSL_CMP_CTX_get0_statusString(const OSSL_CMP_CTX *ctx);
int OSSL_CMP_CTX_get_failInfoCode(const OSSL_CMP_CTX *ctx);
#  define OSSL_CMP_PKISI_BUFLEN 1024
X509 *OSSL_CMP_CTX_get0_newCert(const OSSL_CMP_CTX *ctx);
STACK_OF(X509) *OSSL_CMP_CTX_get1_newChain(const OSSL_CMP_CTX *ctx);
STACK_OF(X509) *OSSL_CMP_CTX_get1_caPubs(const OSSL_CMP_CTX *ctx);
STACK_OF(X509) *OSSL_CMP_CTX_get1_extraCertsIn(const OSSL_CMP_CTX *ctx);
int OSSL_CMP_CTX_set1_transactionID(OSSL_CMP_CTX *ctx,
                            const ASN1_OCTET_STRING
 *id);
int OSSL_CMP_CTX_set1_senderNonce(OSSL_CMP_CTX *ctx,
                          const ASN1_OCTET_STRING *nonce);

/* from cmp_status.c */
char *OSSL_CMP_CTX_snprint_PKIStatus(const OSSL_CMP_CTX *ctx, char *buf,
                             size_t bufsize);
char *OSSL_CMP_snprint_PKIStatusInfo(const OSSL_CMP_PKISI *statusInfo,
                             char *buf, size_t bufsize);
```

```
OSSL_CMP_PKISI *
OSSL_CMP_STATUSINFO_new(int status, int fail_info, const char *text);

/* from cmp_hdr.c */
ASN1_OCTET_STRING *OSSL_CMP_HDR_get0_transactionID(const
                                    OSSL_CMP_PKIHEADER *hdr);
ASN1_OCTET_STRING *OSSL_CMP_HDR_get0_recipNonce(const OSSL_CMP_PKIHEADER *hdr);

/* from cmp_msg.c */
OSSL_CMP_PKIHEADER *OSSL_CMP_MSG_get0_header(const OSSL_CMP_MSG *msg);
int OSSL_CMP_MSG_get_bodytype(const OSSL_CMP_MSG *msg);
int OSSL_CMP_MSG_update_transactionID(OSSL_CMP_CTX *ctx, OSSL_CMP_MSG *msg);
int OSSL_CMP_MSG_update_recipNonce(OSSL_CMP_CTX
 *ctx, OSSL_CMP_MSG *msg);
OSSL_CRMF_MSG *OSSL_CMP_CTX_setup_CRM(OSSL_CMP_CTX *ctx, int for_KUR, int rid);
OSSL_CMP_MSG *OSSL_CMP_MSG_read(const char *file, OSSL_LIB_CTX *libctx,
                    const char *propq);
int OSSL_CMP_MSG_write(const char *file, const OSSL_CMP_MSG *msg);
OSSL_CMP_MSG *d2i_OSSL_CMP_MSG_bio(BIO *bio, OSSL_CMP_MSG **msg);
int i2d_OSSL_CMP_MSG_bio(BIO *bio, const OSSL_CMP_MSG *msg);

/* from cmp_vfy.c */
int OSSL_CMP_validate_msg(OSSL_CMP_CTX *ctx, const OSSL_CMP_MSG *msg);
int OSSL_CMP_validate_cert_path(const OSSL_CMP_CTX *ctx,
                    X509_STORE *trusted_store, X509 *cert);

/* from cmp_http.c */
OSSL_CMP_MSG *OSSL_CMP_MSG_http_perform(OSSL_CMP_CTX *ctx,
                            const OSSL_CMP_MSG *req);

/* from cmp_server.c */
typedef struct ossl_cmp_srv_ctx_st OSSL_CMP_SRV_CTX;
OSSL_CMP_MSG *OSSL_CMP_SRV_process_request(OSSL_CMP_SRV_CTX *srv_ctx,

   const OSSL_CMP_MSG *req);
OSSL_CMP_MSG * OSSL_CMP_CTX_server_perform(OSSL_CMP_CTX *client_ctx,
                                const OSSL_CMP_MSG *req);
OSSL_CMP_SRV_CTX *OSSL_CMP_SRV_CTX_new(OSSL_LIB_CTX *libctx, const char *propq);
void OSSL_CMP_SRV_CTX_free(OSSL_CMP_SRV_CTX *srv_ctx);
typedef OSSL_CMP_PKISI *(*OSSL_CMP_SRV_cert_request_cb_t)
  (OSSL_CMP_SRV_CTX *srv_ctx, const OSSL_CMP_MSG *req, int certReqId,
   const OSSL_CRMF_MSG *crm, const X509_REQ *p10cr,
   X509 **certOut, STACK_OF(X509) **chainOut, STACK_OF(X509) **caPubs);
typedef OSSL_CMP_PKISI *(*OSSL_CMP_SRV_rr_cb_t)(OSSL_CMP_SRV_CTX *srv_ctx,
                                    const OSSL_CMP_MSG *req,
                                    const X509_NAME *issuer,
                                    const ASN1_INTEGER *serial);
typedef int (*OSSL_CMP_SRV_genm_cb_t)(OSSL_CMP_SRV_CTX *srv_ctx,
```

```
                                const OSSL_CMP_MSG *req,

                        const STACK_OF(OSSL_CMP_ITAV) *in,
                                STACK_OF(OSSL_CMP_ITAV) **out);
typedef void (*OSSL_CMP_SRV_error_cb_t)(OSSL_CMP_SRV_CTX *srv_ctx,
                                const OSSL_CMP_MSG *req,
                                const OSSL_CMP_PKISI *statusInfo,
                                const ASN1_INTEGER *errorCode,
                                const OSSL_CMP_PKIFREETEXT *errDetails);
typedef int (*OSSL_CMP_SRV_certConf_cb_t)(OSSL_CMP_SRV_CTX *srv_ctx,
                                 const OSSL_CMP_MSG *req,
                                 int certReqId,
                                 const ASN1_OCTET_STRING *certHash,
                                 const OSSL_CMP_PKISI *si);
typedef int (*OSSL_CMP_SRV_pollReq_cb_t)(OSSL_CMP_SRV_CTX *srv_ctx,
                                const OSSL_CMP_MSG *req, int certReqId,

              OSSL_CMP_MSG **certReq,
                                int64_t *check_after);
int OSSL_CMP_SRV_CTX_init(OSSL_CMP_SRV_CTX *srv_ctx, void *custom_ctx,
                  OSSL_CMP_SRV_cert_request_cb_t process_cert_request,
                  OSSL_CMP_SRV_rr_cb_t process_rr,
                  OSSL_CMP_SRV_genm_cb_t process_genm,
                  OSSL_CMP_SRV_error_cb_t process_error,
                  OSSL_CMP_SRV_certConf_cb_t process_certConf,
                  OSSL_CMP_SRV_pollReq_cb_t process_pollReq);
OSSL_CMP_CTX *OSSL_CMP_SRV_CTX_get0_cmp_ctx(const OSSL_CMP_SRV_CTX *srv_ctx);
void *OSSL_CMP_SRV_CTX_get0_custom_ctx(const OSSL_CMP_SRV_CTX *srv_ctx);
int OSSL_CMP_SRV_CTX_set_send_unprotected_errors(OSSL_CMP_SRV_CTX *srv_ctx,
                                  int val);
int OSSL_CMP_SRV_CTX_set_accept_unprotected(OSSL_CMP_SRV_CTX *srv_ctx, int val);
int OSSL_CMP_SRV_CTX_set_accept_raverified(OSSL_CMP_SRV_CTX
 *srv_ctx, int val);
int OSSL_CMP_SRV_CTX_set_grant_implicit_confirm(OSSL_CMP_SRV_CTX *srv_ctx,
                                  int val);

/* from cmp_client.c */
X509 *OSSL_CMP_exec_certreq(OSSL_CMP_CTX *ctx, int req_type,
                   const OSSL_CRMF_MSG *crm);
# define OSSL_CMP_IR    0
# define OSSL_CMP_CR    2
# define OSSL_CMP_P10CR 4
# define OSSL_CMP_KUR   7
# define OSSL_CMP_exec_IR_ses(ctx) \
  OSSL_CMP_exec_certreq(ctx, OSSL_CMP_IR, NULL)
# define OSSL_CMP_exec_CR_ses(ctx) \
  OSSL_CMP_exec_certreq(ctx, OSSL_CMP_CR, NULL)
# define OSSL_CMP_exec_P10CR_ses(ctx) \
```

```
   OSSL_CMP_exec_certreq(ctx, OSSL_CMP_P10CR, NULL)
#  define OSSL_CMP_exec_KUR_ses(ctx) \
   OSSL_CMP_exec_certreq(ctx, OSSL_CMP_KUR, NULL)
int OSSL_CMP_try_certreq(OSSL_CMP_CTX *ctx, int req_type,
                         const OSSL_CRMF_MSG *crm, int *checkAfter);
int OSSL_CMP_exec_RR_ses(OSSL_CMP_CTX *ctx);
STACK_OF(OSSL_CMP_ITAV) *OSSL_CMP_exec_GENM_ses(OSSL_CMP_CTX
 *ctx);

#  ifdef  __cplusplus
}
#  endif
# endif /* !defined(OPENSSL_NO_CMP) */
#endif /* !defined(OPENSSL_CMP_H) */
/* WARNING: do not edit! */
/* Generated by Makefile from include/crypto/dso_conf.h.in */
/*
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*/

#ifndef OSSL_CRYPTO_DSO_CONF_H
# define OSSL_CRYPTO_DSO_CONF_H
# pragma once

# define DSO_DLFCN
# define HAVE_DLFCN_H
# define DSO_EXTENSION ".so"
#endif
```

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/* WARNING: do not edit! */
/* Generated by Makefile from include/crypto/bn_conf.h.in */
/*
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*
* Licensed under the Apache License 2.0 (the "License"). You may not use
* this file except in compliance with the License. You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#ifndef OSSL_CRYPTO_BN_CONF_H
define OSSL_CRYPTO_BN_CONF_H
pragma once

/*
* The contents of this file are not used in the UEFI build, as
* both 32-bit and 64-bit builds are supported from a single run
* of the Configure script.
*/

/* Should we define BN_DIV2W here? */

```
/* Only one for the following should be defined */
#define SIXTY_FOUR_BIT_LONG
#undef SIXTY_FOUR_BIT
#undef THIRTY_TWO_BIT

#endif
```

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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/x509_vfy.h.in
*
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* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_X509_VFY_H
# define OPENSSL_X509_VFY_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_X509_VFY_H
# endif

/*
* Protect against recursion, x509.h and x509_vfy.h each include the other.
*/
```

```
# ifndef OPENSSL_X509_H
#  include <openssl/x509.h>
# endif

# include <openssl/opensslconf.h>
# include <openssl/lhash.h>
# include <openssl/bio.h>
# include <openssl/crypto.h>
# include <openssl/symhacks.h>

#ifdef  __cplusplus
extern "C" {
#endif

/*-
SSL_CTX -> X509_STORE
            -> X509_LOOKUP

           ->X509_LOOKUP_METHOD
            -> X509_LOOKUP
                  ->X509_LOOKUP_METHOD

SSL     -> X509_STORE_CTX
            ->X509_STORE

The X509_STORE holds the tables etc for verification stuff.
A X509_STORE_CTX is used while validating a single certificate.
The X509_STORE has X509_LOOKUPs for looking up certs.
The X509_STORE then calls a function to actually verify the
certificate chain.
*/

typedef enum {
  X509_LU_NONE = 0,
  X509_LU_X509, X509_LU_CRL
} X509_LOOKUP_TYPE;

#ifndef OPENSSL_NO_DEPRECATED_1_1_0
#define X509_LU_RETRY   -1
#define X509_LU_FAIL    0
#endif

SKM_DEFINE_STACK_OF_INTERNAL(X509_LOOKUP, X509_LOOKUP, X509_LOOKUP)
#define sk_X509_LOOKUP_num(sk) OPENSSL_sk_num(ossl_check_const_X509_LOOKUP_sk_type(sk))
#define sk_X509_LOOKUP_value(sk, idx) ((X509_LOOKUP
*)OPENSSL_sk_value(ossl_check_const_X509_LOOKUP_sk_type(sk), (idx)))
#define sk_X509_LOOKUP_new(cmp) ((STACK_OF(X509_LOOKUP)
*)OPENSSL_sk_new(ossl_check_X509_LOOKUP_compfunc_type(cmp)))
```

```
#define
 sk_X509_LOOKUP_new_null() ((STACK_OF(X509_LOOKUP) *)OPENSSL_sk_new_null())
#define sk_X509_LOOKUP_new_reserve(cmp, n) ((STACK_OF(X509_LOOKUP)
*)OPENSSL_sk_new_reserve(ossl_check_X509_LOOKUP_compfunc_type(cmp), (n)))
#define sk_X509_LOOKUP_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_LOOKUP_sk_type(sk), (n))
#define sk_X509_LOOKUP_free(sk) OPENSSL_sk_free(ossl_check_X509_LOOKUP_sk_type(sk))
#define sk_X509_LOOKUP_zero(sk) OPENSSL_sk_zero(ossl_check_X509_LOOKUP_sk_type(sk))
#define sk_X509_LOOKUP_delete(sk, i) ((X509_LOOKUP
*)OPENSSL_sk_delete(ossl_check_X509_LOOKUP_sk_type(sk), (i)))
#define sk_X509_LOOKUP_delete_ptr(sk, ptr) ((X509_LOOKUP
*)OPENSSL_sk_delete_ptr(ossl_check_X509_LOOKUP_sk_type(sk), ossl_check_X509_LOOKUP_type(ptr)))
#define sk_X509_LOOKUP_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_type(ptr))
#define sk_X509_LOOKUP_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_type(ptr))
#define
 sk_X509_LOOKUP_pop(sk) ((X509_LOOKUP *)OPENSSL_sk_pop(ossl_check_X509_LOOKUP_sk_type(sk)))
#define sk_X509_LOOKUP_shift(sk) ((X509_LOOKUP
*)OPENSSL_sk_shift(ossl_check_X509_LOOKUP_sk_type(sk)))
#define sk_X509_LOOKUP_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_LOOKUP_sk_type(sk),ossl_check_X509_LOOKUP_freefunc_type(free
func))
#define sk_X509_LOOKUP_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_type(ptr), (idx))
#define sk_X509_LOOKUP_set(sk, idx, ptr) ((X509_LOOKUP
*)OPENSSL_sk_set(ossl_check_X509_LOOKUP_sk_type(sk), (idx), ossl_check_X509_LOOKUP_type(ptr)))
#define sk_X509_LOOKUP_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_type(ptr))
#define sk_X509_LOOKUP_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_type(ptr))
#define sk_X509_LOOKUP_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_LOOKUP_sk_type(sk),
 ossl_check_X509_LOOKUP_type(ptr), pnum)
#define sk_X509_LOOKUP_sort(sk) OPENSSL_sk_sort(ossl_check_X509_LOOKUP_sk_type(sk))
#define sk_X509_LOOKUP_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_LOOKUP_sk_type(sk))
#define sk_X509_LOOKUP_dup(sk) ((STACK_OF(X509_LOOKUP)
*)OPENSSL_sk_dup(ossl_check_const_X509_LOOKUP_sk_type(sk)))
#define sk_X509_LOOKUP_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_LOOKUP)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_copyfunc_type(copyfunc), ossl_check_X509_LOOKUP_freefunc_type(freefunc)))
#define sk_X509_LOOKUP_set_cmp_func(sk, cmp)
((sk_X509_LOOKUP_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_LOOKUP_sk_type(sk),
ossl_check_X509_LOOKUP_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(X509_OBJECT, X509_OBJECT, X509_OBJECT)
#define sk_X509_OBJECT_num(sk) OPENSSL_sk_num(ossl_check_const_X509_OBJECT_sk_type(sk))
#define sk_X509_OBJECT_value(sk, idx) ((X509_OBJECT
*)OPENSSL_sk_value(ossl_check_const_X509_OBJECT_sk_type(sk),
```

(idx)))
#define sk_X509_OBJECT_new(cmp) ((STACK_OF(X509_OBJECT)
*)OPENSSL_sk_new(ossl_check_X509_OBJECT_compfunc_type(cmp)))
#define sk_X509_OBJECT_new_null() ((STACK_OF(X509_OBJECT) *)OPENSSL_sk_new_null())
#define sk_X509_OBJECT_new_reserve(cmp, n) ((STACK_OF(X509_OBJECT)
*)OPENSSL_sk_new_reserve(ossl_check_X509_OBJECT_compfunc_type(cmp), (n)))
#define sk_X509_OBJECT_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_OBJECT_sk_type(sk), (n))
#define sk_X509_OBJECT_free(sk) OPENSSL_sk_free(ossl_check_X509_OBJECT_sk_type(sk))
#define sk_X509_OBJECT_zero(sk) OPENSSL_sk_zero(ossl_check_X509_OBJECT_sk_type(sk))
#define sk_X509_OBJECT_delete(sk, i) ((X509_OBJECT
*)OPENSSL_sk_delete(ossl_check_X509_OBJECT_sk_type(sk), (i)))
#define sk_X509_OBJECT_delete_ptr(sk, ptr) ((X509_OBJECT
*)OPENSSL_sk_delete_ptr(ossl_check_X509_OBJECT_sk_type(sk), ossl_check_X509_OBJECT_type(ptr)))
#define sk_X509_OBJECT_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_type(ptr))
#define sk_X509_OBJECT_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_type(ptr))
#define sk_X509_OBJECT_pop(sk) ((X509_OBJECT
*)OPENSSL_sk_pop(ossl_check_X509_OBJECT_sk_type(sk)))
#define sk_X509_OBJECT_shift(sk) ((X509_OBJECT
*)OPENSSL_sk_shift(ossl_check_X509_OBJECT_sk_type(sk)))
#define sk_X509_OBJECT_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_OBJECT_sk_type(sk),ossl_check_X509_OBJECT_freefunc_type(freef
unc))
#define sk_X509_OBJECT_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_type(ptr), (idx))
#define sk_X509_OBJECT_set(sk, idx, ptr) ((X509_OBJECT
*)OPENSSL_sk_set(ossl_check_X509_OBJECT_sk_type(sk), (idx), ossl_check_X509_OBJECT_type(ptr)))
#define sk_X509_OBJECT_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_type(ptr))
#define sk_X509_OBJECT_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_type(ptr))
#define sk_X509_OBJECT_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_X509_OBJECT_sk_type(sk), ossl_check_X509_OBJECT_type(ptr), pnum)
#define sk_X509_OBJECT_sort(sk) OPENSSL_sk_sort(ossl_check_X509_OBJECT_sk_type(sk))
#define sk_X509_OBJECT_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_OBJECT_sk_type(sk))
#define sk_X509_OBJECT_dup(sk) ((STACK_OF(X509_OBJECT)
*)OPENSSL_sk_dup(ossl_check_const_X509_OBJECT_sk_type(sk)))
#define sk_X509_OBJECT_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_OBJECT)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_copyfunc_type(copyfunc), ossl_check_X509_OBJECT_freefunc_type(freefunc)))
#define sk_X509_OBJECT_set_cmp_func(sk, cmp)
((sk_X509_OBJECT_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_OBJECT_sk_type(sk),
ossl_check_X509_OBJECT_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(X509_VERIFY_PARAM, X509_VERIFY_PARAM,
X509_VERIFY_PARAM)
#define

```
 sk_X509_VERIFY_PARAM_num(sk)
OPENSSL_sk_num(ossl_check_const_X509_VERIFY_PARAM_sk_type(sk))
#define sk_X509_VERIFY_PARAM_value(sk, idx) ((X509_VERIFY_PARAM
*)OPENSSL_sk_value(ossl_check_const_X509_VERIFY_PARAM_sk_type(sk), (idx)))
#define sk_X509_VERIFY_PARAM_new(cmp) ((STACK_OF(X509_VERIFY_PARAM)
*)OPENSSL_sk_new(ossl_check_X509_VERIFY_PARAM_compfunc_type(cmp)))
#define sk_X509_VERIFY_PARAM_new_null() ((STACK_OF(X509_VERIFY_PARAM)
*)OPENSSL_sk_new_null())
#define sk_X509_VERIFY_PARAM_new_reserve(cmp, n) ((STACK_OF(X509_VERIFY_PARAM)
*)OPENSSL_sk_new_reserve(ossl_check_X509_VERIFY_PARAM_compfunc_type(cmp), (n)))
#define sk_X509_VERIFY_PARAM_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_X509_VERIFY_PARAM_sk_type(sk), (n))
#define sk_X509_VERIFY_PARAM_free(sk)
OPENSSL_sk_free(ossl_check_X509_VERIFY_PARAM_sk_type(sk))
#define sk_X509_VERIFY_PARAM_zero(sk)
OPENSSL_sk_zero(ossl_check_X509_VERIFY_PARAM_sk_type(sk))
#define sk_X509_VERIFY_PARAM_delete(sk, i) ((X509_VERIFY_PARAM
*)OPENSSL_sk_delete(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
 (i)))
#define sk_X509_VERIFY_PARAM_delete_ptr(sk, ptr) ((X509_VERIFY_PARAM
*)OPENSSL_sk_delete_ptr(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_type(ptr)))
#define sk_X509_VERIFY_PARAM_push(sk, ptr)
OPENSSL_sk_push(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_type(ptr))
#define sk_X509_VERIFY_PARAM_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_type(ptr))
#define sk_X509_VERIFY_PARAM_pop(sk) ((X509_VERIFY_PARAM
*)OPENSSL_sk_pop(ossl_check_X509_VERIFY_PARAM_sk_type(sk)))
#define sk_X509_VERIFY_PARAM_shift(sk) ((X509_VERIFY_PARAM
*)OPENSSL_sk_shift(ossl_check_X509_VERIFY_PARAM_sk_type(sk)))
#define sk_X509_VERIFY_PARAM_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_VERIFY_PARAM_sk_type(sk),ossl_check_X509_VERIFY_PARAM_
freefunc_type(freefunc))
#define sk_X509_VERIFY_PARAM_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
 ossl_check_X509_VERIFY_PARAM_type(ptr), (idx))
#define sk_X509_VERIFY_PARAM_set(sk, idx, ptr) ((X509_VERIFY_PARAM
*)OPENSSL_sk_set(ossl_check_X509_VERIFY_PARAM_sk_type(sk), (idx),
ossl_check_X509_VERIFY_PARAM_type(ptr)))
#define sk_X509_VERIFY_PARAM_find(sk, ptr)
OPENSSL_sk_find(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_type(ptr))
#define sk_X509_VERIFY_PARAM_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_type(ptr))
#define sk_X509_VERIFY_PARAM_find_all(sk, ptr, pnum)
```

```
OPENSSL_sk_find_all(ossl_check_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_type(ptr), pnum)
#define sk_X509_VERIFY_PARAM_sort(sk)
OPENSSL_sk_sort(ossl_check_X509_VERIFY_PARAM_sk_type(sk))
#define sk_X509_VERIFY_PARAM_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_X509_VERIFY_PARAM_sk_type(sk))
#define sk_X509_VERIFY_PARAM_dup(sk) ((STACK_OF(X509_VERIFY_PARAM)
*)OPENSSL_sk_dup(ossl_check_const_X509_VERIFY_PARAM_sk_type(sk)))
#define
 sk_X509_VERIFY_PARAM_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_VERIFY_PARAM)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_VERIFY_PARAM_sk_type(sk),
ossl_check_X509_VERIFY_PARAM_copyfunc_type(copyfunc),
ossl_check_X509_VERIFY_PARAM_freefunc_type(freefunc)))
#define sk_X509_VERIFY_PARAM_set_cmp_func(sk, cmp)
((sk_X509_VERIFY_PARAM_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_VERIFY_PARAM_sk_
type(sk), ossl_check_X509_VERIFY_PARAM_compfunc_type(cmp)))


/* This is used for a table of trust checking functions */
typedef struct x509_trust_st {
  int trust;
  int flags;
  int (*check_trust) (struct x509_trust_st *, X509 *, int);
  char *name;
  int arg1;
  void *arg2;
} X509_TRUST;
SKM_DEFINE_STACK_OF_INTERNAL(X509_TRUST, X509_TRUST, X509_TRUST)
#define sk_X509_TRUST_num(sk) OPENSSL_sk_num(ossl_check_const_X509_TRUST_sk_type(sk))
#define sk_X509_TRUST_value(sk, idx) ((X509_TRUST
*)OPENSSL_sk_value(ossl_check_const_X509_TRUST_sk_type(sk),
 (idx)))
#define sk_X509_TRUST_new(cmp) ((STACK_OF(X509_TRUST)
*)OPENSSL_sk_new(ossl_check_X509_TRUST_compfunc_type(cmp)))
#define sk_X509_TRUST_new_null() ((STACK_OF(X509_TRUST) *)OPENSSL_sk_new_null())
#define sk_X509_TRUST_new_reserve(cmp, n) ((STACK_OF(X509_TRUST)
*)OPENSSL_sk_new_reserve(ossl_check_X509_TRUST_compfunc_type(cmp), (n)))
#define sk_X509_TRUST_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_X509_TRUST_sk_type(sk), (n))
#define sk_X509_TRUST_free(sk) OPENSSL_sk_free(ossl_check_X509_TRUST_sk_type(sk))
#define sk_X509_TRUST_zero(sk) OPENSSL_sk_zero(ossl_check_X509_TRUST_sk_type(sk))
#define sk_X509_TRUST_delete(sk, i) ((X509_TRUST
*)OPENSSL_sk_delete(ossl_check_X509_TRUST_sk_type(sk), (i)))
#define sk_X509_TRUST_delete_ptr(sk, ptr) ((X509_TRUST
*)OPENSSL_sk_delete_ptr(ossl_check_X509_TRUST_sk_type(sk), ossl_check_X509_TRUST_type(ptr)))
#define sk_X509_TRUST_push(sk, ptr) OPENSSL_sk_push(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_type(ptr))
#define
```

```
 sk_X509_TRUST_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_type(ptr))
#define sk_X509_TRUST_pop(sk) ((X509_TRUST *)OPENSSL_sk_pop(ossl_check_X509_TRUST_sk_type(sk)))
#define sk_X509_TRUST_shift(sk) ((X509_TRUST
*)OPENSSL_sk_shift(ossl_check_X509_TRUST_sk_type(sk)))
#define sk_X509_TRUST_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_X509_TRUST_sk_type(sk),ossl_check_X509_TRUST_freefunc_type(freefunc
))
#define sk_X509_TRUST_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_type(ptr), (idx))
#define sk_X509_TRUST_set(sk, idx, ptr) ((X509_TRUST
*)OPENSSL_sk_set(ossl_check_X509_TRUST_sk_type(sk), (idx), ossl_check_X509_TRUST_type(ptr)))
#define sk_X509_TRUST_find(sk, ptr) OPENSSL_sk_find(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_type(ptr))
#define sk_X509_TRUST_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_type(ptr))
#define
 sk_X509_TRUST_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_type(ptr), pnum)
#define sk_X509_TRUST_sort(sk) OPENSSL_sk_sort(ossl_check_X509_TRUST_sk_type(sk))
#define sk_X509_TRUST_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_X509_TRUST_sk_type(sk))
#define sk_X509_TRUST_dup(sk) ((STACK_OF(X509_TRUST)
*)OPENSSL_sk_dup(ossl_check_const_X509_TRUST_sk_type(sk)))
#define sk_X509_TRUST_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(X509_TRUST)
*)OPENSSL_sk_deep_copy(ossl_check_const_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_copyfunc_type(copyfunc), ossl_check_X509_TRUST_freefunc_type(freefunc)))
#define sk_X509_TRUST_set_cmp_func(sk, cmp)
((sk_X509_TRUST_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_X509_TRUST_sk_type(sk),
ossl_check_X509_TRUST_compfunc_type(cmp)))


/* standard trust ids */
# define X509_TRUST_DEFAULT      0 /* Only valid in purpose settings */
# define X509_TRUST_COMPAT       1
# define X509_TRUST_SSL_CLIENT
  2
# define X509_TRUST_SSL_SERVER   3
# define X509_TRUST_EMAIL        4
# define X509_TRUST_OBJECT_SIGN  5
# define X509_TRUST_OCSP_SIGN    6
# define X509_TRUST_OCSP_REQUEST 7
# define X509_TRUST_TSA          8
/* Keep these up to date! */
# define X509_TRUST_MIN          1
# define X509_TRUST_MAX          8

/* trust_flags values */
# define X509_TRUST_DYNAMIC      (1U << 0)
```

```
# define X509_TRUST_DYNAMIC_NAME (1U << 1)
/* No compat trust if self-signed, preempts "DO_SS" */
# define X509_TRUST_NO_SS_COMPAT (1U << 2)
/* Compat trust if no explicit accepted trust EKUs */
# define X509_TRUST_DO_SS_COMPAT (1U << 3)
/* Accept "anyEKU" as a wildcard rejection OID and as a wildcard trust OID */
# define X509_TRUST_OK_ANY_EKU   (1U << 4)

/* check_trust return codes */
# define X509_TRUST_TRUSTED      1
# define X509_TRUST_REJECTED     2
# define X509_TRUST_UNTRUSTED    3

int X509_TRUST_set(int *t, int trust);
int X509_TRUST_get_count(void);
X509_TRUST *X509_TRUST_get0(int idx);
int
 X509_TRUST_get_by_id(int id);
int X509_TRUST_add(int id, int flags, int (*ck) (X509_TRUST *, X509 *, int),
                   const char *name, int arg1, void *arg2);
void X509_TRUST_cleanup(void);
int X509_TRUST_get_flags(const X509_TRUST *xp);
char *X509_TRUST_get0_name(const X509_TRUST *xp);
int X509_TRUST_get_trust(const X509_TRUST *xp);

int X509_trusted(const X509 *x);
int X509_add1_trust_object(X509 *x, const ASN1_OBJECT *obj);
int X509_add1_reject_object(X509 *x, const ASN1_OBJECT *obj);
void X509_trust_clear(X509 *x);
void X509_reject_clear(X509 *x);
STACK_OF(ASN1_OBJECT) *X509_get0_trust_objects(X509 *x);
STACK_OF(ASN1_OBJECT) *X509_get0_reject_objects(X509 *x);

int (*X509_TRUST_set_default(int (*trust) (int, X509 *, int))) (int, X509 *,
                                                int);
int X509_check_trust(X509 *x, int id, int flags);

int X509_verify_cert(X509_STORE_CTX *ctx);
int X509_STORE_CTX_verify(X509_STORE_CTX *ctx);
STACK_OF(X509) *X509_build_chain(X509
 *target, STACK_OF(X509) *certs,
                                 X509_STORE *store, int with_self_signed,
                                 OSSL_LIB_CTX *libctx, const char *propq);

int X509_STORE_set_depth(X509_STORE *store, int depth);

typedef int (*X509_STORE_CTX_verify_cb)(int, X509_STORE_CTX *);
int X509_STORE_CTX_print_verify_cb(int ok, X509_STORE_CTX *ctx);
```

```
typedef int (*X509_STORE_CTX_verify_fn)(X509_STORE_CTX *);
typedef int (*X509_STORE_CTX_get_issuer_fn)(X509 **issuer,
                                X509_STORE_CTX *ctx, X509 *x);
typedef int (*X509_STORE_CTX_check_issued_fn)(X509_STORE_CTX *ctx,
                                 X509 *x, X509 *issuer);
typedef int (*X509_STORE_CTX_check_revocation_fn)(X509_STORE_CTX *ctx);
typedef int (*X509_STORE_CTX_get_crl_fn)(X509_STORE_CTX *ctx,
                               X509_CRL **crl, X509 *x);
typedef int (*X509_STORE_CTX_check_crl_fn)(X509_STORE_CTX *ctx, X509_CRL *crl);
typedef
 int (*X509_STORE_CTX_cert_crl_fn)(X509_STORE_CTX *ctx,
                                 X509_CRL *crl, X509 *x);
typedef int (*X509_STORE_CTX_check_policy_fn)(X509_STORE_CTX *ctx);
typedef STACK_OF(X509)
   *(*X509_STORE_CTX_lookup_certs_fn)(X509_STORE_CTX *ctx,
                               const X509_NAME *nm);
typedef STACK_OF(X509_CRL)
   *(*X509_STORE_CTX_lookup_crls_fn)(const X509_STORE_CTX *ctx,
                              const X509_NAME *nm);
typedef int (*X509_STORE_CTX_cleanup_fn)(X509_STORE_CTX *ctx);

void X509_STORE_CTX_set_depth(X509_STORE_CTX *ctx, int depth);

# define X509_STORE_CTX_set_app_data(ctx,data) \
      X509_STORE_CTX_set_ex_data(ctx,0,data)
# define X509_STORE_CTX_get_app_data(ctx) \
      X509_STORE_CTX_get_ex_data(ctx,0)

# define X509_L_FILE_LOAD        1
# define X509_L_ADD_DIR          2
# define X509_L_ADD_STORE        3
# define X509_L_LOAD_STORE       4

# define X509_LOOKUP_load_file(x,name,type) \

  X509_LOOKUP_ctrl((x),X509_L_FILE_LOAD,(name),(long)(type),NULL)

# define X509_LOOKUP_add_dir(x,name,type) \
            X509_LOOKUP_ctrl((x),X509_L_ADD_DIR,(name),(long)(type),NULL)

# define X509_LOOKUP_add_store(x,name) \
            X509_LOOKUP_ctrl((x),X509_L_ADD_STORE,(name),0,NULL)

# define X509_LOOKUP_load_store(x,name) \
            X509_LOOKUP_ctrl((x),X509_L_LOAD_STORE,(name),0,NULL)

# define X509_LOOKUP_load_file_ex(x, name, type, libctx, propq)       \
X509_LOOKUP_ctrl_ex((x), X509_L_FILE_LOAD, (name), (long)(type), NULL,\
```

```
                (libctx), (propq))

# define X509_LOOKUP_load_store_ex(x, name, libctx, propq)          \
X509_LOOKUP_ctrl_ex((x), X509_L_LOAD_STORE, (name), 0, NULL,        \
                (libctx), (propq))

# define X509_LOOKUP_add_store_ex(x, name, libctx, propq)           \
X509_LOOKUP_ctrl_ex((x), X509_L_ADD_STORE, (name), 0, NULL,         \
                (libctx), (propq))

# define X509_V_OK
                    0
# define X509_V_ERR_UNSPECIFIED                      1
# define X509_V_ERR_UNABLE_TO_GET_ISSUER_CERT        2
# define X509_V_ERR_UNABLE_TO_GET_CRL                3
# define X509_V_ERR_UNABLE_TO_DECRYPT_CERT_SIGNATURE     4
# define X509_V_ERR_UNABLE_TO_DECRYPT_CRL_SIGNATURE      5
# define X509_V_ERR_UNABLE_TO_DECODE_ISSUER_PUBLIC_KEY   6
# define X509_V_ERR_CERT_SIGNATURE_FAILURE           7
# define X509_V_ERR_CRL_SIGNATURE_FAILURE            8
# define X509_V_ERR_CERT_NOT_YET_VALID               9
# define X509_V_ERR_CERT_HAS_EXPIRED                 10
# define X509_V_ERR_CRL_NOT_YET_VALID                11
# define X509_V_ERR_CRL_HAS_EXPIRED                  12
# define X509_V_ERR_ERROR_IN_CERT_NOT_BEFORE_FIELD       13
# define X509_V_ERR_ERROR_IN_CERT_NOT_AFTER_FIELD        14
# define X509_V_ERR_ERROR_IN_CRL_LAST_UPDATE_FIELD       15
# define X509_V_ERR_ERROR_IN_CRL_NEXT_UPDATE_FIELD       16
# define X509_V_ERR_OUT_OF_MEM
                    17
# define X509_V_ERR_DEPTH_ZERO_SELF_SIGNED_CERT      18
# define X509_V_ERR_SELF_SIGNED_CERT_IN_CHAIN        19
# define X509_V_ERR_UNABLE_TO_GET_ISSUER_CERT_LOCALLY    20
# define X509_V_ERR_UNABLE_TO_VERIFY_LEAF_SIGNATURE      21
# define X509_V_ERR_CERT_CHAIN_TOO_LONG              22
# define X509_V_ERR_CERT_REVOKED                     23
# define X509_V_ERR_NO_ISSUER_PUBLIC_KEY             24
# define X509_V_ERR_PATH_LENGTH_EXCEEDED             25
# define X509_V_ERR_INVALID_PURPOSE                  26
# define X509_V_ERR_CERT_UNTRUSTED                   27
# define X509_V_ERR_CERT_REJECTED                    28

/* These are 'informational' when looking for issuer cert */
# define X509_V_ERR_SUBJECT_ISSUER_MISMATCH          29
# define X509_V_ERR_AKID_SKID_MISMATCH               30
# define X509_V_ERR_AKID_ISSUER_SERIAL_MISMATCH      31
# define X509_V_ERR_KEYUSAGE_NO_CERTSIGN             32
# define
```

```
 X509_V_ERR_UNABLE_TO_GET_CRL_ISSUER            33
# define X509_V_ERR_UNHANDLED_CRITICAL_EXTENSION        34
# define X509_V_ERR_KEYUSAGE_NO_CRL_SIGN                35
# define X509_V_ERR_UNHANDLED_CRITICAL_CRL_EXTENSION    36
# define X509_V_ERR_INVALID_NON_CA                      37
# define X509_V_ERR_PROXY_PATH_LENGTH_EXCEEDED          38
# define X509_V_ERR_KEYUSAGE_NO_DIGITAL_SIGNATURE       39
# define X509_V_ERR_PROXY_CERTIFICATES_NOT_ALLOWED      40
# define X509_V_ERR_INVALID_EXTENSION                   41
# define X509_V_ERR_INVALID_POLICY_EXTENSION            42
# define X509_V_ERR_NO_EXPLICIT_POLICY                  43
# define X509_V_ERR_DIFFERENT_CRL_SCOPE                 44
# define X509_V_ERR_UNSUPPORTED_EXTENSION_FEATURE       45
# define X509_V_ERR_UNNESTED_RESOURCE                   46
# define X509_V_ERR_PERMITTED_VIOLATION                 47
# define X509_V_ERR_EXCLUDED_VIOLATION                  48
# define X509_V_ERR_SUBTREE_MINMAX
            49
/* The application is not happy */
# define X509_V_ERR_APPLICATION_VERIFICATION            50
# define X509_V_ERR_UNSUPPORTED_CONSTRAINT_TYPE         51
# define X509_V_ERR_UNSUPPORTED_CONSTRAINT_SYNTAX       52
# define X509_V_ERR_UNSUPPORTED_NAME_SYNTAX             53
# define X509_V_ERR_CRL_PATH_VALIDATION_ERROR           54
/* Another issuer check debug option */
# define X509_V_ERR_PATH_LOOP                           55
/* Suite B mode algorithm violation */
# define X509_V_ERR_SUITE_B_INVALID_VERSION             56
# define X509_V_ERR_SUITE_B_INVALID_ALGORITHM           57
# define X509_V_ERR_SUITE_B_INVALID_CURVE               58
# define X509_V_ERR_SUITE_B_INVALID_SIGNATURE_ALGORITHM 59
# define X509_V_ERR_SUITE_B_LOS_NOT_ALLOWED             60
# define X509_V_ERR_SUITE_B_CANNOT_SIGN_P_384_WITH_P_256 61
/* Host, email and IP check errors */
# define X509_V_ERR_HOSTNAME_MISMATCH                   62
# define X509_V_ERR_EMAIL_MISMATCH
      63
# define X509_V_ERR_IP_ADDRESS_MISMATCH                 64
/* DANE TLSA errors */
# define X509_V_ERR_DANE_NO_MATCH                       65
/* security level errors */
# define X509_V_ERR_EE_KEY_TOO_SMALL                    66
# define X509_V_ERR_CA_KEY_TOO_SMALL                    67
# define X509_V_ERR_CA_MD_TOO_WEAK                      68
/* Caller error */
# define X509_V_ERR_INVALID_CALL                        69
/* Issuer lookup error */
# define X509_V_ERR_STORE_LOOKUP                        70
```

```
/* Certificate transparency */
# define X509_V_ERR_NO_VALID_SCTS                71

# define X509_V_ERR_PROXY_SUBJECT_NAME_VIOLATION    72
/* OCSP status errors */
# define X509_V_ERR_OCSP_VERIFY_NEEDED              73  /* Need OCSP verification */
# define X509_V_ERR_OCSP_VERIFY_FAILED              74  /* Couldn't verify cert through OCSP */
# define X509_V_ERR_OCSP_CERT_UNKNOWN               75  /* Certificate wasn't recognized by the OCSP
responder
 */

# define X509_V_ERR_UNSUPPORTED_SIGNATURE_ALGORITHM  76
# define X509_V_ERR_SIGNATURE_ALGORITHM_MISMATCH     77

/* Errors in case a check in X509_V_FLAG_X509_STRICT mode fails */
# define X509_V_ERR_SIGNATURE_ALGORITHM_INCONSISTENCY 78
# define X509_V_ERR_INVALID_CA                       79
# define X509_V_ERR_PATHLEN_INVALID_FOR_NON_CA       80
# define X509_V_ERR_PATHLEN_WITHOUT_KU_KEY_CERT_SIGN 81
# define X509_V_ERR_KU_KEY_CERT_SIGN_INVALID_FOR_NON_CA 82
# define X509_V_ERR_ISSUER_NAME_EMPTY                83
# define X509_V_ERR_SUBJECT_NAME_EMPTY               84
# define X509_V_ERR_MISSING_AUTHORITY_KEY_IDENTIFIER 85
# define X509_V_ERR_MISSING_SUBJECT_KEY_IDENTIFIER   86
# define X509_V_ERR_EMPTY_SUBJECT_ALT_NAME           87
# define X509_V_ERR_EMPTY_SUBJECT_SAN_NOT_CRITICAL   88
# define X509_V_ERR_CA_BCONS_NOT_CRITICAL            89
# define X509_V_ERR_AUTHORITY_KEY_IDENTIFIER_CRITICAL 90
# define X509_V_ERR_SUBJECT_KEY_IDENTIFIER_CRITICAL
    91
# define X509_V_ERR_CA_CERT_MISSING_KEY_USAGE        92
# define X509_V_ERR_EXTENSIONS_REQUIRE_VERSION_3     93
# define X509_V_ERR_EC_KEY_EXPLICIT_PARAMS           94

/* Certificate verify flags */
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define X509_V_FLAG_CB_ISSUER_CHECK        0x0   /* Deprecated */
# endif
/* Use check time instead of current time */
# define X509_V_FLAG_USE_CHECK_TIME          0x2
/* Lookup CRLs */
# define X509_V_FLAG_CRL_CHECK               0x4
/* Lookup CRLs for whole chain */
# define X509_V_FLAG_CRL_CHECK_ALL           0x8
/* Ignore unhandled critical extensions */
# define X509_V_FLAG_IGNORE_CRITICAL         0x10
/* Disable workarounds for broken certificates */
# define X509_V_FLAG_X509_STRICT             0x20
```

```
/* Enable proxy certificate validation */
# define X509_V_FLAG_ALLOW_PROXY_CERTS          0x40
/* Enable policy checking */
# define X509_V_FLAG_POLICY_CHECK
  0x80
/* Policy variable require-explicit-policy */
# define X509_V_FLAG_EXPLICIT_POLICY            0x100
/* Policy variable inhibit-any-policy */
# define X509_V_FLAG_INHIBIT_ANY                0x200
/* Policy variable inhibit-policy-mapping */
# define X509_V_FLAG_INHIBIT_MAP                0x400
/* Notify callback that policy is OK */
# define X509_V_FLAG_NOTIFY_POLICY              0x800
/* Extended CRL features such as indirect CRLs, alternate CRL signing keys */
# define X509_V_FLAG_EXTENDED_CRL_SUPPORT       0x1000
/* Delta CRL support */
# define X509_V_FLAG_USE_DELTAS                 0x2000
/* Check self-signed CA signature */
# define X509_V_FLAG_CHECK_SS_SIGNATURE         0x4000
/* Use trusted store first */
# define X509_V_FLAG_TRUSTED_FIRST              0x8000
/* Suite B 128 bit only mode: not normally used */
# define X509_V_FLAG_SUITEB_128_LOS_ONLY        0x10000
/* Suite B 192 bit only mode */
# define X509_V_FLAG_SUITEB_192_LOS             0x20000
/* Suite B
 128 bit mode allowing 192 bit algorithms */
# define X509_V_FLAG_SUITEB_128_LOS             0x30000
/* Allow partial chains if at least one certificate is in trusted store */
# define X509_V_FLAG_PARTIAL_CHAIN              0x80000
/*
* If the initial chain is not trusted, do not attempt to build an alternative
* chain. Alternate chain checking was introduced in 1.1.0. Setting this flag
* will force the behaviour to match that of previous versions.
*/
# define X509_V_FLAG_NO_ALT_CHAINS              0x100000
/* Do not check certificate/CRL validity against current time */
# define X509_V_FLAG_NO_CHECK_TIME              0x200000

# define X509_VP_FLAG_DEFAULT                   0x1
# define X509_VP_FLAG_OVERWRITE                 0x2
# define X509_VP_FLAG_RESET_FLAGS               0x4
# define X509_VP_FLAG_LOCKED                    0x8
# define X509_VP_FLAG_ONCE                      0x10

/* Internal use: mask of policy related options */
# define X509_V_FLAG_POLICY_MASK (X509_V_FLAG_POLICY_CHECK
```

```
\
                        | X509_V_FLAG_EXPLICIT_POLICY \
                        | X509_V_FLAG_INHIBIT_ANY \
                        | X509_V_FLAG_INHIBIT_MAP)

int X509_OBJECT_idx_by_subject(STACK_OF(X509_OBJECT) *h, X509_LOOKUP_TYPE type,
                               const X509_NAME *name);
X509_OBJECT *X509_OBJECT_retrieve_by_subject(STACK_OF(X509_OBJECT) *h,
                                    X509_LOOKUP_TYPE type,
                                    const X509_NAME *name);
X509_OBJECT *X509_OBJECT_retrieve_match(STACK_OF(X509_OBJECT) *h,
                                  X509_OBJECT *x);
int X509_OBJECT_up_ref_count(X509_OBJECT *a);
X509_OBJECT *X509_OBJECT_new(void);
void X509_OBJECT_free(X509_OBJECT *a);
X509_LOOKUP_TYPE X509_OBJECT_get_type(const X509_OBJECT *a);
X509 *X509_OBJECT_get0_X509(const X509_OBJECT *a);
int X509_OBJECT_set1_X509(X509_OBJECT *a, X509 *obj);
X509_CRL *X509_OBJECT_get0_X509_CRL(const
 X509_OBJECT *a);
int X509_OBJECT_set1_X509_CRL(X509_OBJECT *a, X509_CRL *obj);
X509_STORE *X509_STORE_new(void);
void X509_STORE_free(X509_STORE *v);
int X509_STORE_lock(X509_STORE *ctx);
int X509_STORE_unlock(X509_STORE *ctx);
int X509_STORE_up_ref(X509_STORE *v);
STACK_OF(X509_OBJECT) *X509_STORE_get0_objects(const X509_STORE *v);
STACK_OF(X509) *X509_STORE_get1_all_certs(X509_STORE *st);
STACK_OF(X509) *X509_STORE_CTX_get1_certs(X509_STORE_CTX *st,
                                  const X509_NAME *nm);
STACK_OF(X509_CRL) *X509_STORE_CTX_get1_crls(const X509_STORE_CTX *st,
                                    const X509_NAME *nm);
int X509_STORE_set_flags(X509_STORE *ctx, unsigned long flags);
int X509_STORE_set_purpose(X509_STORE *ctx, int purpose);
int X509_STORE_set_trust(X509_STORE *ctx, int trust);
int X509_STORE_set1_param(X509_STORE *ctx, const X509_VERIFY_PARAM *pm);
X509_VERIFY_PARAM *X509_STORE_get0_param(const X509_STORE *ctx);

void X509_STORE_set_verify(X509_STORE
 *ctx, X509_STORE_CTX_verify_fn verify);
#define X509_STORE_set_verify_func(ctx, func) \
        X509_STORE_set_verify((ctx),(func))
void X509_STORE_CTX_set_verify(X509_STORE_CTX *ctx,
                          X509_STORE_CTX_verify_fn verify);
X509_STORE_CTX_verify_fn X509_STORE_get_verify(const X509_STORE *ctx);
void X509_STORE_set_verify_cb(X509_STORE *ctx,
                         X509_STORE_CTX_verify_cb verify_cb);
# define X509_STORE_set_verify_cb_func(ctx,func) \
```

```
        X509_STORE_set_verify_cb((ctx),(func))
X509_STORE_CTX_verify_cb X509_STORE_get_verify_cb(const X509_STORE *ctx);
void X509_STORE_set_get_issuer(X509_STORE *ctx,
                               X509_STORE_CTX_get_issuer_fn get_issuer);
X509_STORE_CTX_get_issuer_fn X509_STORE_get_get_issuer(const X509_STORE *ctx);
void X509_STORE_set_check_issued(X509_STORE *ctx,
                                 X509_STORE_CTX_check_issued_fn check_issued);
X509_STORE_CTX_check_issued_fn X509_STORE_get_check_issued(const
 X509_STORE *ctx);
void X509_STORE_set_check_revocation(X509_STORE *ctx,
                                     X509_STORE_CTX_check_revocation_fn check_revocation);
X509_STORE_CTX_check_revocation_fn
  X509_STORE_get_check_revocation(const X509_STORE *ctx);
void X509_STORE_set_get_crl(X509_STORE *ctx,
                            X509_STORE_CTX_get_crl_fn get_crl);
X509_STORE_CTX_get_crl_fn X509_STORE_get_get_crl(const X509_STORE *ctx);
void X509_STORE_set_check_crl(X509_STORE *ctx,
                              X509_STORE_CTX_check_crl_fn check_crl);
X509_STORE_CTX_check_crl_fn X509_STORE_get_check_crl(const X509_STORE *ctx);
void X509_STORE_set_cert_crl(X509_STORE *ctx,
                             X509_STORE_CTX_cert_crl_fn cert_crl);
X509_STORE_CTX_cert_crl_fn X509_STORE_get_cert_crl(const X509_STORE *ctx);
void X509_STORE_set_check_policy(X509_STORE *ctx,
                                 X509_STORE_CTX_check_policy_fn check_policy);
X509_STORE_CTX_check_policy_fn
 X509_STORE_get_check_policy(const X509_STORE *ctx);
void X509_STORE_set_lookup_certs(X509_STORE *ctx,
                                 X509_STORE_CTX_lookup_certs_fn lookup_certs);
X509_STORE_CTX_lookup_certs_fn X509_STORE_get_lookup_certs(const X509_STORE *ctx);
void X509_STORE_set_lookup_crls(X509_STORE *ctx,
                                X509_STORE_CTX_lookup_crls_fn lookup_crls);
#define X509_STORE_set_lookup_crls_cb(ctx, func) \
  X509_STORE_set_lookup_crls((ctx), (func))
X509_STORE_CTX_lookup_crls_fn X509_STORE_get_lookup_crls(const X509_STORE *ctx);
void X509_STORE_set_cleanup(X509_STORE *ctx,
                            X509_STORE_CTX_cleanup_fn cleanup);
X509_STORE_CTX_cleanup_fn X509_STORE_get_cleanup(const X509_STORE *ctx);

#define X509_STORE_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_X509_STORE, l, p, newf, dupf, freef)
int X509_STORE_set_ex_data(X509_STORE *ctx, int idx, void *data);
void *X509_STORE_get_ex_data(const X509_STORE
 *ctx, int idx);

X509_STORE_CTX *X509_STORE_CTX_new_ex(OSSL_LIB_CTX *libctx, const char *propq);
X509_STORE_CTX *X509_STORE_CTX_new(void);

int X509_STORE_CTX_get1_issuer(X509 **issuer, X509_STORE_CTX *ctx, X509 *x);
```

```
void X509_STORE_CTX_free(X509_STORE_CTX *ctx);
int X509_STORE_CTX_init(X509_STORE_CTX *ctx, X509_STORE *trust_store,
                        X509 *target, STACK_OF(X509) *untrusted);
void X509_STORE_CTX_set0_trusted_stack(X509_STORE_CTX *ctx, STACK_OF(X509) *sk);
void X509_STORE_CTX_cleanup(X509_STORE_CTX *ctx);

X509_STORE *X509_STORE_CTX_get0_store(const X509_STORE_CTX *ctx);
X509 *X509_STORE_CTX_get0_cert(const X509_STORE_CTX *ctx);
STACK_OF(X509)* X509_STORE_CTX_get0_untrusted(const X509_STORE_CTX *ctx);
void X509_STORE_CTX_set0_untrusted(X509_STORE_CTX *ctx, STACK_OF(X509) *sk);
void X509_STORE_CTX_set_verify_cb(X509_STORE_CTX *ctx,
                                  X509_STORE_CTX_verify_cb verify);
X509_STORE_CTX_verify_cb X509_STORE_CTX_get_verify_cb(const
 X509_STORE_CTX *ctx);
X509_STORE_CTX_verify_fn X509_STORE_CTX_get_verify(const X509_STORE_CTX *ctx);
X509_STORE_CTX_get_issuer_fn X509_STORE_CTX_get_get_issuer(const X509_STORE_CTX *ctx);
X509_STORE_CTX_check_issued_fn X509_STORE_CTX_get_check_issued(const X509_STORE_CTX *ctx);
X509_STORE_CTX_check_revocation_fn X509_STORE_CTX_get_check_revocation(const X509_STORE_CTX
*ctx);
X509_STORE_CTX_get_crl_fn X509_STORE_CTX_get_get_crl(const X509_STORE_CTX *ctx);
X509_STORE_CTX_check_crl_fn X509_STORE_CTX_get_check_crl(const X509_STORE_CTX *ctx);
X509_STORE_CTX_cert_crl_fn X509_STORE_CTX_get_cert_crl(const X509_STORE_CTX *ctx);
X509_STORE_CTX_check_policy_fn X509_STORE_CTX_get_check_policy(const X509_STORE_CTX *ctx);
X509_STORE_CTX_lookup_certs_fn X509_STORE_CTX_get_lookup_certs(const X509_STORE_CTX *ctx);
X509_STORE_CTX_lookup_crls_fn X509_STORE_CTX_get_lookup_crls(const X509_STORE_CTX *ctx);
X509_STORE_CTX_cleanup_fn X509_STORE_CTX_get_cleanup(const X509_STORE_CTX *ctx);

#ifndef OPENSSL_NO_DEPRECATED_1_1_0
#
 define X509_STORE_CTX_get_chain X509_STORE_CTX_get0_chain
# define X509_STORE_CTX_set_chain X509_STORE_CTX_set0_untrusted
# define X509_STORE_CTX_trusted_stack X509_STORE_CTX_set0_trusted_stack
# define X509_STORE_get_by_subject X509_STORE_CTX_get_by_subject
# define X509_STORE_get1_certs X509_STORE_CTX_get1_certs
# define X509_STORE_get1_crls X509_STORE_CTX_get1_crls
/* the following macro is misspelled; use X509_STORE_get1_certs instead */
# define X509_STORE_get1_cert X509_STORE_CTX_get1_certs
/* the following macro is misspelled; use X509_STORE_get1_crls instead */
# define X509_STORE_get1_crl X509_STORE_CTX_get1_crls
#endif

X509_LOOKUP *X509_STORE_add_lookup(X509_STORE *v, X509_LOOKUP_METHOD *m);
X509_LOOKUP_METHOD *X509_LOOKUP_hash_dir(void);
X509_LOOKUP_METHOD *X509_LOOKUP_file(void);
X509_LOOKUP_METHOD *X509_LOOKUP_store(void);

typedef int (*X509_LOOKUP_ctrl_fn)(X509_LOOKUP *ctx, int cmd, const char *argc,
```

```
                        long argl, char **ret);
typedef
 int (*X509_LOOKUP_ctrl_ex_fn)(
   X509_LOOKUP *ctx, int cmd, const char *argc, long argl, char **ret,
   OSSL_LIB_CTX *libctx, const char *propq);

typedef int (*X509_LOOKUP_get_by_subject_fn)(X509_LOOKUP *ctx,
                                X509_LOOKUP_TYPE type,
                                const X509_NAME *name,
                                X509_OBJECT *ret);
typedef int (*X509_LOOKUP_get_by_subject_ex_fn)(X509_LOOKUP *ctx,
                                     X509_LOOKUP_TYPE type,
                                     const X509_NAME *name,
                                     X509_OBJECT *ret,
                                     OSSL_LIB_CTX *libctx,
                                     const char *propq);
typedef int (*X509_LOOKUP_get_by_issuer_serial_fn)(X509_LOOKUP *ctx,

     X509_LOOKUP_TYPE type,
                                   const X509_NAME *name,
                                   const ASN1_INTEGER *serial,
                                   X509_OBJECT *ret);
typedef int (*X509_LOOKUP_get_by_fingerprint_fn)(X509_LOOKUP *ctx,
                                  X509_LOOKUP_TYPE type,
                                  const unsigned char* bytes,
                                  int len,
                                  X509_OBJECT *ret);
typedef int (*X509_LOOKUP_get_by_alias_fn)(X509_LOOKUP *ctx,
                               X509_LOOKUP_TYPE type,
                               const char *str,
                               int len,
                               X509_OBJECT *ret);

X509_LOOKUP_METHOD *X509_LOOKUP_meth_new(const char *name);
void X509_LOOKUP_meth_free(X509_LOOKUP_METHOD
 *method);

int X509_LOOKUP_meth_set_new_item(X509_LOOKUP_METHOD *method,
                          int (*new_item) (X509_LOOKUP *ctx));
int (*X509_LOOKUP_meth_get_new_item(const X509_LOOKUP_METHOD* method))
   (X509_LOOKUP *ctx);

int X509_LOOKUP_meth_set_free(X509_LOOKUP_METHOD *method,
                        void (*free_fn) (X509_LOOKUP *ctx));
void (*X509_LOOKUP_meth_get_free(const X509_LOOKUP_METHOD* method))
   (X509_LOOKUP *ctx);

int X509_LOOKUP_meth_set_init(X509_LOOKUP_METHOD *method,
```

```
                        int (*init) (X509_LOOKUP *ctx));
int (*X509_LOOKUP_meth_get_init(const X509_LOOKUP_METHOD* method))
  (X509_LOOKUP *ctx);

int X509_LOOKUP_meth_set_shutdown(X509_LOOKUP_METHOD *method,
                        int (*shutdown) (X509_LOOKUP *ctx));
int (*X509_LOOKUP_meth_get_shutdown(const X509_LOOKUP_METHOD* method))
  (X509_LOOKUP *ctx);

int X509_LOOKUP_meth_set_ctrl(X509_LOOKUP_METHOD *method,
                        X509_LOOKUP_ctrl_fn
 ctrl_fn);
X509_LOOKUP_ctrl_fn X509_LOOKUP_meth_get_ctrl(const X509_LOOKUP_METHOD *method);

int X509_LOOKUP_meth_set_get_by_subject(X509_LOOKUP_METHOD *method,
                            X509_LOOKUP_get_by_subject_fn fn);
X509_LOOKUP_get_by_subject_fn X509_LOOKUP_meth_get_get_by_subject(
  const X509_LOOKUP_METHOD *method);

int X509_LOOKUP_meth_set_get_by_issuer_serial(X509_LOOKUP_METHOD *method,
  X509_LOOKUP_get_by_issuer_serial_fn fn);
X509_LOOKUP_get_by_issuer_serial_fn X509_LOOKUP_meth_get_get_by_issuer_serial(
  const X509_LOOKUP_METHOD *method);

int X509_LOOKUP_meth_set_get_by_fingerprint(X509_LOOKUP_METHOD *method,
  X509_LOOKUP_get_by_fingerprint_fn fn);
X509_LOOKUP_get_by_fingerprint_fn X509_LOOKUP_meth_get_get_by_fingerprint(
  const X509_LOOKUP_METHOD *method);

int X509_LOOKUP_meth_set_get_by_alias(X509_LOOKUP_METHOD *method,
                            X509_LOOKUP_get_by_alias_fn fn);
X509_LOOKUP_get_by_alias_fn X509_LOOKUP_meth_get_get_by_alias(
   const X509_LOOKUP_METHOD *method);


int X509_STORE_add_cert(X509_STORE *ctx, X509 *x);
int X509_STORE_add_crl(X509_STORE *ctx, X509_CRL *x);

int X509_STORE_CTX_get_by_subject(const X509_STORE_CTX *vs,
                        X509_LOOKUP_TYPE type,
                        const X509_NAME *name, X509_OBJECT *ret);
X509_OBJECT *X509_STORE_CTX_get_obj_by_subject(X509_STORE_CTX *vs,
                                X509_LOOKUP_TYPE type,
                                const X509_NAME *name);

int X509_LOOKUP_ctrl(X509_LOOKUP *ctx, int cmd, const char *argc,
                long argl, char **ret);
int X509_LOOKUP_ctrl_ex(X509_LOOKUP *ctx, int cmd, const char *argc, long argl,
```

```
                char **ret, OSSL_LIB_CTX *libctx, const char *propq);

int X509_load_cert_file(X509_LOOKUP *ctx, const char *file, int type);
int X509_load_cert_file_ex(X509_LOOKUP *ctx, const char *file, int type,

        OSSL_LIB_CTX *libctx, const char *propq);
int X509_load_crl_file(X509_LOOKUP *ctx, const char *file, int type);
int X509_load_cert_crl_file(X509_LOOKUP *ctx, const char *file, int type);
int X509_load_cert_crl_file_ex(X509_LOOKUP *ctx, const char *file, int type,
                        OSSL_LIB_CTX *libctx, const char *propq);

X509_LOOKUP *X509_LOOKUP_new(X509_LOOKUP_METHOD *method);
void X509_LOOKUP_free(X509_LOOKUP *ctx);
int X509_LOOKUP_init(X509_LOOKUP *ctx);
int X509_LOOKUP_by_subject(X509_LOOKUP *ctx, X509_LOOKUP_TYPE type,
                    const X509_NAME *name, X509_OBJECT *ret);
int X509_LOOKUP_by_subject_ex(X509_LOOKUP *ctx, X509_LOOKUP_TYPE type,
                        const X509_NAME *name, X509_OBJECT *ret,
                        OSSL_LIB_CTX *libctx, const char *propq);
int X509_LOOKUP_by_issuer_serial(X509_LOOKUP *ctx, X509_LOOKUP_TYPE type,
                          const X509_NAME *name,

 const ASN1_INTEGER *serial,
                          X509_OBJECT *ret);
int X509_LOOKUP_by_fingerprint(X509_LOOKUP *ctx, X509_LOOKUP_TYPE type,
                        const unsigned char *bytes, int len,
                        X509_OBJECT *ret);
int X509_LOOKUP_by_alias(X509_LOOKUP *ctx, X509_LOOKUP_TYPE type,
                    const char *str, int len, X509_OBJECT *ret);
int X509_LOOKUP_set_method_data(X509_LOOKUP *ctx, void *data);
void *X509_LOOKUP_get_method_data(const X509_LOOKUP *ctx);
X509_STORE *X509_LOOKUP_get_store(const X509_LOOKUP *ctx);
int X509_LOOKUP_shutdown(X509_LOOKUP *ctx);

int X509_STORE_load_file(X509_STORE *ctx, const char *file);
int X509_STORE_load_path(X509_STORE *ctx, const char *path);
int X509_STORE_load_store(X509_STORE *ctx, const char *store);
int X509_STORE_load_locations(X509_STORE *ctx,
                                  const char *file,
                                  const char *dir);
int X509_STORE_set_default_paths(X509_STORE
 *ctx);

int X509_STORE_load_file_ex(X509_STORE *ctx, const char *file,
                      OSSL_LIB_CTX *libctx, const char *propq);
int X509_STORE_load_store_ex(X509_STORE *ctx, const char *store,
                      OSSL_LIB_CTX *libctx, const char *propq);
int X509_STORE_load_locations_ex(X509_STORE *ctx, const char *file,
```

```
                        const char *dir, OSSL_LIB_CTX *libctx,
                        const char *propq);
int X509_STORE_set_default_paths_ex(X509_STORE *ctx, OSSL_LIB_CTX *libctx,
                          const char *propq);

#define X509_STORE_CTX_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_X509_STORE_CTX, l, p, newf, dupf, freef)
int X509_STORE_CTX_set_ex_data(X509_STORE_CTX *ctx, int idx, void *data);
void *X509_STORE_CTX_get_ex_data(const X509_STORE_CTX *ctx, int idx);
int X509_STORE_CTX_get_error(const X509_STORE_CTX *ctx);
void X509_STORE_CTX_set_error(X509_STORE_CTX
 *ctx, int s);
int X509_STORE_CTX_get_error_depth(const X509_STORE_CTX *ctx);
void X509_STORE_CTX_set_error_depth(X509_STORE_CTX *ctx, int depth);
X509 *X509_STORE_CTX_get_current_cert(const X509_STORE_CTX *ctx);
void X509_STORE_CTX_set_current_cert(X509_STORE_CTX *ctx, X509 *x);
X509 *X509_STORE_CTX_get0_current_issuer(const X509_STORE_CTX *ctx);
X509_CRL *X509_STORE_CTX_get0_current_crl(const X509_STORE_CTX *ctx);
X509_STORE_CTX *X509_STORE_CTX_get0_parent_ctx(const X509_STORE_CTX *ctx);
STACK_OF(X509) *X509_STORE_CTX_get0_chain(const X509_STORE_CTX *ctx);
STACK_OF(X509) *X509_STORE_CTX_get1_chain(const X509_STORE_CTX *ctx);
void X509_STORE_CTX_set_cert(X509_STORE_CTX *ctx, X509 *target);
void X509_STORE_CTX_set0_verified_chain(X509_STORE_CTX *c, STACK_OF(X509) *sk);
void X509_STORE_CTX_set0_crls(X509_STORE_CTX *ctx, STACK_OF(X509_CRL) *sk);
int X509_STORE_CTX_set_purpose(X509_STORE_CTX *ctx, int purpose);
int X509_STORE_CTX_set_trust(X509_STORE_CTX
 *ctx, int trust);
int X509_STORE_CTX_purpose_inherit(X509_STORE_CTX *ctx, int def_purpose,
                          int purpose, int trust);
void X509_STORE_CTX_set_flags(X509_STORE_CTX *ctx, unsigned long flags);
void X509_STORE_CTX_set_time(X509_STORE_CTX *ctx, unsigned long flags,
                        time_t t);

X509_POLICY_TREE *X509_STORE_CTX_get0_policy_tree(const X509_STORE_CTX *ctx);
int X509_STORE_CTX_get_explicit_policy(const X509_STORE_CTX *ctx);
int X509_STORE_CTX_get_num_untrusted(const X509_STORE_CTX *ctx);

X509_VERIFY_PARAM *X509_STORE_CTX_get0_param(const X509_STORE_CTX *ctx);
void X509_STORE_CTX_set0_param(X509_STORE_CTX *ctx, X509_VERIFY_PARAM *param);
int X509_STORE_CTX_set_default(X509_STORE_CTX *ctx, const char *name);

/*
* Bridge opacity barrier between libcrypt and libssl, also needed to support
* offline testing in test/danetest.c
*/
void X509_STORE_CTX_set0_dane(X509_STORE_CTX *ctx, SSL_DANE *dane);
#define DANE_FLAG_NO_DANE_EE_NAMECHECKS
```

```
(1L << 0)

/* X509_VERIFY_PARAM functions */

X509_VERIFY_PARAM *X509_VERIFY_PARAM_new(void);
void X509_VERIFY_PARAM_free(X509_VERIFY_PARAM *param);
int X509_VERIFY_PARAM_inherit(X509_VERIFY_PARAM *to,
                     const X509_VERIFY_PARAM *from);
int X509_VERIFY_PARAM_set1(X509_VERIFY_PARAM *to,
                    const X509_VERIFY_PARAM *from);
int X509_VERIFY_PARAM_set1_name(X509_VERIFY_PARAM *param, const char *name);
int X509_VERIFY_PARAM_set_flags(X509_VERIFY_PARAM *param,
                      unsigned long flags);
int X509_VERIFY_PARAM_clear_flags(X509_VERIFY_PARAM *param,
                       unsigned long flags);
unsigned long X509_VERIFY_PARAM_get_flags(const X509_VERIFY_PARAM *param);
int X509_VERIFY_PARAM_set_purpose(X509_VERIFY_PARAM *param, int purpose);
int X509_VERIFY_PARAM_set_trust(X509_VERIFY_PARAM *param, int trust);
void X509_VERIFY_PARAM_set_depth(X509_VERIFY_PARAM *param, int depth);
void X509_VERIFY_PARAM_set_auth_level(X509_VERIFY_PARAM
 *param, int auth_level);
time_t X509_VERIFY_PARAM_get_time(const X509_VERIFY_PARAM *param);
void X509_VERIFY_PARAM_set_time(X509_VERIFY_PARAM *param, time_t t);
int X509_VERIFY_PARAM_add0_policy(X509_VERIFY_PARAM *param,
                       ASN1_OBJECT *policy);
int X509_VERIFY_PARAM_set1_policies(X509_VERIFY_PARAM *param,
                       STACK_OF(ASN1_OBJECT) *policies);

int X509_VERIFY_PARAM_set_inh_flags(X509_VERIFY_PARAM *param,
                       uint32_t flags);
uint32_t X509_VERIFY_PARAM_get_inh_flags(const X509_VERIFY_PARAM *param);

char *X509_VERIFY_PARAM_get0_host(X509_VERIFY_PARAM *param, int idx);
int X509_VERIFY_PARAM_set1_host(X509_VERIFY_PARAM *param,
                      const char *name, size_t namelen);
int X509_VERIFY_PARAM_add1_host(X509_VERIFY_PARAM *param,
                      const char *name, size_t namelen);
void X509_VERIFY_PARAM_set_hostflags(X509_VERIFY_PARAM
 *param,
                       unsigned int flags);
unsigned int X509_VERIFY_PARAM_get_hostflags(const X509_VERIFY_PARAM *param);
char *X509_VERIFY_PARAM_get0_peername(const X509_VERIFY_PARAM *param);
void X509_VERIFY_PARAM_move_peername(X509_VERIFY_PARAM *, X509_VERIFY_PARAM *);
char *X509_VERIFY_PARAM_get0_email(X509_VERIFY_PARAM *param);
int X509_VERIFY_PARAM_set1_email(X509_VERIFY_PARAM *param,
                      const char *email, size_t emaillen);
char *X509_VERIFY_PARAM_get1_ip_asc(X509_VERIFY_PARAM *param);
int X509_VERIFY_PARAM_set1_ip(X509_VERIFY_PARAM *param,
```

```
                        const unsigned char *ip, size_t iplen);
int X509_VERIFY_PARAM_set1_ip_asc(X509_VERIFY_PARAM *param,
                          const char *ipasc);

int X509_VERIFY_PARAM_get_depth(const X509_VERIFY_PARAM *param);
int X509_VERIFY_PARAM_get_auth_level(const X509_VERIFY_PARAM *param);
const char *X509_VERIFY_PARAM_get0_name(const X509_VERIFY_PARAM *param);

int
 X509_VERIFY_PARAM_add0_table(X509_VERIFY_PARAM *param);
int X509_VERIFY_PARAM_get_count(void);
const X509_VERIFY_PARAM *X509_VERIFY_PARAM_get0(int id);
const X509_VERIFY_PARAM *X509_VERIFY_PARAM_lookup(const char *name);
void X509_VERIFY_PARAM_table_cleanup(void);

/* Non positive return values are errors */
#define X509_PCY_TREE_FAILURE  -2 /* Failure to satisfy explicit policy */
#define X509_PCY_TREE_INVALID  -1 /* Inconsistent or invalid extensions */
#define X509_PCY_TREE_INTERNAL  0 /* Internal error, most likely malloc */

/*
* Positive return values form a bit mask, all but the first are internal to
* the library and don't appear in results from X509_policy_check().
*/
#define X509_PCY_TREE_VALID     1 /* The policy tree is valid */
#define X509_PCY_TREE_EMPTY     2 /* The policy tree is empty */
#define X509_PCY_TREE_EXPLICIT  4 /* Explicit policy required */

int X509_policy_check(X509_POLICY_TREE **ptree, int *pexplicit_policy,
                      STACK_OF(X509)
 *certs,
                      STACK_OF(ASN1_OBJECT) *policy_oids, unsigned int flags);

void X509_policy_tree_free(X509_POLICY_TREE *tree);

int X509_policy_tree_level_count(const X509_POLICY_TREE *tree);
X509_POLICY_LEVEL *X509_policy_tree_get0_level(const X509_POLICY_TREE *tree,
                                       int i);

STACK_OF(X509_POLICY_NODE)
  *X509_policy_tree_get0_policies(const X509_POLICY_TREE *tree);

STACK_OF(X509_POLICY_NODE)
  *X509_policy_tree_get0_user_policies(const X509_POLICY_TREE *tree);

int X509_policy_level_node_count(X509_POLICY_LEVEL *level);

X509_POLICY_NODE *X509_policy_level_get0_node(const X509_POLICY_LEVEL *level,
```

```
                                int i);

const ASN1_OBJECT *X509_policy_node_get0_policy(const X509_POLICY_NODE *node);

STACK_OF(POLICYQUALINFO)
  *X509_policy_node_get0_qualifiers(const X509_POLICY_NODE *node);
const X509_POLICY_NODE
  *X509_policy_node_get0_parent(const X509_POLICY_NODE *node);

#ifdef  __cplusplus
}
#endif
#endif
```

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```
/*
* WARNING: do not edit!
* Generated by configdata.pm from Configurations/common0.tmpl, Configurations/unix-Makefile.tmpl
* via Makefile.in
*
* Copyright 2016-2021 The OpenSSL Project Authors. All Rights Reserved.
*
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#ifndef OPENSSL_CONFIGURATION_H
# define OPENSSL_CONFIGURATION_H
# pragma once

# ifdef  __cplusplus
extern "C" {
```

```
# endif

# ifdef OPENSSL_ALGORITHM_DEFINES
#  error OPENSSL_ALGORITHM_DEFINES no longer supported
# endif

/*
* OpenSSL was configured with the following options:
*/

# define OPENSSL_CONFIGURED_API 30000
# ifndef OPENSSL_RAND_SEED_OS
#  define OPENSSL_RAND_SEED_OS
# endif
# ifndef OPENSSL_THREADS
#  define OPENSSL_THREADS
# endif
# ifndef OPENSSL_NO_AFALGENG
#  define OPENSSL_NO_AFALGENG
# endif
# ifndef
 OPENSSL_NO_ASAN
#  define OPENSSL_NO_ASAN
# endif
# ifndef OPENSSL_NO_COMP
#  define OPENSSL_NO_COMP
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG
#  define OPENSSL_NO_CRYPTO_MDEBUG
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
#  define OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
# endif
# ifndef OPENSSL_NO_EC_NISTP_64_GCC_128
#  define OPENSSL_NO_EC_NISTP_64_GCC_128
# endif
# ifndef OPENSSL_NO_EGD
#  define OPENSSL_NO_EGD
# endif
# ifndef OPENSSL_NO_EXTERNAL_TESTS
#  define OPENSSL_NO_EXTERNAL_TESTS
# endif
# ifndef OPENSSL_NO_FUZZ_AFL
#  define OPENSSL_NO_FUZZ_AFL
# endif
# ifndef OPENSSL_NO_FUZZ_LIBFUZZER
#  define OPENSSL_NO_FUZZ_LIBFUZZER
# endif
```

```
# ifndef OPENSSL_NO_KTLS
#  define OPENSSL_NO_KTLS
# endif
# ifndef OPENSSL_NO_LOADERENG
#  define OPENSSL_NO_LOADERENG
# endif
# ifndef OPENSSL_NO_MD2
#  define OPENSSL_NO_MD2
# endif
# ifndef OPENSSL_NO_MSAN
#  define OPENSSL_NO_MSAN
# endif
# ifndef OPENSSL_NO_RC5
#  define OPENSSL_NO_RC5
# endif
# ifndef OPENSSL_NO_SCTP
#  define OPENSSL_NO_SCTP
#
 endif
# ifndef OPENSSL_NO_SSL3
#  define OPENSSL_NO_SSL3
# endif
# ifndef OPENSSL_NO_SSL3_METHOD
#  define OPENSSL_NO_SSL3_METHOD
# endif
# ifndef OPENSSL_NO_TRACE
#  define OPENSSL_NO_TRACE
# endif
# ifndef OPENSSL_NO_UBSAN
#  define OPENSSL_NO_UBSAN
# endif
# ifndef OPENSSL_NO_UNIT_TEST
#  define OPENSSL_NO_UNIT_TEST
# endif
# ifndef OPENSSL_NO_UPLINK
#  define OPENSSL_NO_UPLINK
# endif
# ifndef OPENSSL_NO_WEAK_SSL_CIPHERS
#  define OPENSSL_NO_WEAK_SSL_CIPHERS
# endif
# ifndef OPENSSL_NO_DYNAMIC_ENGINE
#  define OPENSSL_NO_DYNAMIC_ENGINE
# endif


/* Generate 80386 code? */
# undef I386_ONLY
```

```
/*
* The following are cipher-specific, but are part of the public API.
*/
# if !defined(OPENSSL_SYS_UEFI)
#  define BN_LLONG
/* Only one for the following should be defined */
#  undef SIXTY_FOUR_BIT_LONG
#  undef SIXTY_FOUR_BIT
#  define THIRTY_TWO_BIT
# endif

# define RC4_INT unsigned int

# ifdef  __cplusplus
}
# endif

#endif                          /* OPENSSL_CONFIGURATION_H
 */
/*
* WARNING: do not edit!
* Generated by Makefile from providers/common/include/prov/der_dsa.h.in
*
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*
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* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#include "internal/der.h"

/* Well known OIDs precompiled */

/*
* id-dsa OBJECT IDENTIFIER ::= {
*      iso(1) member-body(2) us(840) x9-57(10040) x9algorithm(4) 1 }
*/
#define DER_OID_V_id_dsa DER_P_OBJECT, 7, 0x2A, 0x86, 0x48, 0xCE, 0x38, 0x04, 0x01
#define DER_OID_SZ_id_dsa 9
extern const unsigned char ossl_der_oid_id_dsa[DER_OID_SZ_id_dsa];

/*
* id-dsa-with-sha1 OBJECT IDENTIFIER ::=  {
*      iso(1) member-body(2) us(840) x9-57 (10040) x9algorithm(4) 3 }
*/
#define DER_OID_V_id_dsa_with_sha1 DER_P_OBJECT, 7, 0x2A, 0x86, 0x48, 0xCE, 0x38, 0x04,
```

```
 0x03
#define DER_OID_SZ_id_dsa_with_sha1 9
extern const unsigned char ossl_der_oid_id_dsa_with_sha1[DER_OID_SZ_id_dsa_with_sha1];

/*
* id-dsa-with-sha224 OBJECT IDENTIFIER ::= { sigAlgs 1 }
*/
#define DER_OID_V_id_dsa_with_sha224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x03,
0x01
#define DER_OID_SZ_id_dsa_with_sha224 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha224[DER_OID_SZ_id_dsa_with_sha224];

/*
* id-dsa-with-sha256 OBJECT IDENTIFIER ::= { sigAlgs 2 }
*/
#define DER_OID_V_id_dsa_with_sha256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x03,
0x02
#define DER_OID_SZ_id_dsa_with_sha256 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha256[DER_OID_SZ_id_dsa_with_sha256];

/*
* id-dsa-with-sha384 OBJECT IDENTIFIER ::= { sigAlgs 3 }
*/
#define DER_OID_V_id_dsa_with_sha384 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x03,
0x03
#define DER_OID_SZ_id_dsa_with_sha384 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha384[DER_OID_SZ_id_dsa_with_sha384];

/*
 * id-dsa-with-sha512 OBJECT IDENTIFIER ::= { sigAlgs 4 }
*/
#define DER_OID_V_id_dsa_with_sha512 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x03,
0x04
#define DER_OID_SZ_id_dsa_with_sha512 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha512[DER_OID_SZ_id_dsa_with_sha512];

/*
* id-dsa-with-sha3-224 OBJECT IDENTIFIER ::= { sigAlgs 5 }
*/
#define DER_OID_V_id_dsa_with_sha3_224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x05
#define DER_OID_SZ_id_dsa_with_sha3_224 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha3_224[DER_OID_SZ_id_dsa_with_sha3_224];

/*
* id-dsa-with-sha3-256 OBJECT IDENTIFIER ::= { sigAlgs 6 }
*/
#define DER_OID_V_id_dsa_with_sha3_256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
```

```
0x03, 0x06
#define DER_OID_SZ_id_dsa_with_sha3_256 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha3_256[DER_OID_SZ_id_dsa_with_sha3_256];

/*
* id-dsa-with-sha3-384
 OBJECT IDENTIFIER ::= { sigAlgs 7 }
*/
#define DER_OID_V_id_dsa_with_sha3_384 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x07
#define DER_OID_SZ_id_dsa_with_sha3_384 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha3_384[DER_OID_SZ_id_dsa_with_sha3_384];

/*
* id-dsa-with-sha3-512 OBJECT IDENTIFIER ::= { sigAlgs 8 }
*/
#define DER_OID_V_id_dsa_with_sha3_512 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x03, 0x08
#define DER_OID_SZ_id_dsa_with_sha3_512 11
extern const unsigned char ossl_der_oid_id_dsa_with_sha3_512[DER_OID_SZ_id_dsa_with_sha3_512];


/* Subject Public Key Info */
int ossl_DER_w_algorithmIdentifier_DSA(WPACKET *pkt, int tag, DSA *dsa);
/* Signature */
int ossl_DER_w_algorithmIdentifier_DSA_with_MD(WPACKET *pkt, int tag,
                                               DSA *dsa, int mdnid);
/*
* WARNING: do not edit!
* Generated by configdata.pm from Configurations/common0.tmpl, Configurations/unix-Makefile.tmpl
* via Makefile.in
*
* Copyright 2016-2021 The OpenSSL Project Authors. All Rights Reserved.
*
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#ifndef OPENSSL_CONFIGURATION_H
# define OPENSSL_CONFIGURATION_H
# pragma once

# ifdef  __cplusplus
extern "C" {
# endif
```

```
# ifdef OPENSSL_ALGORITHM_DEFINES
#  error OPENSSL_ALGORITHM_DEFINES no longer supported
# endif

/*
* OpenSSL was configured with the following options:
*/

# define OPENSSL_CONFIGURED_API 30000
# ifndef OPENSSL_RAND_SEED_OS
#  define OPENSSL_RAND_SEED_OS
# endif
# ifndef OPENSSL_THREADS
#  define OPENSSL_THREADS
# endif
# ifndef OPENSSL_NO_AFALGENG
#  define OPENSSL_NO_AFALGENG
# endif
# ifndef
 OPENSSL_NO_ASAN
#  define OPENSSL_NO_ASAN
# endif
# ifndef OPENSSL_NO_ASM
#  define OPENSSL_NO_ASM
# endif
# ifndef OPENSSL_NO_COMP
#  define OPENSSL_NO_COMP
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG
#  define OPENSSL_NO_CRYPTO_MDEBUG
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
#  define OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
# endif
# ifndef OPENSSL_NO_EC_NISTP_64_GCC_128
#  define OPENSSL_NO_EC_NISTP_64_GCC_128
# endif
# ifndef OPENSSL_NO_EGD
#  define OPENSSL_NO_EGD
# endif
# ifndef OPENSSL_NO_EXTERNAL_TESTS
#  define OPENSSL_NO_EXTERNAL_TESTS
# endif
# ifndef OPENSSL_NO_FUZZ_AFL
#  define OPENSSL_NO_FUZZ_AFL
# endif
# ifndef OPENSSL_NO_FUZZ_LIBFUZZER
#  define OPENSSL_NO_FUZZ_LIBFUZZER
```

```
# endif
# ifndef OPENSSL_NO_KTLS
#  define OPENSSL_NO_KTLS
# endif
# ifndef OPENSSL_NO_LOADERENG
#  define OPENSSL_NO_LOADERENG
# endif
# ifndef OPENSSL_NO_MD2
#  define OPENSSL_NO_MD2
# endif
# ifndef OPENSSL_NO_MSAN
#  define OPENSSL_NO_MSAN
# endif
# ifndef OPENSSL_NO_RC5
#  define OPENSSL_NO_RC5
#
 endif
# ifndef OPENSSL_NO_SCTP
#  define OPENSSL_NO_SCTP
# endif
# ifndef OPENSSL_NO_SSL3
#  define OPENSSL_NO_SSL3
# endif
# ifndef OPENSSL_NO_SSL3_METHOD
#  define OPENSSL_NO_SSL3_METHOD
# endif
# ifndef OPENSSL_NO_TRACE
#  define OPENSSL_NO_TRACE
# endif
# ifndef OPENSSL_NO_UBSAN
#  define OPENSSL_NO_UBSAN
# endif
# ifndef OPENSSL_NO_UNIT_TEST
#  define OPENSSL_NO_UNIT_TEST
# endif
# ifndef OPENSSL_NO_UPLINK
#  define OPENSSL_NO_UPLINK
# endif
# ifndef OPENSSL_NO_WEAK_SSL_CIPHERS
#  define OPENSSL_NO_WEAK_SSL_CIPHERS
# endif
# ifndef OPENSSL_NO_DYNAMIC_ENGINE
#  define OPENSSL_NO_DYNAMIC_ENGINE
# endif


/* Generate 80386 code? */
# undef I386_ONLY
```

```
/*
* The following are cipher-specific, but are part of the public API.
*/
# if !defined(OPENSSL_SYS_UEFI)
#  undef BN_LLONG
/* Only one for the following should be defined */
#  define SIXTY_FOUR_BIT_LONG
#  undef SIXTY_FOUR_BIT
#  undef THIRTY_TWO_BIT
# endif

# define RC4_INT unsigned int

# ifdef  __cplusplus
}
# endif

#endif
                    /* OPENSSL_CONFIGURATION_H */
/*
* WARNING: do not edit!
* Generated by Makefile from providers/common/include/prov/der_sm2.h.in
*
* Copyright 2020-2021 The OpenSSL Project Authors. All Rights Reserved.
*
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#include "crypto/ec.h"
#include "internal/der.h"

/* Well known OIDs precompiled */

/*
* sm2-with-SM3 OBJECT IDENTIFIER ::= { sm-scheme 501 }
*/
#define DER_OID_V_sm2_with_SM3 DER_P_OBJECT, 8, 0x2A, 0x81, 0x1C, 0xCF, 0x55, 0x01, 0x83, 0x75
#define DER_OID_SZ_sm2_with_SM3 10
extern const unsigned char ossl_der_oid_sm2_with_SM3[DER_OID_SZ_sm2_with_SM3];

/*
* curveSM2 OBJECT IDENTIFIER ::= { sm-scheme 301 }
*/
#define DER_OID_V_curveSM2 DER_P_OBJECT, 8, 0x2A, 0x81, 0x1C, 0xCF, 0x55, 0x01, 0x82, 0x2D
```

```
#define DER_OID_SZ_curveSM2 10
extern const unsigned char
 ossl_der_oid_curveSM2[DER_OID_SZ_curveSM2];


/* Subject Public Key Info */
int ossl_DER_w_algorithmIdentifier_SM2(WPACKET *pkt, int cont, EC_KEY *ec);
/* Signature */
int ossl_DER_w_algorithmIdentifier_SM2_with_MD(WPACKET *pkt, int cont,
                                               EC_KEY *ec, int mdnid);
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/crypto.h.in
*
* Copyright 1995-2022 The OpenSSL Project Authors. All Rights Reserved.
* Copyright (c) 2002, Oracle and/or its affiliates. All rights reserved
*
* Licensed under the Apache License 2.0 (the "License").  You may not use
* this file except in compliance with the License.  You can obtain a copy
* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_CRYPTO_H
# define OPENSSL_CRYPTO_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_CRYPTO_H
# endif

# include <stdlib.h>
# include <time.h>

# include <openssl/e_os2.h>

# ifndef OPENSSL_NO_STDIO
#  include <stdio.h>
# endif

# include <openssl/safestack.h>
# include <openssl/opensslv.h>
# include <openssl/types.h>
# include <openssl/opensslconf.h>
# include <openssl/cryptoerr.h>
```

```
# include <openssl/core.h>

# ifdef CHARSET_EBCDIC
#  include
 <openssl/ebcdic.h>
# endif

/*
* Resolve problems on some operating systems with symbol names that clash
* one way or another
*/
# include <openssl/symhacks.h>

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  include <openssl/opensslv.h>
# endif

#ifdef  __cplusplus
extern "C" {
#endif

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define SSLeay                OpenSSL_version_num
#  define SSLeay_version        OpenSSL_version
#  define SSLEAY_VERSION_NUMBER   OPENSSL_VERSION_NUMBER
#  define SSLEAY_VERSION        OPENSSL_VERSION
#  define SSLEAY_CFLAGS         OPENSSL_CFLAGS
#  define SSLEAY_BUILT_ON       OPENSSL_BUILT_ON
#  define SSLEAY_PLATFORM       OPENSSL_PLATFORM
#  define SSLEAY_DIR            OPENSSL_DIR

/*
* Old type for allocating dynamic locks. No longer used. Use the new thread
* API instead.
*/
typedef struct {
  int dummy;
} CRYPTO_dynlock;

# endif /* OPENSSL_NO_DEPRECATED_1_1_0 */

typedef void CRYPTO_RWLOCK;

CRYPTO_RWLOCK *CRYPTO_THREAD_lock_new(void);
__owur
 int CRYPTO_THREAD_read_lock(CRYPTO_RWLOCK *lock);
__owur int CRYPTO_THREAD_write_lock(CRYPTO_RWLOCK *lock);
int CRYPTO_THREAD_unlock(CRYPTO_RWLOCK *lock);
```

```
void CRYPTO_THREAD_lock_free(CRYPTO_RWLOCK *lock);

int CRYPTO_atomic_add(int *val, int amount, int *ret, CRYPTO_RWLOCK *lock);
int CRYPTO_atomic_or(uint64_t *val, uint64_t op, uint64_t *ret,
                     CRYPTO_RWLOCK *lock);
int CRYPTO_atomic_load(uint64_t *val, uint64_t *ret, CRYPTO_RWLOCK *lock);

/* No longer needed, so this is a no-op */
#define OPENSSL_malloc_init() while(0) continue

# define OPENSSL_malloc(num) \
      CRYPTO_malloc(num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_zalloc(num) \
      CRYPTO_zalloc(num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_realloc(addr, num) \
      CRYPTO_realloc(addr, num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_clear_realloc(addr, old_num, num) \
      CRYPTO_clear_realloc(addr, old_num, num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_clear_free(addr,
 num) \
      CRYPTO_clear_free(addr, num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_free(addr) \
      CRYPTO_free(addr, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_memdup(str, s) \
      CRYPTO_memdup((str), s, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_strdup(str) \
      CRYPTO_strdup(str, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_strndup(str, n) \
      CRYPTO_strndup(str, n, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_secure_malloc(num) \
      CRYPTO_secure_malloc(num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_secure_zalloc(num) \
      CRYPTO_secure_zalloc(num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_secure_free(addr) \
      CRYPTO_secure_free(addr, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_secure_clear_free(addr, num) \
      CRYPTO_secure_clear_free(addr, num, OPENSSL_FILE, OPENSSL_LINE)
# define OPENSSL_secure_actual_size(ptr) \
      CRYPTO_secure_actual_size(ptr)

size_t OPENSSL_strlcpy(char *dst, const char *src, size_t siz);
size_t
 OPENSSL_strlcat(char *dst, const char *src, size_t siz);
size_t OPENSSL_strnlen(const char *str, size_t maxlen);
int OPENSSL_buf2hexstr_ex(char *str, size_t str_n, size_t *strlength,
                          const unsigned char *buf, size_t buflen,
                          const char sep);
char *OPENSSL_buf2hexstr(const unsigned char *buf, long buflen);
```

```
int OPENSSL_hexstr2buf_ex(unsigned char *buf, size_t buf_n, size_t *buflen,
                          const char *str, const char sep);
unsigned char *OPENSSL_hexstr2buf(const char *str, long *buflen);
int OPENSSL_hexchar2int(unsigned char c);
int OPENSSL_strcasecmp(const char *s1, const char *s2);
int OPENSSL_strncasecmp(const char *s1, const char *s2, size_t n);

# define OPENSSL_MALLOC_MAX_NELEMS(type)  (((1U<<(sizeof(int)*8-1))-1)/sizeof(type))

/*
* These functions return the values of OPENSSL_VERSION_MAJOR,
* OPENSSL_VERSION_MINOR, OPENSSL_VERSION_PATCH, OPENSSL_VERSION_PRE_RELEASE
* and OPENSSL_VERSION_BUILD_METADATA,
 respectively.
*/
unsigned int OPENSSL_version_major(void);
unsigned int OPENSSL_version_minor(void);
unsigned int OPENSSL_version_patch(void);
const char *OPENSSL_version_pre_release(void);
const char *OPENSSL_version_build_metadata(void);

unsigned long OpenSSL_version_num(void);
const char *OpenSSL_version(int type);
# define OPENSSL_VERSION              0
# define OPENSSL_CFLAGS               1
# define OPENSSL_BUILT_ON             2
# define OPENSSL_PLATFORM             3
# define OPENSSL_DIR                  4
# define OPENSSL_ENGINES_DIR          5
# define OPENSSL_VERSION_STRING       6
# define OPENSSL_FULL_VERSION_STRING  7
# define OPENSSL_MODULES_DIR          8
# define OPENSSL_CPU_INFO             9

const char *OPENSSL_info(int type);
/*
* The series starts at 1001 to avoid confusion with the OpenSSL_version
* types.
*/
# define OPENSSL_INFO_CONFIG_DIR              1001
# define OPENSSL_INFO_ENGINES_DIR             1002
# define OPENSSL_INFO_MODULES_DIR
            1003
# define OPENSSL_INFO_DSO_EXTENSION           1004
# define OPENSSL_INFO_DIR_FILENAME_SEPARATOR  1005
# define OPENSSL_INFO_LIST_SEPARATOR          1006
# define OPENSSL_INFO_SEED_SOURCE             1007
# define OPENSSL_INFO_CPU_SETTINGS            1008
```

```
int OPENSSL_issetugid(void);

struct crypto_ex_data_st {
  OSSL_LIB_CTX *ctx;
  STACK_OF(void) *sk;
};

SKM_DEFINE_STACK_OF_INTERNAL(void, void, void)
#define sk_void_num(sk) OPENSSL_sk_num(ossl_check_const_void_sk_type(sk))
#define sk_void_value(sk, idx) ((void *)OPENSSL_sk_value(ossl_check_const_void_sk_type(sk), (idx)))
#define sk_void_new(cmp) ((STACK_OF(void) *)OPENSSL_sk_new(ossl_check_void_compfunc_type(cmp)))
#define sk_void_new_null() ((STACK_OF(void) *)OPENSSL_sk_new_null())
#define sk_void_new_reserve(cmp, n) ((STACK_OF(void)
*)OPENSSL_sk_new_reserve(ossl_check_void_compfunc_type(cmp), (n)))
#define sk_void_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_void_sk_type(sk), (n))
#define
 sk_void_free(sk) OPENSSL_sk_free(ossl_check_void_sk_type(sk))
#define sk_void_zero(sk) OPENSSL_sk_zero(ossl_check_void_sk_type(sk))
#define sk_void_delete(sk, i) ((void *)OPENSSL_sk_delete(ossl_check_void_sk_type(sk), (i)))
#define sk_void_delete_ptr(sk, ptr) ((void *)OPENSSL_sk_delete_ptr(ossl_check_void_sk_type(sk),
ossl_check_void_type(ptr)))
#define sk_void_push(sk, ptr) OPENSSL_sk_push(ossl_check_void_sk_type(sk), ossl_check_void_type(ptr))
#define sk_void_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_void_sk_type(sk), ossl_check_void_type(ptr))
#define sk_void_pop(sk) ((void *)OPENSSL_sk_pop(ossl_check_void_sk_type(sk)))
#define sk_void_shift(sk) ((void *)OPENSSL_sk_shift(ossl_check_void_sk_type(sk)))
#define sk_void_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_void_sk_type(sk),ossl_check_void_freefunc_type(freefunc))
#define sk_void_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_void_sk_type(sk), ossl_check_void_type(ptr),
(idx))
#define sk_void_set(sk, idx, ptr) ((void
 *)OPENSSL_sk_set(ossl_check_void_sk_type(sk), (idx), ossl_check_void_type(ptr)))
#define sk_void_find(sk, ptr) OPENSSL_sk_find(ossl_check_void_sk_type(sk), ossl_check_void_type(ptr))
#define sk_void_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_void_sk_type(sk), ossl_check_void_type(ptr))
#define sk_void_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_void_sk_type(sk),
ossl_check_void_type(ptr), pnum)
#define sk_void_sort(sk) OPENSSL_sk_sort(ossl_check_void_sk_type(sk))
#define sk_void_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_void_sk_type(sk))
#define sk_void_dup(sk) ((STACK_OF(void) *)OPENSSL_sk_dup(ossl_check_const_void_sk_type(sk)))
#define sk_void_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(void)
*)OPENSSL_sk_deep_copy(ossl_check_const_void_sk_type(sk), ossl_check_void_copyfunc_type(copyfunc),
ossl_check_void_freefunc_type(freefunc)))
#define sk_void_set_cmp_func(sk, cmp)
((sk_void_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_void_sk_type(sk),
ossl_check_void_compfunc_type(cmp)))
```

```
/*
 * Per class, we have a STACK of function pointers.
*/
# define CRYPTO_EX_INDEX_SSL            0
# define CRYPTO_EX_INDEX_SSL_CTX        1
# define CRYPTO_EX_INDEX_SSL_SESSION    2
# define CRYPTO_EX_INDEX_X509           3
# define CRYPTO_EX_INDEX_X509_STORE     4
# define CRYPTO_EX_INDEX_X509_STORE_CTX 5
# define CRYPTO_EX_INDEX_DH             6
# define CRYPTO_EX_INDEX_DSA            7
# define CRYPTO_EX_INDEX_EC_KEY         8
# define CRYPTO_EX_INDEX_RSA            9
# define CRYPTO_EX_INDEX_ENGINE         10
# define CRYPTO_EX_INDEX_UI             11
# define CRYPTO_EX_INDEX_BIO            12
# define CRYPTO_EX_INDEX_APP            13
# define CRYPTO_EX_INDEX_UI_METHOD      14
# define CRYPTO_EX_INDEX_RAND_DRBG      15
# define CRYPTO_EX_INDEX_DRBG           CRYPTO_EX_INDEX_RAND_DRBG
# define CRYPTO_EX_INDEX_OSSL_LIB_CTX   16
# define CRYPTO_EX_INDEX_EVP_PKEY       17
# define CRYPTO_EX_INDEX__COUNT         18

typedef void
 CRYPTO_EX_new (void *parent, void *ptr, CRYPTO_EX_DATA *ad,
                int idx, long argl, void *argp);
typedef void CRYPTO_EX_free (void *parent, void *ptr, CRYPTO_EX_DATA *ad,
                 int idx, long argl, void *argp);
typedef int CRYPTO_EX_dup (CRYPTO_EX_DATA *to, const CRYPTO_EX_DATA *from,
                void **from_d, int idx, long argl, void *argp);
__owur int CRYPTO_get_ex_new_index(int class_index, long argl, void *argp,
                           CRYPTO_EX_new *new_func,
                           CRYPTO_EX_dup *dup_func,
                           CRYPTO_EX_free *free_func);
/* No longer use an index. */
int CRYPTO_free_ex_index(int class_index, int idx);

/*
* Initialise/duplicate/free CRYPTO_EX_DATA variables corresponding to a
* given class (invokes whatever per-class callbacks are applicable)
*/
int CRYPTO_new_ex_data(int class_index, void *obj, CRYPTO_EX_DATA *ad);
int CRYPTO_dup_ex_data(int class_index,
 CRYPTO_EX_DATA *to,
                const CRYPTO_EX_DATA *from);

void CRYPTO_free_ex_data(int class_index, void *obj, CRYPTO_EX_DATA *ad);
```

```
/* Allocate a single item in the CRYPTO_EX_DATA variable */
int CRYPTO_alloc_ex_data(int class_index, void *obj, CRYPTO_EX_DATA *ad,
                         int idx);

/*
* Get/set data in a CRYPTO_EX_DATA variable corresponding to a particular
* index (relative to the class type involved)
*/
int CRYPTO_set_ex_data(CRYPTO_EX_DATA *ad, int idx, void *val);
void *CRYPTO_get_ex_data(const CRYPTO_EX_DATA *ad, int idx);

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
/*
* This function cleans up all "ex_data" state. It mustn't be called under
* potential race-conditions.
*/
# define CRYPTO_cleanup_all_ex_data() while(0) continue

/*
* The old locking functions have been removed completely without compatibility
* macros. This is because the old functions either could not properly report
* errors, or the returned error values were not clearly
 documented.
* Replacing the locking functions with no-ops would cause race condition
* issues in the affected applications. It is far better for them to fail at
* compile time.
* On the other hand, the locking callbacks are no longer used.  Consequently,
* the callback management functions can be safely replaced with no-op macros.
*/
#  define CRYPTO_num_locks()            (1)
#  define CRYPTO_set_locking_callback(func)
#  define CRYPTO_get_locking_callback()         (NULL)
#  define CRYPTO_set_add_lock_callback(func)
#  define CRYPTO_get_add_lock_callback()        (NULL)

/*
* These defines where used in combination with the old locking callbacks,
* they are not called anymore, but old code that's not called might still
* use them.
*/
#  define CRYPTO_LOCK             1
#  define CRYPTO_UNLOCK           2
#  define CRYPTO_READ             4
#  define CRYPTO_WRITE            8

/* This structure is no longer used */
typedef struct crypto_threadid_st {
```

```
  int dummy;
}
 CRYPTO_THREADID;
/* Only use CRYPTO_THREADID_set_[numeric|pointer]() within callbacks */
#  define CRYPTO_THREADID_set_numeric(id, val)
#  define CRYPTO_THREADID_set_pointer(id, ptr)
#  define CRYPTO_THREADID_set_callback(threadid_func)   (0)
#  define CRYPTO_THREADID_get_callback()              (NULL)
#  define CRYPTO_THREADID_current(id)
#  define CRYPTO_THREADID_cmp(a, b)                   (-1)
#  define CRYPTO_THREADID_cpy(dest, src)
#  define CRYPTO_THREADID_hash(id)                    (0UL)

#  ifndef OPENSSL_NO_DEPRECATED_1_0_0
#   define CRYPTO_set_id_callback(func)
#   define CRYPTO_get_id_callback()                   (NULL)
#   define CRYPTO_thread_id()                         (0UL)
#  endif /* OPENSSL_NO_DEPRECATED_1_0_0 */

#  define CRYPTO_set_dynlock_create_callback(dyn_create_function)
#  define CRYPTO_set_dynlock_lock_callback(dyn_lock_function)
#  define CRYPTO_set_dynlock_destroy_callback(dyn_destroy_function)
#  define CRYPTO_get_dynlock_create_callback()
       (NULL)
#  define CRYPTO_get_dynlock_lock_callback()          (NULL)
#  define CRYPTO_get_dynlock_destroy_callback()       (NULL)
# endif /* OPENSSL_NO_DEPRECATED_1_1_0 */

typedef void *(*CRYPTO_malloc_fn)(size_t num, const char *file, int line);
typedef void *(*CRYPTO_realloc_fn)(void *addr, size_t num, const char *file,
                                   int line);
typedef void (*CRYPTO_free_fn)(void *addr, const char *file, int line);
int CRYPTO_set_mem_functions(CRYPTO_malloc_fn malloc_fn,
                             CRYPTO_realloc_fn realloc_fn,
                             CRYPTO_free_fn free_fn);
void CRYPTO_get_mem_functions(CRYPTO_malloc_fn *malloc_fn,
                              CRYPTO_realloc_fn *realloc_fn,
                              CRYPTO_free_fn *free_fn);

void *CRYPTO_malloc(size_t num, const char *file, int line);
void *CRYPTO_zalloc(size_t num, const char *file, int line);
void *CRYPTO_memdup(const void *str, size_t siz, const char *file, int line);
char
 *CRYPTO_strdup(const char *str, const char *file, int line);
char *CRYPTO_strndup(const char *str, size_t s, const char *file, int line);
void CRYPTO_free(void *ptr, const char *file, int line);
void CRYPTO_clear_free(void *ptr, size_t num, const char *file, int line);
void *CRYPTO_realloc(void *addr, size_t num, const char *file, int line);
```

```
void *CRYPTO_clear_realloc(void *addr, size_t old_num, size_t num,
                           const char *file, int line);

int CRYPTO_secure_malloc_init(size_t sz, size_t minsize);
int CRYPTO_secure_malloc_done(void);
void *CRYPTO_secure_malloc(size_t num, const char *file, int line);
void *CRYPTO_secure_zalloc(size_t num, const char *file, int line);
void CRYPTO_secure_free(void *ptr, const char *file, int line);
void CRYPTO_secure_clear_free(void *ptr, size_t num,
                              const char *file, int line);
int CRYPTO_secure_allocated(const void *ptr);
int CRYPTO_secure_malloc_initialized(void);
size_t CRYPTO_secure_actual_size(void
 *ptr);
size_t CRYPTO_secure_used(void);

void OPENSSL_cleanse(void *ptr, size_t len);

# ifndef OPENSSL_NO_CRYPTO_MDEBUG
/*
* The following can be used to detect memory leaks in the library. If
* used, it turns on malloc checking
*/
# define CRYPTO_MEM_CHECK_OFF     0x0   /* Control only */
# define CRYPTO_MEM_CHECK_ON      0x1   /* Control and mode bit */
# define CRYPTO_MEM_CHECK_ENABLE  0x2   /* Control and mode bit */
# define CRYPTO_MEM_CHECK_DISABLE 0x3   /* Control only */

void CRYPTO_get_alloc_counts(int *mcount, int *rcount, int *fcount);
#  ifndef OPENSSL_NO_DEPRECATED_3_0
#    define OPENSSL_mem_debug_push(info) \
       CRYPTO_mem_debug_push(info, OPENSSL_FILE, OPENSSL_LINE)
#    define OPENSSL_mem_debug_pop() \
       CRYPTO_mem_debug_pop()
#  endif
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 int CRYPTO_set_mem_debug(int flag);
OSSL_DEPRECATEDIN_3_0 int CRYPTO_mem_ctrl(int mode);
OSSL_DEPRECATEDIN_3_0 int CRYPTO_mem_debug_push(const char *info,
                                                const char *file, int line);
OSSL_DEPRECATEDIN_3_0 int CRYPTO_mem_debug_pop(void);
OSSL_DEPRECATEDIN_3_0 void CRYPTO_mem_debug_malloc(void *addr, size_t num,
                                                   int flag,
                                                   const char *file, int line);
OSSL_DEPRECATEDIN_3_0 void CRYPTO_mem_debug_realloc(void *addr1, void *addr2,
                                                    size_t num, int flag,
                                                    const char *file, int line);
OSSL_DEPRECATEDIN_3_0 void CRYPTO_mem_debug_free(void *addr, int flag,
```

```
                                    const char *file, int line);
OSSL_DEPRECATEDIN_3_0
int CRYPTO_mem_leaks_cb(int (*cb)(const char *str, size_t len, void *u),
                        void *u);
#  endif
#  ifndef OPENSSL_NO_STDIO
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 int CRYPTO_mem_leaks_fp(FILE *);
#  endif
#
 endif
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 int CRYPTO_mem_leaks(BIO *bio);
# endif
# endif /* OPENSSL_NO_CRYPTO_MDEBUG */

/* die if we have to */
ossl_noreturn void OPENSSL_die(const char *assertion, const char *file, int line);
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define OpenSSLDie(f,l,a) OPENSSL_die((a),(f),(l))
# endif
# define OPENSSL_assert(e) \
   (void)((e) ? 0 : (OPENSSL_die("assertion failed: " #e, OPENSSL_FILE, OPENSSL_LINE), 1))

int OPENSSL_isservice(void);

void OPENSSL_init(void);
# ifdef OPENSSL_SYS_UNIX
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 void OPENSSL_fork_prepare(void);
OSSL_DEPRECATEDIN_3_0 void OPENSSL_fork_parent(void);
OSSL_DEPRECATEDIN_3_0 void OPENSSL_fork_child(void);
#  endif
# endif

struct tm *OPENSSL_gmtime(const time_t *timer, struct tm *result);
int OPENSSL_gmtime_adj(struct tm *tm, int offset_day, long offset_sec);
int OPENSSL_gmtime_diff(int *pday, int *psec,
                        const struct tm *from, const
 struct tm *to);

/*
* CRYPTO_memcmp returns zero iff the |len| bytes at |a| and |b| are equal.
* It takes an amount of time dependent on |len|, but independent of the
* contents of |a| and |b|. Unlike memcmp, it cannot be used to put elements
* into a defined order as the return value when a != b is undefined, other
* than to be non-zero.
*/
```

```
int CRYPTO_memcmp(const void * in_a, const void * in_b, size_t len);

/* Standard initialisation options */
# define OPENSSL_INIT_NO_LOAD_CRYPTO_STRINGS 0x00000001L
# define OPENSSL_INIT_LOAD_CRYPTO_STRINGS    0x00000002L
# define OPENSSL_INIT_ADD_ALL_CIPHERS        0x00000004L
# define OPENSSL_INIT_ADD_ALL_DIGESTS        0x00000008L
# define OPENSSL_INIT_NO_ADD_ALL_CIPHERS     0x00000010L
# define OPENSSL_INIT_NO_ADD_ALL_DIGESTS     0x00000020L
# define OPENSSL_INIT_LOAD_CONFIG            0x00000040L
# define OPENSSL_INIT_NO_LOAD_CONFIG         0x00000080L
# define OPENSSL_INIT_ASYNC                  0x00000100L
# define OPENSSL_INIT_ENGINE_RDRAND
        0x00000200L
# define OPENSSL_INIT_ENGINE_DYNAMIC         0x00000400L
# define OPENSSL_INIT_ENGINE_OPENSSL         0x00000800L
# define OPENSSL_INIT_ENGINE_CRYPTODEV       0x00001000L
# define OPENSSL_INIT_ENGINE_CAPI            0x00002000L
# define OPENSSL_INIT_ENGINE_PADLOCK         0x00004000L
# define OPENSSL_INIT_ENGINE_AFALG           0x00008000L
/* FREE:                                    0x00010000L */
# define OPENSSL_INIT_ATFORK                 0x00020000L
/* OPENSSL_INIT_BASE_ONLY                   0x00040000L */
# define OPENSSL_INIT_NO_ATEXIT              0x00080000L
/* OPENSSL_INIT flag range 0x03f00000 reserved for OPENSSL_init_ssl() */
/* FREE: 0x04000000L */
/* FREE: 0x08000000L */
/* FREE: 0x10000000L */
/* FREE: 0x20000000L */
/* FREE: 0x40000000L */
/* FREE: 0x80000000L */
/* Max OPENSSL_INIT flag value is 0x80000000 */

/* openssl and dasync not counted as builtin */
# define OPENSSL_INIT_ENGINE_ALL_BUILTIN \
  (OPENSSL_INIT_ENGINE_RDRAND | OPENSSL_INIT_ENGINE_DYNAMIC
 \
  | OPENSSL_INIT_ENGINE_CRYPTODEV | OPENSSL_INIT_ENGINE_CAPI | \
  OPENSSL_INIT_ENGINE_PADLOCK)

/* Library initialisation functions */
void OPENSSL_cleanup(void);
int OPENSSL_init_crypto(uint64_t opts, const OPENSSL_INIT_SETTINGS *settings);
int OPENSSL_atexit(void (*handler)(void));
void OPENSSL_thread_stop(void);
void OPENSSL_thread_stop_ex(OSSL_LIB_CTX *ctx);

/* Low-level control of initialization */
```

```
OPENSSL_INIT_SETTINGS *OPENSSL_INIT_new(void);
# ifndef OPENSSL_NO_STDIO
int OPENSSL_INIT_set_config_filename(OPENSSL_INIT_SETTINGS *settings,
                                     const char *config_filename);
void OPENSSL_INIT_set_config_file_flags(OPENSSL_INIT_SETTINGS *settings,
                                        unsigned long flags);
int OPENSSL_INIT_set_config_appname(OPENSSL_INIT_SETTINGS *settings,
                                    const char *config_appname);
# endif
void OPENSSL_INIT_free(OPENSSL_INIT_SETTINGS *settings);

# if defined(OPENSSL_THREADS)
 && !defined(CRYPTO_TDEBUG)
#  if defined(_WIN32)
#   if defined(BASETYPES) || defined(_WINDEF_H)
/* application has to include <windows.h> in order to use this */
typedef DWORD CRYPTO_THREAD_LOCAL;
typedef DWORD CRYPTO_THREAD_ID;

typedef LONG CRYPTO_ONCE;
#    define CRYPTO_ONCE_STATIC_INIT 0
#   endif
#  else
#   if defined(__TANDEM) && defined(_SPT_MODEL_)
#    define  SPT_THREAD_SIGNAL 1
#    define  SPT_THREAD_AWARE 1
#    include <spthread.h>
#   else
#    include <pthread.h>
#   endif
typedef pthread_once_t CRYPTO_ONCE;
typedef pthread_key_t CRYPTO_THREAD_LOCAL;
typedef pthread_t CRYPTO_THREAD_ID;

#   define CRYPTO_ONCE_STATIC_INIT PTHREAD_ONCE_INIT
#  endif
# endif

# if !defined(CRYPTO_ONCE_STATIC_INIT)
typedef unsigned int CRYPTO_ONCE;
typedef unsigned int CRYPTO_THREAD_LOCAL;
typedef unsigned int CRYPTO_THREAD_ID;
#  define CRYPTO_ONCE_STATIC_INIT 0
# endif

int CRYPTO_THREAD_run_once(CRYPTO_ONCE *once, void (*init)(void));

int CRYPTO_THREAD_init_local(CRYPTO_THREAD_LOCAL
```

```
 *key, void (*cleanup)(void *));
void *CRYPTO_THREAD_get_local(CRYPTO_THREAD_LOCAL *key);
int CRYPTO_THREAD_set_local(CRYPTO_THREAD_LOCAL *key, void *val);
int CRYPTO_THREAD_cleanup_local(CRYPTO_THREAD_LOCAL *key);

CRYPTO_THREAD_ID CRYPTO_THREAD_get_current_id(void);
int CRYPTO_THREAD_compare_id(CRYPTO_THREAD_ID a, CRYPTO_THREAD_ID b);

OSSL_LIB_CTX *OSSL_LIB_CTX_new(void);
OSSL_LIB_CTX *OSSL_LIB_CTX_new_from_dispatch(const OSSL_CORE_HANDLE *handle,
                                             const OSSL_DISPATCH *in);
OSSL_LIB_CTX *OSSL_LIB_CTX_new_child(const OSSL_CORE_HANDLE *handle,
                                     const OSSL_DISPATCH *in);
int OSSL_LIB_CTX_load_config(OSSL_LIB_CTX *ctx, const char *config_file);
void OSSL_LIB_CTX_free(OSSL_LIB_CTX *);
OSSL_LIB_CTX *OSSL_LIB_CTX_get0_global_default(void);
OSSL_LIB_CTX *OSSL_LIB_CTX_set0_default(OSSL_LIB_CTX *libctx);

# ifdef  __cplusplus
}
# endif
#endif
```

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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

```
#include "function.h"

extern int asn1parse_main(int argc, char *argv[]);
extern int ca_main(int argc, char *argv[]);
extern int ciphers_main(int argc, char *argv[]);
extern int cmp_main(int argc, char *argv[]);
extern int cms_main(int argc, char *argv[]);
extern int crl_main(int argc, char *argv[]);
extern int crl2pkcs7_main(int argc, char *argv[]);
extern int dgst_main(int argc, char *argv[]);
extern int dhparam_main(int argc, char *argv[]);
extern int dsa_main(int argc, char *argv[]);
extern int dsaparam_main(int argc, char *argv[]);
extern int ec_main(int argc, char *argv[]);
extern int ecparam_main(int
 argc, char *argv[]);
extern int enc_main(int argc, char *argv[]);
extern int engine_main(int argc, char *argv[]);
extern int errstr_main(int argc, char *argv[]);
extern int fipsinstall_main(int argc, char *argv[]);
extern int gendsa_main(int argc, char *argv[]);
extern int genpkey_main(int argc, char *argv[]);
extern int genrsa_main(int argc, char *argv[]);
extern int help_main(int argc, char *argv[]);
extern int info_main(int argc, char *argv[]);
extern int kdf_main(int argc, char *argv[]);
extern int list_main(int argc, char *argv[]);
extern int mac_main(int argc, char *argv[]);
extern int nseq_main(int argc, char *argv[]);
extern int ocsp_main(int argc, char *argv[]);
extern int passwd_main(int argc, char *argv[]);
extern int pkcs12_main(int argc, char *argv[]);
extern int pkcs7_main(int argc, char *argv[]);
extern int pkcs8_main(int argc, char *argv[]);
extern int pkey_main(int argc, char *argv[]);
extern int pkeyparam_main(int argc, char *argv[]);
extern int pkeyutl_main(int
 argc, char *argv[]);
extern int prime_main(int argc, char *argv[]);
extern int rand_main(int argc, char *argv[]);
extern int rehash_main(int argc, char *argv[]);
extern int req_main(int argc, char *argv[]);
extern int rsa_main(int argc, char *argv[]);
extern int rsautl_main(int argc, char *argv[]);
extern int s_client_main(int argc, char *argv[]);
extern int s_server_main(int argc, char *argv[]);
extern int s_time_main(int argc, char *argv[]);
extern int sess_id_main(int argc, char *argv[]);
```

```
extern int smime_main(int argc, char *argv[]);
extern int speed_main(int argc, char *argv[]);
extern int spkac_main(int argc, char *argv[]);
extern int srp_main(int argc, char *argv[]);
extern int storeutl_main(int argc, char *argv[]);
extern int ts_main(int argc, char *argv[]);
extern int verify_main(int argc, char *argv[]);
extern int version_main(int argc, char *argv[]);
extern int x509_main(int argc, char *argv[]);

extern const OPTIONS asn1parse_options[];
extern const OPTIONS ca_options[];
extern
 const OPTIONS ciphers_options[];
extern const OPTIONS cmp_options[];
extern const OPTIONS cms_options[];
extern const OPTIONS crl_options[];
extern const OPTIONS crl2pkcs7_options[];
extern const OPTIONS dgst_options[];
extern const OPTIONS dhparam_options[];
extern const OPTIONS dsa_options[];
extern const OPTIONS dsaparam_options[];
extern const OPTIONS ec_options[];
extern const OPTIONS ecparam_options[];
extern const OPTIONS enc_options[];
extern const OPTIONS engine_options[];
extern const OPTIONS errstr_options[];
extern const OPTIONS fipsinstall_options[];
extern const OPTIONS gendsa_options[];
extern const OPTIONS genpkey_options[];
extern const OPTIONS genrsa_options[];
extern const OPTIONS help_options[];
extern const OPTIONS info_options[];
extern const OPTIONS kdf_options[];
extern const OPTIONS list_options[];
extern const OPTIONS mac_options[];
extern const OPTIONS nseq_options[];
extern const OPTIONS ocsp_options[];
extern const OPTIONS passwd_options[];
extern
 const OPTIONS pkcs12_options[];
extern const OPTIONS pkcs7_options[];
extern const OPTIONS pkcs8_options[];
extern const OPTIONS pkey_options[];
extern const OPTIONS pkeyparam_options[];
extern const OPTIONS pkeyutl_options[];
extern const OPTIONS prime_options[];
extern const OPTIONS rand_options[];
```

extern const OPTIONS rehash_options[];
extern const OPTIONS req_options[];
extern const OPTIONS rsa_options[];
extern const OPTIONS rsautl_options[];
extern const OPTIONS s_client_options[];
extern const OPTIONS s_server_options[];
extern const OPTIONS s_time_options[];
extern const OPTIONS sess_id_options[];
extern const OPTIONS smime_options[];
extern const OPTIONS speed_options[];
extern const OPTIONS spkac_options[];
extern const OPTIONS srp_options[];
extern const OPTIONS storeutl_options[];
extern const OPTIONS ts_options[];
extern const OPTIONS verify_options[];
extern const OPTIONS version_options[];
extern const OPTIONS x509_options[];

extern FUNCTION functions[];
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```
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*/

#include "internal/der.h"

/* Well known OIDs precompiled */

/*
* sigAlgs OBJECT IDENTIFIER ::= { nistAlgorithms 3 }
*/
#define DER_OID_V_sigAlgs DER_P_OBJECT, 8, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x03
#define DER_OID_SZ_sigAlgs 10
extern const unsigned char ossl_der_oid_sigAlgs[DER_OID_SZ_sigAlgs];

/*
* id-sha1  OBJECT IDENTIFIER  ::=  { iso(1)
*                  identified-organization(3) oiw(14)
*                  secsig(3) algorithms(2) 26 }
*/
#define DER_OID_V_id_sha1 DER_P_OBJECT, 5, 0x2B, 0x0E, 0x03, 0x02, 0x1A
#define DER_OID_SZ_id_sha1
 7
extern const unsigned char ossl_der_oid_id_sha1[DER_OID_SZ_id_sha1];

/*
* id-md2  OBJECT IDENTIFIER ::= {
*   iso(1) member-body(2) us(840) rsadsi(113549) digestAlgorithm(2) 2 }
*/
#define DER_OID_V_id_md2 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x02, 0x02
#define DER_OID_SZ_id_md2 10
extern const unsigned char ossl_der_oid_id_md2[DER_OID_SZ_id_md2];

/*
* id-md5  OBJECT IDENTIFIER ::= {
*   iso(1) member-body(2) us(840) rsadsi(113549) digestAlgorithm(2) 5 }
*/
#define DER_OID_V_id_md5 DER_P_OBJECT, 8, 0x2A, 0x86, 0x48, 0x86, 0xF7, 0x0D, 0x02, 0x05
#define DER_OID_SZ_id_md5 10
extern const unsigned char ossl_der_oid_id_md5[DER_OID_SZ_id_md5];
```

```
/*
* id-sha256 OBJECT IDENTIFIER ::= { hashAlgs 1 }
*/
#define DER_OID_V_id_sha256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x01
#define DER_OID_SZ_id_sha256 11
extern const unsigned char ossl_der_oid_id_sha256[DER_OID_SZ_id_sha256];

/*
* id-sha384 OBJECT IDENTIFIER ::= { hashAlgs
 2 }
*/
#define DER_OID_V_id_sha384 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x02
#define DER_OID_SZ_id_sha384 11
extern const unsigned char ossl_der_oid_id_sha384[DER_OID_SZ_id_sha384];

/*
* id-sha512 OBJECT IDENTIFIER ::= { hashAlgs 3 }
*/
#define DER_OID_V_id_sha512 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x03
#define DER_OID_SZ_id_sha512 11
extern const unsigned char ossl_der_oid_id_sha512[DER_OID_SZ_id_sha512];

/*
* id-sha224 OBJECT IDENTIFIER ::= { hashAlgs 4 }
*/
#define DER_OID_V_id_sha224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x04
#define DER_OID_SZ_id_sha224 11
extern const unsigned char ossl_der_oid_id_sha224[DER_OID_SZ_id_sha224];

/*
* id-sha512-224 OBJECT IDENTIFIER ::= { hashAlgs 5 }
*/
#define DER_OID_V_id_sha512_224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x05
#define DER_OID_SZ_id_sha512_224 11
extern const unsigned char ossl_der_oid_id_sha512_224[DER_OID_SZ_id_sha512_224];

/*
 * id-sha512-256 OBJECT IDENTIFIER ::= { hashAlgs 6 }
*/
#define DER_OID_V_id_sha512_256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x06
#define DER_OID_SZ_id_sha512_256 11
extern const unsigned char ossl_der_oid_id_sha512_256[DER_OID_SZ_id_sha512_256];

/*
* id-sha3-224 OBJECT IDENTIFIER ::= { hashAlgs 7 }
*/
#define DER_OID_V_id_sha3_224 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x07
```

```
#define DER_OID_SZ_id_sha3_224 11
extern const unsigned char ossl_der_oid_id_sha3_224[DER_OID_SZ_id_sha3_224];

/*
* id-sha3-256 OBJECT IDENTIFIER ::= { hashAlgs 8 }
*/
#define DER_OID_V_id_sha3_256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x08
#define DER_OID_SZ_id_sha3_256 11
extern const unsigned char ossl_der_oid_id_sha3_256[DER_OID_SZ_id_sha3_256];

/*
* id-sha3-384 OBJECT IDENTIFIER ::= { hashAlgs 9 }
*/
#define DER_OID_V_id_sha3_384 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x09
#define
 DER_OID_SZ_id_sha3_384 11
extern const unsigned char ossl_der_oid_id_sha3_384[DER_OID_SZ_id_sha3_384];

/*
* id-sha3-512 OBJECT IDENTIFIER ::= { hashAlgs 10 }
*/
#define DER_OID_V_id_sha3_512 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x0A
#define DER_OID_SZ_id_sha3_512 11
extern const unsigned char ossl_der_oid_id_sha3_512[DER_OID_SZ_id_sha3_512];

/*
* id-shake128 OBJECT IDENTIFIER ::= { hashAlgs 11 }
*/
#define DER_OID_V_id_shake128 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x0B
#define DER_OID_SZ_id_shake128 11
extern const unsigned char ossl_der_oid_id_shake128[DER_OID_SZ_id_shake128];

/*
* id-shake256 OBJECT IDENTIFIER ::= { hashAlgs 12 }
*/
#define DER_OID_V_id_shake256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x0C
#define DER_OID_SZ_id_shake256 11
extern const unsigned char ossl_der_oid_id_shake256[DER_OID_SZ_id_shake256];

/*
* id-shake128-len OBJECT IDENTIFIER ::= { hashAlgs 17 }
*/
#define DER_OID_V_id_shake128_len
 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02, 0x11
#define DER_OID_SZ_id_shake128_len 11
extern const unsigned char ossl_der_oid_id_shake128_len[DER_OID_SZ_id_shake128_len];

/*
```

```
* id-shake256-len OBJECT IDENTIFIER ::= { hashAlgs 18 }
*/
#define DER_OID_V_id_shake256_len DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04, 0x02,
0x12
#define DER_OID_SZ_id_shake256_len 11
extern const unsigned char ossl_der_oid_id_shake256_len[DER_OID_SZ_id_shake256_len];

/*
* id-KMACWithSHAKE128 OBJECT IDENTIFIER ::={hashAlgs 19}
*/
#define DER_OID_V_id_KMACWithSHAKE128 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x02, 0x13
#define DER_OID_SZ_id_KMACWithSHAKE128 11
extern const unsigned char ossl_der_oid_id_KMACWithSHAKE128[DER_OID_SZ_id_KMACWithSHAKE128];

/*
* id-KMACWithSHAKE256 OBJECT IDENTIFIER ::={ hashAlgs 20}
*/
#define DER_OID_V_id_KMACWithSHAKE256 DER_P_OBJECT, 9, 0x60, 0x86, 0x48, 0x01, 0x65, 0x03, 0x04,
0x02, 0x14
#define
 DER_OID_SZ_id_KMACWithSHAKE256 11
extern const unsigned char ossl_der_oid_id_KMACWithSHAKE256[DER_OID_SZ_id_KMACWithSHAKE256];
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*/
```

```
#ifndef OPENSSL_BIO_H
# define OPENSSL_BIO_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_BIO_H
# endif

# include <openssl/e_os2.h>

# ifndef OPENSSL_NO_STDIO
#  include <stdio.h>
# endif
# include <stdarg.h>

# include <openssl/crypto.h>
# include <openssl/bioerr.h>
# include <openssl/core.h>

#ifdef  __cplusplus
extern "C" {
#endif

/* There are the classes of BIOs */
# define BIO_TYPE_DESCRIPTOR     0x0100 /* socket, fd, connect or accept */
# define BIO_TYPE_FILTER         0x0200
# define BIO_TYPE_SOURCE_SINK    0x0400

/*
 These are the 'types' of BIOs */
# define BIO_TYPE_NONE            0
# define BIO_TYPE_MEM           ( 1|BIO_TYPE_SOURCE_SINK)
# define BIO_TYPE_FILE          ( 2|BIO_TYPE_SOURCE_SINK)

# define BIO_TYPE_FD            ( 4|BIO_TYPE_SOURCE_SINK|BIO_TYPE_DESCRIPTOR)
# define BIO_TYPE_SOCKET        ( 5|BIO_TYPE_SOURCE_SINK|BIO_TYPE_DESCRIPTOR)
# define BIO_TYPE_NULL          ( 6|BIO_TYPE_SOURCE_SINK)
# define BIO_TYPE_SSL           ( 7|BIO_TYPE_FILTER)
# define BIO_TYPE_MD            ( 8|BIO_TYPE_FILTER)
# define BIO_TYPE_BUFFER        ( 9|BIO_TYPE_FILTER)
# define BIO_TYPE_CIPHER        (10|BIO_TYPE_FILTER)
# define BIO_TYPE_BASE64        (11|BIO_TYPE_FILTER)
# define BIO_TYPE_CONNECT       (12|BIO_TYPE_SOURCE_SINK|BIO_TYPE_DESCRIPTOR)
# define BIO_TYPE_ACCEPT        (13|BIO_TYPE_SOURCE_SINK|BIO_TYPE_DESCRIPTOR)

# define BIO_TYPE_NBIO_TEST     (16|BIO_TYPE_FILTER)/* server proxy BIO */
```

```
# define BIO_TYPE_NULL_FILTER    (17|BIO_TYPE_FILTER)
# define BIO_TYPE_BIO
   (19|BIO_TYPE_SOURCE_SINK)/* half a BIO pair */
# define BIO_TYPE_LINEBUFFER     (20|BIO_TYPE_FILTER)
# define BIO_TYPE_DGRAM          (21|BIO_TYPE_SOURCE_SINK|BIO_TYPE_DESCRIPTOR)
# define BIO_TYPE_ASN1           (22|BIO_TYPE_FILTER)
# define BIO_TYPE_COMP           (23|BIO_TYPE_FILTER)
# ifndef OPENSSL_NO_SCTP
#  define BIO_TYPE_DGRAM_SCTP    (24|BIO_TYPE_SOURCE_SINK|BIO_TYPE_DESCRIPTOR)
# endif
# define BIO_TYPE_CORE_TO_PROV   (25|BIO_TYPE_SOURCE_SINK)

#define BIO_TYPE_START           128

/*
* BIO_FILENAME_READ|BIO_CLOSE to open or close on free.
* BIO_set_fp(in,stdin,BIO_NOCLOSE);
*/
# define BIO_NOCLOSE             0x00
# define BIO_CLOSE               0x01

/*
* These are used in the following macros and are passed to BIO_ctrl()
*/
# define BIO_CTRL_RESET          1/* opt - rewind/zero etc */
# define BIO_CTRL_EOF            2/* opt - are we at the eof */
# define BIO_CTRL_INFO           3/* opt - extra tit-bits */
# define BIO_CTRL_SET            4/* man - set the 'IO'
 type */
# define BIO_CTRL_GET            5/* man - get the 'IO' type */
# define BIO_CTRL_PUSH           6/* opt - internal, used to signify change */
# define BIO_CTRL_POP            7/* opt - internal, used to signify change */
# define BIO_CTRL_GET_CLOSE      8/* man - set the 'close' on free */
# define BIO_CTRL_SET_CLOSE      9/* man - set the 'close' on free */
# define BIO_CTRL_PENDING        10/* opt - is their more data buffered */
# define BIO_CTRL_FLUSH          11/* opt - 'flush' buffered output */
# define BIO_CTRL_DUP            12/* man - extra stuff for 'duped' BIO */
# define BIO_CTRL_WPENDING       13/* opt - number of bytes still to write */
# define BIO_CTRL_SET_CALLBACK   14/* opt - set callback function */
# define BIO_CTRL_GET_CALLBACK   15/* opt - set callback function */

# define BIO_CTRL_PEEK           29/* BIO_f_buffer special */
# define BIO_CTRL_SET_FILENAME   30/* BIO_s_file special */

/* dgram BIO stuff */
# define BIO_CTRL_DGRAM_CONNECT       31/* BIO
 dgram special */
# define BIO_CTRL_DGRAM_SET_CONNECTED 32/* allow for an externally connected
```

```
                                * socket to be passed in */
# define BIO_CTRL_DGRAM_SET_RECV_TIMEOUT 33/* setsockopt, essentially */
# define BIO_CTRL_DGRAM_GET_RECV_TIMEOUT 34/* getsockopt, essentially */
# define BIO_CTRL_DGRAM_SET_SEND_TIMEOUT 35/* setsockopt, essentially */
# define BIO_CTRL_DGRAM_GET_SEND_TIMEOUT 36/* getsockopt, essentially */

# define BIO_CTRL_DGRAM_GET_RECV_TIMER_EXP 37/* flag whether the last */
# define BIO_CTRL_DGRAM_GET_SEND_TIMER_EXP 38/* I/O operation timed out */

/* #ifdef IP_MTU_DISCOVER */
# define BIO_CTRL_DGRAM_MTU_DISCOVER       39/* set DF bit on egress packets */
/* #endif */

# define BIO_CTRL_DGRAM_QUERY_MTU         40/* as kernel for current MTU */
# define BIO_CTRL_DGRAM_GET_FALLBACK_MTU   47
# define BIO_CTRL_DGRAM_GET_MTU           41/* get cached value for MTU */
# define BIO_CTRL_DGRAM_SET_MTU           42/* set cached value for MTU.
                                 * want to use this if asking
                                * the kernel fails */

# define BIO_CTRL_DGRAM_MTU_EXCEEDED       43/* check whether the MTU was
                                * exceed in the previous write
                                * operation */

# define BIO_CTRL_DGRAM_GET_PEER          46
# define BIO_CTRL_DGRAM_SET_PEER          44/* Destination for the data */

# define BIO_CTRL_DGRAM_SET_NEXT_TIMEOUT   45/* Next DTLS handshake timeout
                                * to adjust socket timeouts */
# define BIO_CTRL_DGRAM_SET_DONT_FRAG     48

# define BIO_CTRL_DGRAM_GET_MTU_OVERHEAD   49

/* Deliberately outside of OPENSSL_NO_SCTP - used in bss_dgram.c */
#  define BIO_CTRL_DGRAM_SCTP_SET_IN_HANDSHAKE    50
# ifndef OPENSSL_NO_SCTP
/* SCTP stuff */
#  define BIO_CTRL_DGRAM_SCTP_ADD_AUTH_KEY              51
#  define BIO_CTRL_DGRAM_SCTP_NEXT_AUTH_KEY
        52
#  define BIO_CTRL_DGRAM_SCTP_AUTH_CCS_RCVD             53
#  define BIO_CTRL_DGRAM_SCTP_GET_SNDINFO        60
#  define BIO_CTRL_DGRAM_SCTP_SET_SNDINFO        61
#  define BIO_CTRL_DGRAM_SCTP_GET_RCVINFO        62
#  define BIO_CTRL_DGRAM_SCTP_SET_RCVINFO        63
#  define BIO_CTRL_DGRAM_SCTP_GET_PRINFO              64
#  define BIO_CTRL_DGRAM_SCTP_SET_PRINFO              65
#  define BIO_CTRL_DGRAM_SCTP_SAVE_SHUTDOWN             70
```

```
# endif

# define BIO_CTRL_DGRAM_SET_PEEK_MODE      71

/*
* internal BIO:
* # define BIO_CTRL_SET_KTLS_SEND                72
* # define BIO_CTRL_SET_KTLS_SEND_CTRL_MSG       74
* # define BIO_CTRL_CLEAR_KTLS_CTRL_MSG          75
*/

# define BIO_CTRL_GET_KTLS_SEND               73
# define BIO_CTRL_GET_KTLS_RECV               76

# define BIO_CTRL_DGRAM_SCTP_WAIT_FOR_DRY      77
# define BIO_CTRL_DGRAM_SCTP_MSG_WAITING       78

/* BIO_f_prefix controls */
# define BIO_CTRL_SET_PREFIX                  79
# define
 BIO_CTRL_SET_INDENT                 80
# define BIO_CTRL_GET_INDENT                  81

# ifndef OPENSSL_NO_KTLS
#  define BIO_get_ktls_send(b)        \
   (BIO_ctrl(b, BIO_CTRL_GET_KTLS_SEND, 0, NULL) > 0)
#  define BIO_get_ktls_recv(b)        \
   (BIO_ctrl(b, BIO_CTRL_GET_KTLS_RECV, 0, NULL) > 0)
# else
#  define BIO_get_ktls_send(b)  (0)
#  define BIO_get_ktls_recv(b)  (0)
# endif

/* modifiers */
# define BIO_FP_READ            0x02
# define BIO_FP_WRITE           0x04
# define BIO_FP_APPEND          0x08
# define BIO_FP_TEXT            0x10

# define BIO_FLAGS_READ         0x01
# define BIO_FLAGS_WRITE        0x02
# define BIO_FLAGS_IO_SPECIAL    0x04
# define BIO_FLAGS_RWS (BIO_FLAGS_READ|BIO_FLAGS_WRITE|BIO_FLAGS_IO_SPECIAL)
# define BIO_FLAGS_SHOULD_RETRY  0x08
# ifndef OPENSSL_NO_DEPRECATED_3_0
/* This #define was replaced by an internal constant and should not be used. */
#  define BIO_FLAGS_UPLINK       0
# endif
```

```
# define BIO_FLAGS_BASE64_NO_NL  0x100

/*
 * This is used with memory BIOs:
* BIO_FLAGS_MEM_RDONLY means we shouldn't free up or change the data in any way;
* BIO_FLAGS_NONCLEAR_RST means we shouldn't clear data on reset.
*/
# define BIO_FLAGS_MEM_RDONLY    0x200
# define BIO_FLAGS_NONCLEAR_RST  0x400
# define BIO_FLAGS_IN_EOF        0x800

/* the BIO FLAGS values 0x1000 to 0x4000 are reserved for internal KTLS flags */

typedef union bio_addr_st BIO_ADDR;
typedef struct bio_addrinfo_st BIO_ADDRINFO;

int BIO_get_new_index(void);
void BIO_set_flags(BIO *b, int flags);
int BIO_test_flags(const BIO *b, int flags);
void BIO_clear_flags(BIO *b, int flags);

# define BIO_get_flags(b) BIO_test_flags(b, ~(0x0))
# define BIO_set_retry_special(b) \
            BIO_set_flags(b, (BIO_FLAGS_IO_SPECIAL|BIO_FLAGS_SHOULD_RETRY))
# define BIO_set_retry_read(b) \
            BIO_set_flags(b, (BIO_FLAGS_READ|BIO_FLAGS_SHOULD_RETRY))
# define BIO_set_retry_write(b) \
            BIO_set_flags(b, (BIO_FLAGS_WRITE|BIO_FLAGS_SHOULD_RETRY))

/*
 These are normally used internally in BIOs */
# define BIO_clear_retry_flags(b) \
            BIO_clear_flags(b, (BIO_FLAGS_RWS|BIO_FLAGS_SHOULD_RETRY))
# define BIO_get_retry_flags(b) \
            BIO_test_flags(b, (BIO_FLAGS_RWS|BIO_FLAGS_SHOULD_RETRY))

/* These should be used by the application to tell why we should retry */
# define BIO_should_read(a)              BIO_test_flags(a, BIO_FLAGS_READ)
# define BIO_should_write(a)             BIO_test_flags(a, BIO_FLAGS_WRITE)
# define BIO_should_io_special(a)        BIO_test_flags(a, BIO_FLAGS_IO_SPECIAL)
# define BIO_retry_type(a)               BIO_test_flags(a, BIO_FLAGS_RWS)
# define BIO_should_retry(a)             BIO_test_flags(a, BIO_FLAGS_SHOULD_RETRY)

/*
* The next three are used in conjunction with the BIO_should_io_special()
* condition.  After this returns true, BIO *BIO_get_retry_BIO(BIO *bio, int
* *reason); will walk the BIO stack and return the 'reason' for the special
```

```
* and the offending
 BIO. Given a BIO, BIO_get_retry_reason(bio) will return
* the code.
*/
/*
* Returned from the SSL bio when the certificate retrieval code had an error
*/
# define BIO_RR_SSL_X509_LOOKUP          0x01
/* Returned from the connect BIO when a connect would have blocked */
# define BIO_RR_CONNECT                  0x02
/* Returned from the accept BIO when an accept would have blocked */
# define BIO_RR_ACCEPT                   0x03

/* These are passed by the BIO callback */
# define BIO_CB_FREE     0x01
# define BIO_CB_READ     0x02
# define BIO_CB_WRITE    0x03
# define BIO_CB_PUTS     0x04
# define BIO_CB_GETS     0x05
# define BIO_CB_CTRL     0x06

/*
* The callback is called before and after the underling operation, The
* BIO_CB_RETURN flag indicates if it is after the call
*/
# define BIO_CB_RETURN   0x80
# define BIO_CB_return(a) ((a)|BIO_CB_RETURN)
# define BIO_cb_pre(a)   (!((a)&BIO_CB_RETURN))
# define BIO_cb_post(a)  ((a)&BIO_CB_RETURN)

# ifndef OPENSSL_NO_DEPRECATED_3_0
typedef
 long (*BIO_callback_fn)(BIO *b, int oper, const char *argp, int argi,
                         long argl, long ret);
OSSL_DEPRECATEDIN_3_0 BIO_callback_fn BIO_get_callback(const BIO *b);
OSSL_DEPRECATEDIN_3_0 void BIO_set_callback(BIO *b, BIO_callback_fn callback);
OSSL_DEPRECATEDIN_3_0 long BIO_debug_callback(BIO *bio, int cmd,
                                      const char *argp, int argi,
                                      long argl, long ret);
# endif

typedef long (*BIO_callback_fn_ex)(BIO *b, int oper, const char *argp,
                           size_t len, int argi,
                           long argl, int ret, size_t *processed);
BIO_callback_fn_ex BIO_get_callback_ex(const BIO *b);
void BIO_set_callback_ex(BIO *b, BIO_callback_fn_ex callback);
long BIO_debug_callback_ex(BIO *bio, int oper, const char *argp, size_t len,
                     int argi, long argl, int ret, size_t *processed);
```

```
char *BIO_get_callback_arg(const
 BIO *b);
void BIO_set_callback_arg(BIO *b, char *arg);

typedef struct bio_method_st BIO_METHOD;

const char *BIO_method_name(const BIO *b);
int BIO_method_type(const BIO *b);

typedef int BIO_info_cb(BIO *, int, int);
typedef BIO_info_cb bio_info_cb;  /* backward compatibility */

SKM_DEFINE_STACK_OF_INTERNAL(BIO, BIO, BIO)
#define sk_BIO_num(sk) OPENSSL_sk_num(ossl_check_const_BIO_sk_type(sk))
#define sk_BIO_value(sk, idx) ((BIO *)OPENSSL_sk_value(ossl_check_const_BIO_sk_type(sk), (idx)))
#define sk_BIO_new(cmp) ((STACK_OF(BIO) *)OPENSSL_sk_new(ossl_check_BIO_compfunc_type(cmp)))
#define sk_BIO_new_null() ((STACK_OF(BIO) *)OPENSSL_sk_new_null())
#define sk_BIO_new_reserve(cmp, n) ((STACK_OF(BIO)
*)OPENSSL_sk_new_reserve(ossl_check_BIO_compfunc_type(cmp), (n)))
#define sk_BIO_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_BIO_sk_type(sk), (n))
#define sk_BIO_free(sk) OPENSSL_sk_free(ossl_check_BIO_sk_type(sk))
#define sk_BIO_zero(sk) OPENSSL_sk_zero(ossl_check_BIO_sk_type(sk))
#define
 sk_BIO_delete(sk, i) ((BIO *)OPENSSL_sk_delete(ossl_check_BIO_sk_type(sk), (i)))
#define sk_BIO_delete_ptr(sk, ptr) ((BIO *)OPENSSL_sk_delete_ptr(ossl_check_BIO_sk_type(sk),
ossl_check_BIO_type(ptr)))
#define sk_BIO_push(sk, ptr) OPENSSL_sk_push(ossl_check_BIO_sk_type(sk), ossl_check_BIO_type(ptr))
#define sk_BIO_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_BIO_sk_type(sk), ossl_check_BIO_type(ptr))
#define sk_BIO_pop(sk) ((BIO *)OPENSSL_sk_pop(ossl_check_BIO_sk_type(sk)))
#define sk_BIO_shift(sk) ((BIO *)OPENSSL_sk_shift(ossl_check_BIO_sk_type(sk)))
#define sk_BIO_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_BIO_sk_type(sk),ossl_check_BIO_freefunc_type(freefunc))
#define sk_BIO_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_BIO_sk_type(sk), ossl_check_BIO_type(ptr),
(idx))
#define sk_BIO_set(sk, idx, ptr) ((BIO *)OPENSSL_sk_set(ossl_check_BIO_sk_type(sk), (idx),
ossl_check_BIO_type(ptr)))
#define sk_BIO_find(sk, ptr) OPENSSL_sk_find(ossl_check_BIO_sk_type(sk), ossl_check_BIO_type(ptr))
#define
 sk_BIO_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_BIO_sk_type(sk), ossl_check_BIO_type(ptr))
#define sk_BIO_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_BIO_sk_type(sk),
ossl_check_BIO_type(ptr), pnum)
#define sk_BIO_sort(sk) OPENSSL_sk_sort(ossl_check_BIO_sk_type(sk))
#define sk_BIO_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_BIO_sk_type(sk))
#define sk_BIO_dup(sk) ((STACK_OF(BIO) *)OPENSSL_sk_dup(ossl_check_const_BIO_sk_type(sk)))
#define sk_BIO_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(BIO)
*)OPENSSL_sk_deep_copy(ossl_check_const_BIO_sk_type(sk), ossl_check_BIO_copyfunc_type(copyfunc),
ossl_check_BIO_freefunc_type(freefunc)))
```

```
#define sk_BIO_set_cmp_func(sk, cmp)
((sk_BIO_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_BIO_sk_type(sk),
ossl_check_BIO_compfunc_type(cmp)))



/* Prefix and suffix callback in ASN1 BIO */
typedef int asn1_ps_func (BIO *b, unsigned char **pbuf, int *plen,
                          void *parg);

typedef void
 (*BIO_dgram_sctp_notification_handler_fn) (BIO *b,
                                            void *context,
                                            void *buf);
# ifndef OPENSSL_NO_SCTP
/* SCTP parameter structs */
struct bio_dgram_sctp_sndinfo {
  uint16_t snd_sid;
  uint16_t snd_flags;
  uint32_t snd_ppid;
  uint32_t snd_context;
};

struct bio_dgram_sctp_rcvinfo {
  uint16_t rcv_sid;
  uint16_t rcv_ssn;
  uint16_t rcv_flags;
  uint32_t rcv_ppid;
  uint32_t rcv_tsn;
  uint32_t rcv_cumtsn;
  uint32_t rcv_context;
};

struct bio_dgram_sctp_prinfo {
  uint16_t pr_policy;
  uint32_t pr_value;
};
# endif

/*
* #define BIO_CONN_get_param_hostname BIO_ctrl
*/

# define BIO_C_SET_CONNECT                       100
# define BIO_C_DO_STATE_MACHINE                  101
# define BIO_C_SET_NBIO                          102
/* # define BIO_C_SET_PROXY_PARAM                 103 */
# define BIO_C_SET_FD                            104
```

```
# define
 BIO_C_GET_FD                    105
# define BIO_C_SET_FILE_PTR              106
# define BIO_C_GET_FILE_PTR              107
# define BIO_C_SET_FILENAME              108
# define BIO_C_SET_SSL                   109
# define BIO_C_GET_SSL                   110
# define BIO_C_SET_MD                    111
# define BIO_C_GET_MD                    112
# define BIO_C_GET_CIPHER_STATUS         113
# define BIO_C_SET_BUF_MEM               114
# define BIO_C_GET_BUF_MEM_PTR           115
# define BIO_C_GET_BUFF_NUM_LINES        116
# define BIO_C_SET_BUFF_SIZE             117
# define BIO_C_SET_ACCEPT                118
# define BIO_C_SSL_MODE                  119
# define BIO_C_GET_MD_CTX                120
/* # define BIO_C_GET_PROXY_PARAM          121 */
# define BIO_C_SET_BUFF_READ_DATA        122/* data to read first */
# define BIO_C_GET_CONNECT
                 123
# define BIO_C_GET_ACCEPT                124
# define BIO_C_SET_SSL_RENEGOTIATE_BYTES 125
# define BIO_C_GET_SSL_NUM_RENEGOTIATES  126
# define BIO_C_SET_SSL_RENEGOTIATE_TIMEOUT 127
# define BIO_C_FILE_SEEK                 128
# define BIO_C_GET_CIPHER_CTX            129
# define BIO_C_SET_BUF_MEM_EOF_RETURN    130/* return end of input
                                    * value */
# define BIO_C_SET_BIND_MODE             131
# define BIO_C_GET_BIND_MODE             132
# define BIO_C_FILE_TELL                 133
# define BIO_C_GET_SOCKS                 134
# define BIO_C_SET_SOCKS                 135

# define BIO_C_SET_WRITE_BUF_SIZE        136/* for BIO_s_bio */
# define BIO_C_GET_WRITE_BUF_SIZE        137
# define BIO_C_MAKE_BIO_PAIR             138
# define BIO_C_DESTROY_BIO_PAIR          139
# define BIO_C_GET_WRITE_GUARANTEE
          140
# define BIO_C_GET_READ_REQUEST          141
# define BIO_C_SHUTDOWN_WR               142
# define BIO_C_NREAD0                    143
# define BIO_C_NREAD                     144
# define BIO_C_NWRITE0                   145
# define BIO_C_NWRITE                    146
# define BIO_C_RESET_READ_REQUEST        147
```

```
# define BIO_C_SET_MD_CTX                148

# define BIO_C_SET_PREFIX                149
# define BIO_C_GET_PREFIX                150
# define BIO_C_SET_SUFFIX                151
# define BIO_C_GET_SUFFIX                152

# define BIO_C_SET_EX_ARG                153
# define BIO_C_GET_EX_ARG                154

# define BIO_C_SET_CONNECT_MODE          155

# define BIO_set_app_data(s,arg)         BIO_set_ex_data(s,0,arg)
# define BIO_get_app_data(s)             BIO_get_ex_data(s,0)

# define BIO_set_nbio(b,n)
     BIO_ctrl(b,BIO_C_SET_NBIO,(n),NULL)

# ifndef OPENSSL_NO_SOCK
/* IP families we support, for BIO_s_connect() and BIO_s_accept() */
/* Note: the underlying operating system may not support some of them */
#  define BIO_FAMILY_IPV4                 4
#  define BIO_FAMILY_IPV6                 6
#  define BIO_FAMILY_IPANY                256

/* BIO_s_connect() */
#  define BIO_set_conn_hostname(b,name) BIO_ctrl(b,BIO_C_SET_CONNECT,0, \
                                (char *)(name))
#  define BIO_set_conn_port(b,port)     BIO_ctrl(b,BIO_C_SET_CONNECT,1, \
                                (char *)(port))
#  define BIO_set_conn_address(b,addr)  BIO_ctrl(b,BIO_C_SET_CONNECT,2, \
                                (char *)(addr))
#  define BIO_set_conn_ip_family(b,f)   BIO_int_ctrl(b,BIO_C_SET_CONNECT,3,f)
#  define BIO_get_conn_hostname(b)      ((const char *)BIO_ptr_ctrl(b,BIO_C_GET_CONNECT,0))
#  define BIO_get_conn_port(b)
       ((const char *)BIO_ptr_ctrl(b,BIO_C_GET_CONNECT,1))
#  define BIO_get_conn_address(b)       ((const BIO_ADDR *)BIO_ptr_ctrl(b,BIO_C_GET_CONNECT,2))
#  define BIO_get_conn_ip_family(b)     BIO_ctrl(b,BIO_C_GET_CONNECT,3,NULL)
#  define BIO_set_conn_mode(b,n)        BIO_ctrl(b,BIO_C_SET_CONNECT_MODE,(n),NULL)

/* BIO_s_accept() */
#  define BIO_set_accept_name(b,name)   BIO_ctrl(b,BIO_C_SET_ACCEPT,0, \
                                (char *)(name))
#  define BIO_set_accept_port(b,port)   BIO_ctrl(b,BIO_C_SET_ACCEPT,1, \
                                (char *)(port))
#  define BIO_get_accept_name(b)        ((const char *)BIO_ptr_ctrl(b,BIO_C_GET_ACCEPT,0))
#  define BIO_get_accept_port(b)        ((const char *)BIO_ptr_ctrl(b,BIO_C_GET_ACCEPT,1))
#  define BIO_get_peer_name(b)          ((const char *)BIO_ptr_ctrl(b,BIO_C_GET_ACCEPT,2))
```

```
#  define BIO_get_peer_port(b)         ((const char *)BIO_ptr_ctrl(b,BIO_C_GET_ACCEPT,3))
/* #define
 BIO_set_nbio(b,n)    BIO_ctrl(b,BIO_C_SET_NBIO,(n),NULL) */
#  define BIO_set_nbio_accept(b,n)      BIO_ctrl(b,BIO_C_SET_ACCEPT,2,(n)?(void *)"a":NULL)
#  define BIO_set_accept_bios(b,bio)    BIO_ctrl(b,BIO_C_SET_ACCEPT,3, \
                                    (char *)(bio))
#  define BIO_set_accept_ip_family(b,f) BIO_int_ctrl(b,BIO_C_SET_ACCEPT,4,f)
#  define BIO_get_accept_ip_family(b)   BIO_ctrl(b,BIO_C_GET_ACCEPT,4,NULL)

/* Aliases kept for backward compatibility */
#  define BIO_BIND_NORMAL                 0
#  define BIO_BIND_REUSEADDR              BIO_SOCK_REUSEADDR
#  define BIO_BIND_REUSEADDR_IF_UNUSED    BIO_SOCK_REUSEADDR
#  define BIO_set_bind_mode(b,mode) BIO_ctrl(b,BIO_C_SET_BIND_MODE,mode,NULL)
#  define BIO_get_bind_mode(b)    BIO_ctrl(b,BIO_C_GET_BIND_MODE,0,NULL)
# endif /* OPENSSL_NO_SOCK */

# define BIO_do_connect(b)       BIO_do_handshake(b)
# define BIO_do_accept(b)        BIO_do_handshake(b)

# define BIO_do_handshake(b)     BIO_ctrl(b,BIO_C_DO_STATE_MACHINE,0,NULL)

/*
 BIO_s_datagram(), BIO_s_fd(), BIO_s_socket(), BIO_s_accept() and BIO_s_connect() */
# define BIO_set_fd(b,fd,c)      BIO_int_ctrl(b,BIO_C_SET_FD,c,fd)
# define BIO_get_fd(b,c)         BIO_ctrl(b,BIO_C_GET_FD,0,(char *)(c))

/* BIO_s_file() */
# define BIO_set_fp(b,fp,c)      BIO_ctrl(b,BIO_C_SET_FILE_PTR,c,(char *)(fp))
# define BIO_get_fp(b,fpp)       BIO_ctrl(b,BIO_C_GET_FILE_PTR,0,(char *)(fpp))

/* BIO_s_fd() and BIO_s_file() */
# define BIO_seek(b,ofs) (int)BIO_ctrl(b,BIO_C_FILE_SEEK,ofs,NULL)
# define BIO_tell(b)     (int)BIO_ctrl(b,BIO_C_FILE_TELL,0,NULL)

/*
* name is cast to lose const, but might be better to route through a
* function so we can do it safely
*/
# ifdef CONST_STRICT
/*
* If you are wondering why this isn't defined, its because CONST_STRICT is
* purely a compile-time kludge to allow const to be checked.
*/
int BIO_read_filename(BIO *b, const char *name);
# else
#  define BIO_read_filename(b,name) (int)BIO_ctrl(b,BIO_C_SET_FILENAME,
```

```
 \
        BIO_CLOSE|BIO_FP_READ,(char *)(name))
# endif
# define BIO_write_filename(b,name) (int)BIO_ctrl(b,BIO_C_SET_FILENAME, \
        BIO_CLOSE|BIO_FP_WRITE,name)
# define BIO_append_filename(b,name) (int)BIO_ctrl(b,BIO_C_SET_FILENAME, \
        BIO_CLOSE|BIO_FP_APPEND,name)
# define BIO_rw_filename(b,name) (int)BIO_ctrl(b,BIO_C_SET_FILENAME, \
        BIO_CLOSE|BIO_FP_READ|BIO_FP_WRITE,name)

/*
* WARNING WARNING, this ups the reference count on the read bio of the SSL
* structure.  This is because the ssl read BIO is now pointed to by the
* next_bio field in the bio.  So when you free the BIO, make sure you are
* doing a BIO_free_all() to catch the underlying BIO.
*/
# define BIO_set_ssl(b,ssl,c)    BIO_ctrl(b,BIO_C_SET_SSL,c,(char *)(ssl))
# define BIO_get_ssl(b,sslp)     BIO_ctrl(b,BIO_C_GET_SSL,0,(char *)(sslp))
# define BIO_set_ssl_mode(b,client)      BIO_ctrl(b,BIO_C_SSL_MODE,client,NULL)
# define BIO_set_ssl_renegotiate_bytes(b,num) \

     BIO_ctrl(b,BIO_C_SET_SSL_RENEGOTIATE_BYTES,num,NULL)
# define BIO_get_num_renegotiates(b) \
     BIO_ctrl(b,BIO_C_GET_SSL_NUM_RENEGOTIATES,0,NULL)
# define BIO_set_ssl_renegotiate_timeout(b,seconds) \
     BIO_ctrl(b,BIO_C_SET_SSL_RENEGOTIATE_TIMEOUT,seconds,NULL)

/* defined in evp.h */
/* #define BIO_set_md(b,md)     BIO_ctrl(b,BIO_C_SET_MD,1,(char *)(md)) */

# define BIO_get_mem_data(b,pp)  BIO_ctrl(b,BIO_CTRL_INFO,0,(char *)(pp))
# define BIO_set_mem_buf(b,bm,c) BIO_ctrl(b,BIO_C_SET_BUF_MEM,c,(char *)(bm))
# define BIO_get_mem_ptr(b,pp)   BIO_ctrl(b,BIO_C_GET_BUF_MEM_PTR,0, \
                                 (char *)(pp))
# define BIO_set_mem_eof_return(b,v) \
                       BIO_ctrl(b,BIO_C_SET_BUF_MEM_EOF_RETURN,v,NULL)

/* For the BIO_f_buffer() type */
# define BIO_get_buffer_num_lines(b)     BIO_ctrl(b,BIO_C_GET_BUFF_NUM_LINES,0,NULL)
# define BIO_set_buffer_size(b,size)     BIO_ctrl(b,BIO_C_SET_BUFF_SIZE,size,NULL)
# define BIO_set_read_buffer_size(b,size)
 BIO_int_ctrl(b,BIO_C_SET_BUFF_SIZE,size,0)
# define BIO_set_write_buffer_size(b,size) BIO_int_ctrl(b,BIO_C_SET_BUFF_SIZE,size,1)
# define BIO_set_buffer_read_data(b,buf,num) BIO_ctrl(b,BIO_C_SET_BUFF_READ_DATA,num,buf)

/* Don't use the next one unless you know what you are doing :-) */
# define BIO_dup_state(b,ret)    BIO_ctrl(b,BIO_CTRL_DUP,0,(char *)(ret))
```

```
# define BIO_reset(b)           (int)BIO_ctrl(b,BIO_CTRL_RESET,0,NULL)
# define BIO_eof(b)             (int)BIO_ctrl(b,BIO_CTRL_EOF,0,NULL)
# define BIO_set_close(b,c)      (int)BIO_ctrl(b,BIO_CTRL_SET_CLOSE,(c),NULL)
# define BIO_get_close(b)        (int)BIO_ctrl(b,BIO_CTRL_GET_CLOSE,0,NULL)
# define BIO_pending(b)          (int)BIO_ctrl(b,BIO_CTRL_PENDING,0,NULL)
# define BIO_wpending(b)         (int)BIO_ctrl(b,BIO_CTRL_WPENDING,0,NULL)
/* ...pending macros have inappropriate return type */
size_t BIO_ctrl_pending(BIO *b);
size_t BIO_ctrl_wpending(BIO *b);
# define BIO_flush(b)           (int)BIO_ctrl(b,BIO_CTRL_FLUSH,0,NULL)
#
 define BIO_get_info_callback(b,cbp) (int)BIO_ctrl(b,BIO_CTRL_GET_CALLBACK,0, \
                                     cbp)
# define BIO_set_info_callback(b,cb) (int)BIO_callback_ctrl(b,BIO_CTRL_SET_CALLBACK,cb)

/* For the BIO_f_buffer() type */
# define BIO_buffer_get_num_lines(b) BIO_ctrl(b,BIO_CTRL_GET,0,NULL)
# define BIO_buffer_peek(b,s,l) BIO_ctrl(b,BIO_CTRL_PEEK,(l),(s))

/* For BIO_s_bio() */
# define BIO_set_write_buf_size(b,size) (int)BIO_ctrl(b,BIO_C_SET_WRITE_BUF_SIZE,size,NULL)
# define BIO_get_write_buf_size(b,size) (size_t)BIO_ctrl(b,BIO_C_GET_WRITE_BUF_SIZE,size,NULL)
# define BIO_make_bio_pair(b1,b2)   (int)BIO_ctrl(b1,BIO_C_MAKE_BIO_PAIR,0,b2)
# define BIO_destroy_bio_pair(b)    (int)BIO_ctrl(b,BIO_C_DESTROY_BIO_PAIR,0,NULL)
# define BIO_shutdown_wr(b) (int)BIO_ctrl(b, BIO_C_SHUTDOWN_WR, 0, NULL)
/* macros with inappropriate type -- but ...pending macros use int too: */
# define BIO_get_write_guarantee(b) (int)BIO_ctrl(b,BIO_C_GET_WRITE_GUARANTEE,0,NULL)
#
 define BIO_get_read_request(b)    (int)BIO_ctrl(b,BIO_C_GET_READ_REQUEST,0,NULL)
size_t BIO_ctrl_get_write_guarantee(BIO *b);
size_t BIO_ctrl_get_read_request(BIO *b);
int BIO_ctrl_reset_read_request(BIO *b);

/* ctrl macros for dgram */
# define BIO_ctrl_dgram_connect(b,peer)  \
                (int)BIO_ctrl(b,BIO_CTRL_DGRAM_CONNECT,0, (char *)(peer))
# define BIO_ctrl_set_connected(b,peer) \
        (int)BIO_ctrl(b, BIO_CTRL_DGRAM_SET_CONNECTED, 0, (char *)(peer))
# define BIO_dgram_recv_timedout(b) \
        (int)BIO_ctrl(b, BIO_CTRL_DGRAM_GET_RECV_TIMER_EXP, 0, NULL)
# define BIO_dgram_send_timedout(b) \
        (int)BIO_ctrl(b, BIO_CTRL_DGRAM_GET_SEND_TIMER_EXP, 0, NULL)
# define BIO_dgram_get_peer(b,peer) \
        (int)BIO_ctrl(b, BIO_CTRL_DGRAM_GET_PEER, 0, (char *)(peer))
# define BIO_dgram_set_peer(b,peer) \
        (int)BIO_ctrl(b, BIO_CTRL_DGRAM_SET_PEER, 0, (char *)(peer))
# define BIO_dgram_get_mtu_overhead(b) \
        (unsigned int)BIO_ctrl((b),
```

```
 BIO_CTRL_DGRAM_GET_MTU_OVERHEAD, 0, NULL)

/* ctrl macros for BIO_f_prefix */
# define BIO_set_prefix(b,p) BIO_ctrl((b), BIO_CTRL_SET_PREFIX, 0, (void *)(p))
# define BIO_set_indent(b,i) BIO_ctrl((b), BIO_CTRL_SET_INDENT, (i), NULL)
# define BIO_get_indent(b) BIO_ctrl((b), BIO_CTRL_GET_INDENT, 0, NULL)

#define BIO_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_BIO, l, p, newf, dupf, freef)
int BIO_set_ex_data(BIO *bio, int idx, void *data);
void *BIO_get_ex_data(const BIO *bio, int idx);
uint64_t BIO_number_read(BIO *bio);
uint64_t BIO_number_written(BIO *bio);

/* For BIO_f_asn1() */
int BIO_asn1_set_prefix(BIO *b, asn1_ps_func *prefix,
                        asn1_ps_func *prefix_free);
int BIO_asn1_get_prefix(BIO *b, asn1_ps_func **pprefix,
                        asn1_ps_func **pprefix_free);
int BIO_asn1_set_suffix(BIO *b, asn1_ps_func *suffix,
                        asn1_ps_func *suffix_free);
int BIO_asn1_get_suffix(BIO *b,
 asn1_ps_func **psuffix,
                        asn1_ps_func **psuffix_free);

const BIO_METHOD *BIO_s_file(void);
BIO *BIO_new_file(const char *filename, const char *mode);
BIO *BIO_new_from_core_bio(OSSL_LIB_CTX *libctx, OSSL_CORE_BIO *corebio);
# ifndef OPENSSL_NO_STDIO
BIO *BIO_new_fp(FILE *stream, int close_flag);
# endif
BIO *BIO_new_ex(OSSL_LIB_CTX *libctx, const BIO_METHOD *method);
BIO *BIO_new(const BIO_METHOD *type);
int BIO_free(BIO *a);
void BIO_set_data(BIO *a, void *ptr);
void *BIO_get_data(BIO *a);
void BIO_set_init(BIO *a, int init);
int BIO_get_init(BIO *a);
void BIO_set_shutdown(BIO *a, int shut);
int BIO_get_shutdown(BIO *a);
void BIO_vfree(BIO *a);
int BIO_up_ref(BIO *a);
int BIO_read(BIO *b, void *data, int dlen);
int BIO_read_ex(BIO *b, void *data, size_t dlen, size_t *readbytes);
int BIO_gets(BIO *bp, char *buf, int size);
int BIO_get_line(BIO *bio, char *buf, int size);
int BIO_write(BIO *b, const void *data, int dlen);
int BIO_write_ex(BIO *b, const void *data,
```

```
 size_t dlen, size_t *written);
int BIO_puts(BIO *bp, const char *buf);
int BIO_indent(BIO *b, int indent, int max);
long BIO_ctrl(BIO *bp, int cmd, long larg, void *parg);
long BIO_callback_ctrl(BIO *b, int cmd, BIO_info_cb *fp);
void *BIO_ptr_ctrl(BIO *bp, int cmd, long larg);
long BIO_int_ctrl(BIO *bp, int cmd, long larg, int iarg);
BIO *BIO_push(BIO *b, BIO *append);
BIO *BIO_pop(BIO *b);
void BIO_free_all(BIO *a);
BIO *BIO_find_type(BIO *b, int bio_type);
BIO *BIO_next(BIO *b);
void BIO_set_next(BIO *b, BIO *next);
BIO *BIO_get_retry_BIO(BIO *bio, int *reason);
int BIO_get_retry_reason(BIO *bio);
void BIO_set_retry_reason(BIO *bio, int reason);
BIO *BIO_dup_chain(BIO *in);

int BIO_nread0(BIO *bio, char **buf);
int BIO_nread(BIO *bio, char **buf, int num);
int BIO_nwrite0(BIO *bio, char **buf);
int BIO_nwrite(BIO *bio, char **buf, int num);

const BIO_METHOD *BIO_s_mem(void);
const BIO_METHOD *BIO_s_secmem(void);
BIO *BIO_new_mem_buf(const void *buf, int len);
# ifndef OPENSSL_NO_SOCK
const
 BIO_METHOD *BIO_s_socket(void);
const BIO_METHOD *BIO_s_connect(void);
const BIO_METHOD *BIO_s_accept(void);
# endif
const BIO_METHOD *BIO_s_fd(void);
const BIO_METHOD *BIO_s_log(void);
const BIO_METHOD *BIO_s_bio(void);
const BIO_METHOD *BIO_s_null(void);
const BIO_METHOD *BIO_f_null(void);
const BIO_METHOD *BIO_f_buffer(void);
const BIO_METHOD *BIO_f_readbuffer(void);
const BIO_METHOD *BIO_f_linebuffer(void);
const BIO_METHOD *BIO_f_nbio_test(void);
const BIO_METHOD *BIO_f_prefix(void);
const BIO_METHOD *BIO_s_core(void);
# ifndef OPENSSL_NO_DGRAM
const BIO_METHOD *BIO_s_datagram(void);
int BIO_dgram_non_fatal_error(int error);
BIO *BIO_new_dgram(int fd, int close_flag);
#  ifndef OPENSSL_NO_SCTP
```

```
const BIO_METHOD *BIO_s_datagram_sctp(void);
BIO *BIO_new_dgram_sctp(int fd, int close_flag);
int BIO_dgram_is_sctp(BIO *bio);
int BIO_dgram_sctp_notification_cb(BIO *b,
            BIO_dgram_sctp_notification_handler_fn handle_notifications,
            void *context);
int
 BIO_dgram_sctp_wait_for_dry(BIO *b);
int BIO_dgram_sctp_msg_waiting(BIO *b);
#  endif
# endif

# ifndef OPENSSL_NO_SOCK
int BIO_sock_should_retry(int i);
int BIO_sock_non_fatal_error(int error);
int BIO_socket_wait(int fd, int for_read, time_t max_time);
# endif
int BIO_wait(BIO *bio, time_t max_time, unsigned int nap_milliseconds);
int BIO_do_connect_retry(BIO *bio, int timeout, int nap_milliseconds);

int BIO_fd_should_retry(int i);
int BIO_fd_non_fatal_error(int error);
int BIO_dump_cb(int (*cb) (const void *data, size_t len, void *u),
            void *u, const void *s, int len);
int BIO_dump_indent_cb(int (*cb) (const void *data, size_t len, void *u),
                void *u, const void *s, int len, int indent);
int BIO_dump(BIO *b, const void *bytes, int len);
int BIO_dump_indent(BIO *b, const void *bytes, int len, int indent);
# ifndef OPENSSL_NO_STDIO
int BIO_dump_fp(FILE *fp, const void *s, int len);
int BIO_dump_indent_fp(FILE *fp, const void *s, int len, int indent);
#
 endif
int BIO_hex_string(BIO *out, int indent, int width, const void *data,
               int datalen);

# ifndef OPENSSL_NO_SOCK
BIO_ADDR *BIO_ADDR_new(void);
int BIO_ADDR_rawmake(BIO_ADDR *ap, int family,
                const void *where, size_t wherelen, unsigned short port);
void BIO_ADDR_free(BIO_ADDR *);
void BIO_ADDR_clear(BIO_ADDR *ap);
int BIO_ADDR_family(const BIO_ADDR *ap);
int BIO_ADDR_rawaddress(const BIO_ADDR *ap, void *p, size_t *l);
unsigned short BIO_ADDR_rawport(const BIO_ADDR *ap);
char *BIO_ADDR_hostname_string(const BIO_ADDR *ap, int numeric);
char *BIO_ADDR_service_string(const BIO_ADDR *ap, int numeric);
char *BIO_ADDR_path_string(const BIO_ADDR *ap);
```

```
const BIO_ADDRINFO *BIO_ADDRINFO_next(const BIO_ADDRINFO *bai);
int BIO_ADDRINFO_family(const BIO_ADDRINFO *bai);
int BIO_ADDRINFO_socktype(const BIO_ADDRINFO *bai);
int BIO_ADDRINFO_protocol(const BIO_ADDRINFO *bai);
const BIO_ADDR *BIO_ADDRINFO_address(const BIO_ADDRINFO *bai);
void BIO_ADDRINFO_free(BIO_ADDRINFO
 *bai);

enum BIO_hostserv_priorities {
  BIO_PARSE_PRIO_HOST, BIO_PARSE_PRIO_SERV
};
int BIO_parse_hostserv(const char *hostserv, char **host, char **service,
                       enum BIO_hostserv_priorities hostserv_prio);
enum BIO_lookup_type {
  BIO_LOOKUP_CLIENT, BIO_LOOKUP_SERVER
};
int BIO_lookup(const char *host, const char *service,
               enum BIO_lookup_type lookup_type,
               int family, int socktype, BIO_ADDRINFO **res);
int BIO_lookup_ex(const char *host, const char *service,
                  int lookup_type, int family, int socktype, int protocol,
                  BIO_ADDRINFO **res);
int BIO_sock_error(int sock);
int BIO_socket_ioctl(int fd, long type, void *arg);
int BIO_socket_nbio(int fd, int mode);
int BIO_sock_init(void);
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define BIO_sock_cleanup() while(0) continue
# endif
int BIO_set_tcp_ndelay(int sock, int turn_on);
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 struct
 hostent *BIO_gethostbyname(const char *name);
OSSL_DEPRECATEDIN_1_1_0 int BIO_get_port(const char *str, unsigned short *port_ptr);
OSSL_DEPRECATEDIN_1_1_0 int BIO_get_host_ip(const char *str, unsigned char *ip);
OSSL_DEPRECATEDIN_1_1_0 int BIO_get_accept_socket(char *host_port, int mode);
OSSL_DEPRECATEDIN_1_1_0 int BIO_accept(int sock, char **ip_port);
# endif

union BIO_sock_info_u {
  BIO_ADDR *addr;
};
enum BIO_sock_info_type {
  BIO_SOCK_INFO_ADDRESS
};
int BIO_sock_info(int sock,
                  enum BIO_sock_info_type type, union BIO_sock_info_u *info);
```

```
#  define BIO_SOCK_REUSEADDR    0x01
#  define BIO_SOCK_V6_ONLY      0x02
#  define BIO_SOCK_KEEPALIVE    0x04
#  define BIO_SOCK_NONBLOCK     0x08
#  define BIO_SOCK_NODELAY      0x10

int BIO_socket(int domain, int socktype, int protocol, int options);
int BIO_connect(int sock, const BIO_ADDR *addr, int options);
int BIO_bind(int sock, const BIO_ADDR *addr, int options);
int BIO_listen(int sock, const BIO_ADDR *addr,
 int options);
int BIO_accept_ex(int accept_sock, BIO_ADDR *addr, int options);
int BIO_closesocket(int sock);

BIO *BIO_new_socket(int sock, int close_flag);
BIO *BIO_new_connect(const char *host_port);
BIO *BIO_new_accept(const char *host_port);
# endif /* OPENSSL_NO_SOCK*/

BIO *BIO_new_fd(int fd, int close_flag);

int BIO_new_bio_pair(BIO **bio1, size_t writebuf1,
                     BIO **bio2, size_t writebuf2);
/*
* If successful, returns 1 and in *bio1, *bio2 two BIO pair endpoints.
* Otherwise returns 0 and sets *bio1 and *bio2 to NULL. Size 0 uses default
* value.
*/

void BIO_copy_next_retry(BIO *b);

/*
* long BIO_ghbn_ctrl(int cmd,int iarg,char *parg);
*/

# define ossl_bio__attr__(x)
# if defined(__GNUC__) && defined(__STDC_VERSION__) \
   && !defined(__MINGW32__) && !defined(__MINGW64__) \
   && !defined(__APPLE__)
   /*
    * Because we support the 'z' modifier, which made its appearance in C99,
    * we can't use __attribute__ with pre C99 dialects.

 */
#  if __STDC_VERSION__ >= 199901L
#   undef ossl_bio__attr__
#   define ossl_bio__attr__ __attribute__
```

```
#   if __GNUC__*10 + __GNUC_MINOR__ >= 44
#    define ossl_bio__printf__ __gnu_printf__
#   else
#    define ossl_bio__printf__ __printf__
#   endif
#  endif
# endif
int BIO_printf(BIO *bio, const char *format, ...)
ossl_bio__attr__((__format__(ossl_bio__printf__, 2, 3)));
int BIO_vprintf(BIO *bio, const char *format, va_list args)
ossl_bio__attr__((__format__(ossl_bio__printf__, 2, 0)));
int BIO_snprintf(char *buf, size_t n, const char *format, ...)
ossl_bio__attr__((__format__(ossl_bio__printf__, 3, 4)));
int BIO_vsnprintf(char *buf, size_t n, const char *format, va_list args)
ossl_bio__attr__((__format__(ossl_bio__printf__, 3, 0)));
# undef ossl_bio__attr__
# undef ossl_bio__printf__


BIO_METHOD *BIO_meth_new(int type, const char *name);
void BIO_meth_free(BIO_METHOD *biom);
int (*BIO_meth_get_write(const BIO_METHOD *biom)) (BIO *, const char *, int);
int (*BIO_meth_get_write_ex(const
 BIO_METHOD *biom)) (BIO *, const char *, size_t,
                                    size_t *);
int BIO_meth_set_write(BIO_METHOD *biom,
                int (*write) (BIO *, const char *, int));
int BIO_meth_set_write_ex(BIO_METHOD *biom,
                int (*bwrite) (BIO *, const char *, size_t, size_t *));
int (*BIO_meth_get_read(const BIO_METHOD *biom)) (BIO *, char *, int);
int (*BIO_meth_get_read_ex(const BIO_METHOD *biom)) (BIO *, char *, size_t, size_t *);
int BIO_meth_set_read(BIO_METHOD *biom,
                int (*read) (BIO *, char *, int));
int BIO_meth_set_read_ex(BIO_METHOD *biom,
                  int (*bread) (BIO *, char *, size_t, size_t *));
int (*BIO_meth_get_puts(const BIO_METHOD *biom)) (BIO *, const char *);
int BIO_meth_set_puts(BIO_METHOD *biom,
                int (*puts) (BIO *, const char *));
int (*BIO_meth_get_gets(const BIO_METHOD *biom)) (BIO *, char *, int);
int BIO_meth_set_gets(BIO_METHOD *biom,

                int (*ossl_gets) (BIO *, char *, int));
long (*BIO_meth_get_ctrl(const BIO_METHOD *biom)) (BIO *, int, long, void *);
int BIO_meth_set_ctrl(BIO_METHOD *biom,
                long (*ctrl) (BIO *, int, long, void *));
int (*BIO_meth_get_create(const BIO_METHOD *bion)) (BIO *);
int BIO_meth_set_create(BIO_METHOD *biom, int (*create) (BIO *));
int (*BIO_meth_get_destroy(const BIO_METHOD *biom)) (BIO *);
```

```
int BIO_meth_set_destroy(BIO_METHOD *biom, int (*destroy) (BIO *));
long (*BIO_meth_get_callback_ctrl(const BIO_METHOD *biom))
                          (BIO *, int, BIO_info_cb *);
int BIO_meth_set_callback_ctrl(BIO_METHOD *biom,
                         long (*callback_ctrl) (BIO *, int,
                                                BIO_info_cb *));

# ifdef  __cplusplus
}
# endif
#endif
/*
* WARNING: do not edit!
* Generated by Makefile from providers/common/include/prov/der_ecx.h.in
*
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* https://www.openssl.org/source/license.html
*/

#include "internal/der.h"
#include "crypto/ecx.h"

/* Well known OIDs precompiled */

/*
* id-X25519       OBJECT IDENTIFIER ::= { id-edwards-curve-algs 110 }
*/
#define DER_OID_V_id_X25519 DER_P_OBJECT, 3, 0x2B, 0x65, 0x6E
#define DER_OID_SZ_id_X25519 5
extern const unsigned char ossl_der_oid_id_X25519[DER_OID_SZ_id_X25519];

/*
* id-X448         OBJECT IDENTIFIER ::= { id-edwards-curve-algs 111 }
*/
#define DER_OID_V_id_X448 DER_P_OBJECT, 3, 0x2B, 0x65, 0x6F
#define DER_OID_SZ_id_X448 5
extern const unsigned char ossl_der_oid_id_X448[DER_OID_SZ_id_X448];

/*
 * id-Ed25519      OBJECT IDENTIFIER ::= { id-edwards-curve-algs 112 }
*/
#define DER_OID_V_id_Ed25519 DER_P_OBJECT, 3, 0x2B, 0x65, 0x70
#define DER_OID_SZ_id_Ed25519 5
extern const unsigned char ossl_der_oid_id_Ed25519[DER_OID_SZ_id_Ed25519];
```

```
/*
* id-Ed448         OBJECT IDENTIFIER ::= { id-edwards-curve-algs 113 }
*/
#define DER_OID_V_id_Ed448 DER_P_OBJECT, 3, 0x2B, 0x65, 0x71
#define DER_OID_SZ_id_Ed448 5
extern const unsigned char ossl_der_oid_id_Ed448[DER_OID_SZ_id_Ed448];


int ossl_DER_w_algorithmIdentifier_ED25519(WPACKET *pkt, int cont, ECX_KEY *ec);
int ossl_DER_w_algorithmIdentifier_ED448(WPACKET *pkt, int cont, ECX_KEY *ec);
int ossl_DER_w_algorithmIdentifier_X25519(WPACKET *pkt, int cont, ECX_KEY *ec);
int ossl_DER_w_algorithmIdentifier_X448(WPACKET *pkt, int cont, ECX_KEY *ec);
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/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/srp.h.in
*
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* https://www.openssl.org/source/license.html
*
* Originally written by Christophe Renou and Peter Sylvester,
* for the EdelKey project.
*/
```

```
#ifndef OPENSSL_SRP_H
# define OPENSSL_SRP_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_SRP_H
# endif

#include <openssl/opensslconf.h>

#ifndef OPENSSL_NO_SRP
# include <stdio.h>
# include <string.h>
# include <openssl/safestack.h>
# include <openssl/bn.h>
# include <openssl/crypto.h>

# ifdef  __cplusplus
extern "C" {
# endif

# ifndef OPENSSL_NO_DEPRECATED_3_0

typedef
 struct SRP_gN_cache_st {
   char *b64_bn;
   BIGNUM *bn;
} SRP_gN_cache;
SKM_DEFINE_STACK_OF_INTERNAL(SRP_gN_cache, SRP_gN_cache, SRP_gN_cache)
#define sk_SRP_gN_cache_num(sk) OPENSSL_sk_num(ossl_check_const_SRP_gN_cache_sk_type(sk))
#define sk_SRP_gN_cache_value(sk, idx) ((SRP_gN_cache
*)OPENSSL_sk_value(ossl_check_const_SRP_gN_cache_sk_type(sk), (idx)))
#define sk_SRP_gN_cache_new(cmp) ((STACK_OF(SRP_gN_cache)
*)OPENSSL_sk_new(ossl_check_SRP_gN_cache_compfunc_type(cmp)))
#define sk_SRP_gN_cache_new_null() ((STACK_OF(SRP_gN_cache) *)OPENSSL_sk_new_null())
#define sk_SRP_gN_cache_new_reserve(cmp, n) ((STACK_OF(SRP_gN_cache)
*)OPENSSL_sk_new_reserve(ossl_check_SRP_gN_cache_compfunc_type(cmp), (n)))
#define sk_SRP_gN_cache_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_SRP_gN_cache_sk_type(sk), (n))
#define sk_SRP_gN_cache_free(sk) OPENSSL_sk_free(ossl_check_SRP_gN_cache_sk_type(sk))
#define sk_SRP_gN_cache_zero(sk) OPENSSL_sk_zero(ossl_check_SRP_gN_cache_sk_type(sk))
#define sk_SRP_gN_cache_delete(sk,
 i) ((SRP_gN_cache *)OPENSSL_sk_delete(ossl_check_SRP_gN_cache_sk_type(sk), (i)))
#define sk_SRP_gN_cache_delete_ptr(sk, ptr) ((SRP_gN_cache
*)OPENSSL_sk_delete_ptr(ossl_check_SRP_gN_cache_sk_type(sk), ossl_check_SRP_gN_cache_type(ptr)))
#define sk_SRP_gN_cache_push(sk, ptr) OPENSSL_sk_push(ossl_check_SRP_gN_cache_sk_type(sk),
```

```
ossl_check_SRP_gN_cache_type(ptr))
#define sk_SRP_gN_cache_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_SRP_gN_cache_sk_type(sk),
ossl_check_SRP_gN_cache_type(ptr))
#define sk_SRP_gN_cache_pop(sk) ((SRP_gN_cache
*)OPENSSL_sk_pop(ossl_check_SRP_gN_cache_sk_type(sk)))
#define sk_SRP_gN_cache_shift(sk) ((SRP_gN_cache
*)OPENSSL_sk_shift(ossl_check_SRP_gN_cache_sk_type(sk)))
#define sk_SRP_gN_cache_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SRP_gN_cache_sk_type(sk),ossl_check_SRP_gN_cache_freefunc_type(freefu
nc))
#define sk_SRP_gN_cache_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SRP_gN_cache_sk_type(sk),
ossl_check_SRP_gN_cache_type(ptr),
 (idx))
#define sk_SRP_gN_cache_set(sk, idx, ptr) ((SRP_gN_cache
*)OPENSSL_sk_set(ossl_check_SRP_gN_cache_sk_type(sk), (idx), ossl_check_SRP_gN_cache_type(ptr)))
#define sk_SRP_gN_cache_find(sk, ptr) OPENSSL_sk_find(ossl_check_SRP_gN_cache_sk_type(sk),
ossl_check_SRP_gN_cache_type(ptr))
#define sk_SRP_gN_cache_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SRP_gN_cache_sk_type(sk),
ossl_check_SRP_gN_cache_type(ptr))
#define sk_SRP_gN_cache_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_SRP_gN_cache_sk_type(sk), ossl_check_SRP_gN_cache_type(ptr), pnum)
#define sk_SRP_gN_cache_sort(sk) OPENSSL_sk_sort(ossl_check_SRP_gN_cache_sk_type(sk))
#define sk_SRP_gN_cache_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SRP_gN_cache_sk_type(sk))
#define sk_SRP_gN_cache_dup(sk) ((STACK_OF(SRP_gN_cache)
*)OPENSSL_sk_dup(ossl_check_const_SRP_gN_cache_sk_type(sk)))
#define sk_SRP_gN_cache_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(SRP_gN_cache)
*)OPENSSL_sk_deep_copy(ossl_check_const_SRP_gN_cache_sk_type(sk),
 ossl_check_SRP_gN_cache_copyfunc_type(copyfunc), ossl_check_SRP_gN_cache_freefunc_type(freefunc)))
#define sk_SRP_gN_cache_set_cmp_func(sk, cmp)
((sk_SRP_gN_cache_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SRP_gN_cache_sk_type(sk),
ossl_check_SRP_gN_cache_compfunc_type(cmp)))



typedef struct SRP_user_pwd_st {
  /* Owned by us. */
  char *id;
  BIGNUM *s;
  BIGNUM *v;
  /* Not owned by us. */
  const BIGNUM *g;
  const BIGNUM *N;
  /* Owned by us. */
  char *info;
} SRP_user_pwd;
SKM_DEFINE_STACK_OF_INTERNAL(SRP_user_pwd, SRP_user_pwd, SRP_user_pwd)
#define sk_SRP_user_pwd_num(sk) OPENSSL_sk_num(ossl_check_const_SRP_user_pwd_sk_type(sk))
#define sk_SRP_user_pwd_value(sk, idx) ((SRP_user_pwd
```

*)OPENSSL_sk_value(ossl_check_const_SRP_user_pwd_sk_type(sk), (idx)))
#define sk_SRP_user_pwd_new(cmp) ((STACK_OF(SRP_user_pwd)
*)OPENSSL_sk_new(ossl_check_SRP_user_pwd_compfunc_type(cmp)))
#define sk_SRP_user_pwd_new_null() ((STACK_OF(SRP_user_pwd)
*)OPENSSL_sk_new_null())
#define sk_SRP_user_pwd_new_reserve(cmp, n) ((STACK_OF(SRP_user_pwd)
*)OPENSSL_sk_new_reserve(ossl_check_SRP_user_pwd_compfunc_type(cmp), (n)))
#define sk_SRP_user_pwd_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_SRP_user_pwd_sk_type(sk), (n))
#define sk_SRP_user_pwd_free(sk) OPENSSL_sk_free(ossl_check_SRP_user_pwd_sk_type(sk))
#define sk_SRP_user_pwd_zero(sk) OPENSSL_sk_zero(ossl_check_SRP_user_pwd_sk_type(sk))
#define sk_SRP_user_pwd_delete(sk, i) ((SRP_user_pwd
*)OPENSSL_sk_delete(ossl_check_SRP_user_pwd_sk_type(sk), (i)))
#define sk_SRP_user_pwd_delete_ptr(sk, ptr) ((SRP_user_pwd
*)OPENSSL_sk_delete_ptr(ossl_check_SRP_user_pwd_sk_type(sk), ossl_check_SRP_user_pwd_type(ptr)))
#define sk_SRP_user_pwd_push(sk, ptr) OPENSSL_sk_push(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_type(ptr))
#define sk_SRP_user_pwd_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_type(ptr))
#define sk_SRP_user_pwd_pop(sk)
((SRP_user_pwd *)OPENSSL_sk_pop(ossl_check_SRP_user_pwd_sk_type(sk)))
#define sk_SRP_user_pwd_shift(sk) ((SRP_user_pwd
*)OPENSSL_sk_shift(ossl_check_SRP_user_pwd_sk_type(sk)))
#define sk_SRP_user_pwd_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SRP_user_pwd_sk_type(sk),ossl_check_SRP_user_pwd_freefunc_type(freefu
nc))
#define sk_SRP_user_pwd_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_type(ptr), (idx))
#define sk_SRP_user_pwd_set(sk, idx, ptr) ((SRP_user_pwd
*)OPENSSL_sk_set(ossl_check_SRP_user_pwd_sk_type(sk), (idx), ossl_check_SRP_user_pwd_type(ptr)))
#define sk_SRP_user_pwd_find(sk, ptr) OPENSSL_sk_find(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_type(ptr))
#define sk_SRP_user_pwd_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_type(ptr))
#define sk_SRP_user_pwd_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_type(ptr),
pnum)
#define sk_SRP_user_pwd_sort(sk) OPENSSL_sk_sort(ossl_check_SRP_user_pwd_sk_type(sk))
#define sk_SRP_user_pwd_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SRP_user_pwd_sk_type(sk))
#define sk_SRP_user_pwd_dup(sk) ((STACK_OF(SRP_user_pwd)
*)OPENSSL_sk_dup(ossl_check_const_SRP_user_pwd_sk_type(sk)))
#define sk_SRP_user_pwd_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(SRP_user_pwd)
*)OPENSSL_sk_deep_copy(ossl_check_const_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_copyfunc_type(copyfunc), ossl_check_SRP_user_pwd_freefunc_type(freefunc)))
#define sk_SRP_user_pwd_set_cmp_func(sk, cmp)
((sk_SRP_user_pwd_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SRP_user_pwd_sk_type(sk),
ossl_check_SRP_user_pwd_compfunc_type(cmp)))

```
OSSL_DEPRECATEDIN_3_0
SRP_user_pwd *SRP_user_pwd_new(void);
OSSL_DEPRECATEDIN_3_0
void SRP_user_pwd_free(SRP_user_pwd *user_pwd);

OSSL_DEPRECATEDIN_3_0
void SRP_user_pwd_set_gN(SRP_user_pwd *user_pwd, const BIGNUM *g,

        const BIGNUM *N);
OSSL_DEPRECATEDIN_3_0
int SRP_user_pwd_set1_ids(SRP_user_pwd *user_pwd, const char *id,
                  const char *info);
OSSL_DEPRECATEDIN_3_0
int SRP_user_pwd_set0_sv(SRP_user_pwd *user_pwd, BIGNUM *s, BIGNUM *v);

typedef struct SRP_VBASE_st {
  STACK_OF(SRP_user_pwd) *users_pwd;
  STACK_OF(SRP_gN_cache) *gN_cache;
/* to simulate a user */
  char *seed_key;
  const BIGNUM *default_g;
  const BIGNUM *default_N;
} SRP_VBASE;

/*
* Internal structure storing N and g pair
*/
typedef struct SRP_gN_st {
  char *id;
  const BIGNUM *g;
  const BIGNUM *N;
} SRP_gN;
SKM_DEFINE_STACK_OF_INTERNAL(SRP_gN, SRP_gN, SRP_gN)
#define sk_SRP_gN_num(sk) OPENSSL_sk_num(ossl_check_const_SRP_gN_sk_type(sk))
#define sk_SRP_gN_value(sk, idx) ((SRP_gN *)OPENSSL_sk_value(ossl_check_const_SRP_gN_sk_type(sk),
(idx)))
#define sk_SRP_gN_new(cmp) ((STACK_OF(SRP_gN)
*)OPENSSL_sk_new(ossl_check_SRP_gN_compfunc_type(cmp)))
#define sk_SRP_gN_new_null() ((STACK_OF(SRP_gN)
 *)OPENSSL_sk_new_null())
#define sk_SRP_gN_new_reserve(cmp, n) ((STACK_OF(SRP_gN)
*)OPENSSL_sk_new_reserve(ossl_check_SRP_gN_compfunc_type(cmp), (n)))
#define sk_SRP_gN_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_SRP_gN_sk_type(sk), (n))
#define sk_SRP_gN_free(sk) OPENSSL_sk_free(ossl_check_SRP_gN_sk_type(sk))
#define sk_SRP_gN_zero(sk) OPENSSL_sk_zero(ossl_check_SRP_gN_sk_type(sk))
#define sk_SRP_gN_delete(sk, i) ((SRP_gN *)OPENSSL_sk_delete(ossl_check_SRP_gN_sk_type(sk), (i)))
#define sk_SRP_gN_delete_ptr(sk, ptr) ((SRP_gN *)OPENSSL_sk_delete_ptr(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr)))
```

```
#define sk_SRP_gN_push(sk, ptr) OPENSSL_sk_push(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr))
#define sk_SRP_gN_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr))
#define sk_SRP_gN_pop(sk) ((SRP_gN *)OPENSSL_sk_pop(ossl_check_SRP_gN_sk_type(sk)))
#define sk_SRP_gN_shift(sk) ((SRP_gN *)OPENSSL_sk_shift(ossl_check_SRP_gN_sk_type(sk)))
#define
 sk_SRP_gN_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SRP_gN_sk_type(sk),ossl_check_SRP_gN_freefunc_type(freefunc))
#define sk_SRP_gN_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr), (idx))
#define sk_SRP_gN_set(sk, idx, ptr) ((SRP_gN *)OPENSSL_sk_set(ossl_check_SRP_gN_sk_type(sk), (idx),
ossl_check_SRP_gN_type(ptr)))
#define sk_SRP_gN_find(sk, ptr) OPENSSL_sk_find(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr))
#define sk_SRP_gN_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr))
#define sk_SRP_gN_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_type(ptr), pnum)
#define sk_SRP_gN_sort(sk) OPENSSL_sk_sort(ossl_check_SRP_gN_sk_type(sk))
#define sk_SRP_gN_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SRP_gN_sk_type(sk))
#define sk_SRP_gN_dup(sk) ((STACK_OF(SRP_gN)
*)OPENSSL_sk_dup(ossl_check_const_SRP_gN_sk_type(sk)))
#define
 sk_SRP_gN_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(SRP_gN)
*)OPENSSL_sk_deep_copy(ossl_check_const_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_copyfunc_type(copyfunc), ossl_check_SRP_gN_freefunc_type(freefunc)))
#define sk_SRP_gN_set_cmp_func(sk, cmp)
((sk_SRP_gN_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SRP_gN_sk_type(sk),
ossl_check_SRP_gN_compfunc_type(cmp)))



OSSL_DEPRECATEDIN_3_0
SRP_VBASE *SRP_VBASE_new(char *seed_key);
OSSL_DEPRECATEDIN_3_0
void SRP_VBASE_free(SRP_VBASE *vb);
OSSL_DEPRECATEDIN_3_0
int SRP_VBASE_init(SRP_VBASE *vb, char *verifier_file);

OSSL_DEPRECATEDIN_3_0
int SRP_VBASE_add0_user(SRP_VBASE *vb, SRP_user_pwd *user_pwd);

/* NOTE: unlike in SRP_VBASE_get_by_user, caller owns the returned pointer.*/
OSSL_DEPRECATEDIN_3_0
SRP_user_pwd *SRP_VBASE_get1_by_user(SRP_VBASE *vb, char *username);

OSSL_DEPRECATEDIN_3_0
```

```
char *SRP_create_verifier_ex(const char *user, const char *pass, char **salt,
                             char **verifier,
 const char *N, const char *g,
                             OSSL_LIB_CTX *libctx, const char *propq);
OSSL_DEPRECATEDIN_3_0
char *SRP_create_verifier(const char *user, const char *pass, char **salt,
                          char **verifier, const char *N, const char *g);
OSSL_DEPRECATEDIN_3_0
int SRP_create_verifier_BN_ex(const char *user, const char *pass, BIGNUM **salt,
                              BIGNUM **verifier, const BIGNUM *N,
                              const BIGNUM *g, OSSL_LIB_CTX *libctx,
                              const char *propq);
OSSL_DEPRECATEDIN_3_0
int SRP_create_verifier_BN(const char *user, const char *pass, BIGNUM **salt,
                           BIGNUM **verifier, const BIGNUM *N,
                           const BIGNUM *g);

#  define SRP_NO_ERROR 0
#  define SRP_ERR_VBASE_INCOMPLETE_FILE 1
#  define SRP_ERR_VBASE_BN_LIB 2
#  define SRP_ERR_OPEN_FILE 3
#  define SRP_ERR_MEMORY 4

#  define DB_srptype      0
#  define DB_srpverifier  1
#  define DB_srpsalt
     2
#  define DB_srpid        3
#  define DB_srpgN        4
#  define DB_srpinfo      5
#  undef  DB_NUMBER
#  define DB_NUMBER       6

#  define DB_SRP_INDEX    'I'
#  define DB_SRP_VALID    'V'
#  define DB_SRP_REVOKED  'R'
#  define DB_SRP_MODIF    'v'

/* see srp.c */
OSSL_DEPRECATEDIN_3_0
char *SRP_check_known_gN_param(const BIGNUM *g, const BIGNUM *N);
OSSL_DEPRECATEDIN_3_0
SRP_gN *SRP_get_default_gN(const char *id);

/* server side .... */
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_server_key(const BIGNUM *A, const BIGNUM *v, const BIGNUM *u,
                            const BIGNUM *b, const BIGNUM *N);
```

```
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_B_ex(const BIGNUM *b, const BIGNUM *N, const BIGNUM *g,
                      const BIGNUM *v, OSSL_LIB_CTX *libctx, const char *propq);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_B(const BIGNUM *b, const BIGNUM *N, const BIGNUM *g,
                   const BIGNUM *v);

OSSL_DEPRECATEDIN_3_0
int SRP_Verify_A_mod_N(const BIGNUM *A, const
 BIGNUM *N);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_u_ex(const BIGNUM *A, const BIGNUM *B, const BIGNUM *N,
                      OSSL_LIB_CTX *libctx, const char *propq);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_u(const BIGNUM *A, const BIGNUM *B, const BIGNUM *N);

/* client side .... */

OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_x_ex(const BIGNUM *s, const char *user, const char *pass,
                      OSSL_LIB_CTX *libctx, const char *propq);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_x(const BIGNUM *s, const char *user, const char *pass);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_A(const BIGNUM *a, const BIGNUM *N, const BIGNUM *g);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_client_key_ex(const BIGNUM *N, const BIGNUM *B, const BIGNUM *g,
                           const BIGNUM *x, const BIGNUM *a, const BIGNUM *u,
                           OSSL_LIB_CTX *libctx, const char *propq);
OSSL_DEPRECATEDIN_3_0
BIGNUM *SRP_Calc_client_key(const BIGNUM *N, const BIGNUM *B, const BIGNUM *g,

                      const BIGNUM *x, const BIGNUM *a, const BIGNUM *u);
OSSL_DEPRECATEDIN_3_0
int SRP_Verify_B_mod_N(const BIGNUM *B, const BIGNUM *N);

#  define SRP_MINIMAL_N 1024

# endif /* OPENSSL_NO_DEPRECATED_3_0 */

/* This method ignores the configured seed and fails for an unknown user. */
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0
SRP_user_pwd *SRP_VBASE_get_by_user(SRP_VBASE *vb, char *username);
# endif

# ifdef  __cplusplus
}
```

endif
endif

#endif
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/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/ssl.h.in
*
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```
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* https://www.openssl.org/source/license.html
*/



#ifndef OPENSSL_SSL_H
# define OPENSSL_SSL_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_SSL_H
# endif

# include <openssl/e_os2.h>
# include <openssl/opensslconf.h>
# include <openssl/comp.h>
# include <openssl/bio.h>
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  include <openssl/x509.h>
#  include <openssl/crypto.h>
#  include <openssl/buffer.h>
# endif
# include <openssl/lhash.h>
# include <openssl/pem.h>
#
 include <openssl/hmac.h>
# include <openssl/async.h>

# include <openssl/safestack.h>
# include <openssl/symhacks.h>
# include <openssl/ct.h>
# include <openssl/sslerr.h>
# include <openssl/prov_ssl.h>

#ifdef  __cplusplus
extern "C" {
#endif

/* OpenSSL version number for ASN.1 encoding of the session information */
/*-
* Version 0 - initial version
* Version 1 - added the optional peer certificate
```

```
*/
# define SSL_SESSION_ASN1_VERSION 0x0001

# define SSL_MAX_SSL_SESSION_ID_LENGTH          32
# define SSL_MAX_SID_CTX_LENGTH                 32

# define SSL_MIN_RSA_MODULUS_LENGTH_IN_BYTES    (512/8)
# define SSL_MAX_KEY_ARG_LENGTH                 8
/* SSL_MAX_MASTER_KEY_LENGTH is defined in prov_ssl.h */

/* The maximum number of encrypt/decrypt pipelines we can support */
# define SSL_MAX_PIPELINES  32

/* text strings for the ciphers */

/* These are used to specify which ciphers to use and not to use */

# define SSL_TXT_LOW            "LOW"
# define SSL_TXT_MEDIUM
 "MEDIUM"
# define SSL_TXT_HIGH           "HIGH"
# define SSL_TXT_FIPS           "FIPS"

# define SSL_TXT_aNULL          "aNULL"
# define SSL_TXT_eNULL          "eNULL"
# define SSL_TXT_NULL           "NULL"

# define SSL_TXT_kRSA           "kRSA"
# define SSL_TXT_kDHr           "kDHr"/* this cipher class has been removed */
# define SSL_TXT_kDHd           "kDHd"/* this cipher class has been removed */
# define SSL_TXT_kDH            "kDH"/* this cipher class has been removed */
# define SSL_TXT_kEDH           "kEDH"/* alias for kDHE */
# define SSL_TXT_kDHE           "kDHE"
# define SSL_TXT_kECDHr         "kECDHr"/* this cipher class has been removed */
# define SSL_TXT_kECDHe         "kECDHe"/* this cipher class has been removed */
# define SSL_TXT_kECDH          "kECDH"/* this cipher class has been removed */
# define SSL_TXT_kEECDH         "kEECDH"/* alias for kECDHE */
# define SSL_TXT_kECDHE         "kECDHE"
# define SSL_TXT_kPSK           "kPSK"
# define SSL_TXT_kRSAPSK
        "kRSAPSK"
# define SSL_TXT_kECDHEPSK      "kECDHEPSK"
# define SSL_TXT_kDHEPSK        "kDHEPSK"
# define SSL_TXT_kGOST          "kGOST"
# define SSL_TXT_kGOST18        "kGOST18"
# define SSL_TXT_kSRP           "kSRP"

# define SSL_TXT_aRSA           "aRSA"
```

```
# define SSL_TXT_aDSS          "aDSS"
# define SSL_TXT_aDH           "aDH"/* this cipher class has been removed */
# define SSL_TXT_aECDH          "aECDH"/* this cipher class has been removed */
# define SSL_TXT_aECDSA         "aECDSA"
# define SSL_TXT_aPSK          "aPSK"
# define SSL_TXT_aGOST94        "aGOST94"
# define SSL_TXT_aGOST01        "aGOST01"
# define SSL_TXT_aGOST12        "aGOST12"
# define SSL_TXT_aGOST          "aGOST"
# define SSL_TXT_aSRP          "aSRP"

# define SSL_TXT_DSS           "DSS"
# define SSL_TXT_DH            "DH"
# define SSL_TXT_DHE           "DHE"/* same as "kDHE:-ADH" */
# define SSL_TXT_EDH           "EDH"/* alias for DHE */
# define SSL_TXT_ADH
    "ADH"
# define SSL_TXT_RSA           "RSA"
# define SSL_TXT_ECDH           "ECDH"
# define SSL_TXT_EECDH          "EECDH"/* alias for ECDHE" */
# define SSL_TXT_ECDHE          "ECDHE"/* same as "kECDHE:-AECDH" */
# define SSL_TXT_AECDH          "AECDH"
# define SSL_TXT_ECDSA          "ECDSA"
# define SSL_TXT_PSK           "PSK"
# define SSL_TXT_SRP           "SRP"

# define SSL_TXT_DES           "DES"
# define SSL_TXT_3DES          "3DES"
# define SSL_TXT_RC4           "RC4"
# define SSL_TXT_RC2           "RC2"
# define SSL_TXT_IDEA          "IDEA"
# define SSL_TXT_SEED          "SEED"
# define SSL_TXT_AES128         "AES128"
# define SSL_TXT_AES256         "AES256"
# define SSL_TXT_AES           "AES"
# define SSL_TXT_AES_GCM        "AESGCM"
# define SSL_TXT_AES_CCM        "AESCCM"
# define SSL_TXT_AES_CCM_8      "AESCCM8"
# define SSL_TXT_CAMELLIA128    "CAMELLIA128"
# define SSL_TXT_CAMELLIA256    "CAMELLIA256"
# define SSL_TXT_CAMELLIA       "CAMELLIA"
#
 define SSL_TXT_CHACHA20       "CHACHA20"
# define SSL_TXT_GOST          "GOST89"
# define SSL_TXT_ARIA          "ARIA"
# define SSL_TXT_ARIA_GCM       "ARIAGCM"
# define SSL_TXT_ARIA128        "ARIA128"
# define SSL_TXT_ARIA256        "ARIA256"
```

```
# define SSL_TXT_GOST2012_GOST8912_GOST8912 "GOST2012-GOST8912-GOST8912"
# define SSL_TXT_CBC            "CBC"

# define SSL_TXT_MD5            "MD5"
# define SSL_TXT_SHA1           "SHA1"
# define SSL_TXT_SHA            "SHA"/* same as "SHA1" */
# define SSL_TXT_GOST94         "GOST94"
# define SSL_TXT_GOST89MAC      "GOST89MAC"
# define SSL_TXT_GOST12         "GOST12"
# define SSL_TXT_GOST89MAC12    "GOST89MAC12"
# define SSL_TXT_SHA256         "SHA256"
# define SSL_TXT_SHA384         "SHA384"

# define SSL_TXT_SSLV3          "SSLv3"
# define SSL_TXT_TLSV1          "TLSv1"
# define SSL_TXT_TLSV1_1        "TLSv1.1"
# define SSL_TXT_TLSV1_2        "TLSv1.2"

# define SSL_TXT_ALL            "ALL"

/*-
* COMPLEMENTOF*
 definitions. These identifiers are used to (de-select)
* ciphers normally not being used.
* Example: "RC4" will activate all ciphers using RC4 including ciphers
* without authentication, which would normally disabled by DEFAULT (due
* the "!ADH" being part of default). Therefore "RC4:!COMPLEMENTOFDEFAULT"
* will make sure that it is also disabled in the specific selection.
* COMPLEMENTOF* identifiers are portable between version, as adjustments
* to the default cipher setup will also be included here.
*
* COMPLEMENTOFDEFAULT does not experience the same special treatment that
* DEFAULT gets, as only selection is being done and no sorting as needed
* for DEFAULT.
*/
# define SSL_TXT_CMPALL         "COMPLEMENTOFALL"
# define SSL_TXT_CMPDEF         "COMPLEMENTOFDEFAULT"

/*
* The following cipher list is used by default. It also is substituted when
* an application-defined cipher list string starts with 'DEFAULT'.
* This applies to ciphersuites for TLSv1.2 and below.
 * DEPRECATED IN 3.0.0, in favor of OSSL_default_cipher_list()
* Update both macro and function simultaneously
*/
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SSL_DEFAULT_CIPHER_LIST "ALL:!COMPLEMENTOFDEFAULT:!eNULL"
/*
```

```
* This is the default set of TLSv1.3 ciphersuites
* DEPRECATED IN 3.0.0, in favor of OSSL_default_ciphersuites()
* Update both macro and function simultaneously
*/
#  define TLS_DEFAULT_CIPHERSUITES "TLS_AES_256_GCM_SHA384:" \
                           "TLS_CHACHA20_POLY1305_SHA256:" \
                           "TLS_AES_128_GCM_SHA256"
# endif
/*
* As of OpenSSL 1.0.0, ssl_create_cipher_list() in ssl/ssl_ciph.c always
* starts with a reasonable order, and all we have to do for DEFAULT is
* throwing out anonymous and unencrypted ciphersuites! (The latter are not
* actually enabled by ALL, but "ALL:RSA" would enable some of them.)
*/

/* Used in SSL_set_shutdown()/SSL_get_shutdown(); */
# define SSL_SENT_SHUTDOWN       1
# define SSL_RECEIVED_SHUTDOWN
  2

#ifdef __cplusplus
}
#endif

#ifdef  __cplusplus
extern "C" {
#endif

# define SSL_FILETYPE_ASN1       X509_FILETYPE_ASN1
# define SSL_FILETYPE_PEM        X509_FILETYPE_PEM

/*
* This is needed to stop compilers complaining about the 'struct ssl_st *'
* function parameters used to prototype callbacks in SSL_CTX.
*/
typedef struct ssl_st *ssl_crock_st;
typedef struct tls_session_ticket_ext_st TLS_SESSION_TICKET_EXT;
typedef struct ssl_method_st SSL_METHOD;
typedef struct ssl_cipher_st SSL_CIPHER;
typedef struct ssl_session_st SSL_SESSION;
typedef struct tls_sigalgs_st TLS_SIGALGS;
typedef struct ssl_conf_ctx_st SSL_CONF_CTX;
typedef struct ssl_comp_st SSL_COMP;

STACK_OF(SSL_CIPHER);
STACK_OF(SSL_COMP);

/* SRTP protection profiles for use with the use_srtp extension (RFC 5764)*/
```

```
typedef struct srtp_protection_profile_st {
  const char *name;
  unsigned long id;
} SRTP_PROTECTION_PROFILE;
SKM_DEFINE_STACK_OF_INTERNAL(SRTP_PROTECTION_PROFILE, SRTP_PROTECTION_PROFILE,
 SRTP_PROTECTION_PROFILE)
#define sk_SRTP_PROTECTION_PROFILE_num(sk)
OPENSSL_sk_num(ossl_check_const_SRTP_PROTECTION_PROFILE_sk_type(sk))
#define sk_SRTP_PROTECTION_PROFILE_value(sk, idx) ((SRTP_PROTECTION_PROFILE
*)OPENSSL_sk_value(ossl_check_const_SRTP_PROTECTION_PROFILE_sk_type(sk), (idx)))
#define sk_SRTP_PROTECTION_PROFILE_new(cmp) ((STACK_OF(SRTP_PROTECTION_PROFILE)
*)OPENSSL_sk_new(ossl_check_SRTP_PROTECTION_PROFILE_compfunc_type(cmp)))
#define sk_SRTP_PROTECTION_PROFILE_new_null() ((STACK_OF(SRTP_PROTECTION_PROFILE)
*)OPENSSL_sk_new_null())
#define sk_SRTP_PROTECTION_PROFILE_new_reserve(cmp, n)
((STACK_OF(SRTP_PROTECTION_PROFILE)
*)OPENSSL_sk_new_reserve(ossl_check_SRTP_PROTECTION_PROFILE_compfunc_type(cmp), (n)))
#define sk_SRTP_PROTECTION_PROFILE_reserve(sk, n)
OPENSSL_sk_reserve(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk), (n))
#define sk_SRTP_PROTECTION_PROFILE_free(sk)
OPENSSL_sk_free(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk))
#define sk_SRTP_PROTECTION_PROFILE_zero(sk)
 OPENSSL_sk_zero(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk))
#define sk_SRTP_PROTECTION_PROFILE_delete(sk, i) ((SRTP_PROTECTION_PROFILE
*)OPENSSL_sk_delete(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk), (i)))
#define sk_SRTP_PROTECTION_PROFILE_delete_ptr(sk, ptr) ((SRTP_PROTECTION_PROFILE
*)OPENSSL_sk_delete_ptr(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr)))
#define sk_SRTP_PROTECTION_PROFILE_push(sk, ptr)
OPENSSL_sk_push(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr))
#define sk_SRTP_PROTECTION_PROFILE_unshift(sk, ptr)
OPENSSL_sk_unshift(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr))
#define sk_SRTP_PROTECTION_PROFILE_pop(sk) ((SRTP_PROTECTION_PROFILE
*)OPENSSL_sk_pop(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk)))
#define sk_SRTP_PROTECTION_PROFILE_shift(sk) ((SRTP_PROTECTION_PROFILE
*)OPENSSL_sk_shift(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk)))
#define
 sk_SRTP_PROTECTION_PROFILE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),ossl_check_SRTP_PROTECTI
ON_PROFILE_freefunc_type(freefunc))
#define sk_SRTP_PROTECTION_PROFILE_insert(sk, ptr, idx)
OPENSSL_sk_insert(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr), (idx))
#define sk_SRTP_PROTECTION_PROFILE_set(sk, idx, ptr) ((SRTP_PROTECTION_PROFILE
*)OPENSSL_sk_set(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk), (idx),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr)))
```

```
#define sk_SRTP_PROTECTION_PROFILE_find(sk, ptr)
OPENSSL_sk_find(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr))
#define sk_SRTP_PROTECTION_PROFILE_find_ex(sk, ptr)
OPENSSL_sk_find_ex(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_type(ptr))
#define sk_SRTP_PROTECTION_PROFILE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk),
 ossl_check_SRTP_PROTECTION_PROFILE_type(ptr), pnum)
#define sk_SRTP_PROTECTION_PROFILE_sort(sk)
OPENSSL_sk_sort(ossl_check_SRTP_PROTECTION_PROFILE_sk_type(sk))
#define sk_SRTP_PROTECTION_PROFILE_is_sorted(sk)
OPENSSL_sk_is_sorted(ossl_check_const_SRTP_PROTECTION_PROFILE_sk_type(sk))
#define sk_SRTP_PROTECTION_PROFILE_dup(sk) ((STACK_OF(SRTP_PROTECTION_PROFILE)
*)OPENSSL_sk_dup(ossl_check_const_SRTP_PROTECTION_PROFILE_sk_type(sk)))
#define sk_SRTP_PROTECTION_PROFILE_deep_copy(sk, copyfunc, freefunc)
((STACK_OF(SRTP_PROTECTION_PROFILE)
*)OPENSSL_sk_deep_copy(ossl_check_const_SRTP_PROTECTION_PROFILE_sk_type(sk),
ossl_check_SRTP_PROTECTION_PROFILE_copyfunc_type(copyfunc),
ossl_check_SRTP_PROTECTION_PROFILE_freefunc_type(freefunc)))
#define sk_SRTP_PROTECTION_PROFILE_set_cmp_func(sk, cmp)
((sk_SRTP_PROTECTION_PROFILE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SRTP_PROTECTION
_PROFILE_sk_type(sk), ossl_check_SRTP_PROTECTION_PROFILE_compfunc_type(cmp)))



typedef int
 (*tls_session_ticket_ext_cb_fn)(SSL *s, const unsigned char *data,
                                 int len, void *arg);
typedef int (*tls_session_secret_cb_fn)(SSL *s, void *secret, int *secret_len,
                                STACK_OF(SSL_CIPHER) *peer_ciphers,
                                const SSL_CIPHER **cipher, void *arg);

/* Extension context codes */
/* This extension is only allowed in TLS */
#define SSL_EXT_TLS_ONLY                     0x0001
/* This extension is only allowed in DTLS */
#define SSL_EXT_DTLS_ONLY                    0x0002
/* Some extensions may be allowed in DTLS but we don't implement them for it */
#define SSL_EXT_TLS_IMPLEMENTATION_ONLY      0x0004
/* Most extensions are not defined for SSLv3 but EXT_TYPE_renegotiate is */
#define SSL_EXT_SSL3_ALLOWED                 0x0008
/* Extension is only defined for TLS1.2 and below */
#define SSL_EXT_TLS1_2_AND_BELOW_ONLY        0x0010
/* Extension is only defined
 for TLS1.3 and above */
#define SSL_EXT_TLS1_3_ONLY                  0x0020
/* Ignore this extension during parsing if we are resuming */
```

```
#define SSL_EXT_IGNORE_ON_RESUMPTION          0x0040
#define SSL_EXT_CLIENT_HELLO                  0x0080
/* Really means TLS1.2 or below */
#define SSL_EXT_TLS1_2_SERVER_HELLO           0x0100
#define SSL_EXT_TLS1_3_SERVER_HELLO           0x0200
#define SSL_EXT_TLS1_3_ENCRYPTED_EXTENSIONS     0x0400
#define SSL_EXT_TLS1_3_HELLO_RETRY_REQUEST      0x0800
#define SSL_EXT_TLS1_3_CERTIFICATE            0x1000
#define SSL_EXT_TLS1_3_NEW_SESSION_TICKET       0x2000
#define SSL_EXT_TLS1_3_CERTIFICATE_REQUEST      0x4000

/* Typedefs for handling custom extensions */

typedef int (*custom_ext_add_cb)(SSL *s, unsigned int ext_type,
                         const unsigned char **out, size_t *outlen,
                         int *al, void *add_arg);

typedef void (*custom_ext_free_cb)(SSL *s, unsigned int ext_type,

                 const unsigned char *out, void *add_arg);

typedef int (*custom_ext_parse_cb)(SSL *s, unsigned int ext_type,
                           const unsigned char *in, size_t inlen,
                           int *al, void *parse_arg);


typedef int (*SSL_custom_ext_add_cb_ex)(SSL *s, unsigned int ext_type,
                                unsigned int context,
                                const unsigned char **out,
                                size_t *outlen, X509 *x,
                                size_t chainidx,
                                int *al, void *add_arg);

typedef void (*SSL_custom_ext_free_cb_ex)(SSL *s, unsigned int ext_type,
                                  unsigned int context,
                                  const unsigned char *out,
                                  void *add_arg);

typedef int (*SSL_custom_ext_parse_cb_ex)(SSL *s, unsigned int ext_type,

                                  unsigned int context,
                                const unsigned char *in,
                                size_t inlen, X509 *x,
                                size_t chainidx,
                                int *al, void *parse_arg);

/* Typedef for verification callback */
typedef int (*SSL_verify_cb)(int preverify_ok, X509_STORE_CTX *x509_ctx);
```

```
/* Typedef for SSL async callback */
typedef int (*SSL_async_callback_fn)(SSL *s, void *arg);

#define SSL_OP_BIT(n)  ((uint64_t)1 << (uint64_t)n)

/*
* SSL/TLS connection options.
*/
   /* Disable Extended master secret */
# define SSL_OP_NO_EXTENDED_MASTER_SECRET               SSL_OP_BIT(0)
   /* Cleanse plaintext copies of data delivered to the application */
# define SSL_OP_CLEANSE_PLAINTEXT                       SSL_OP_BIT(1)
   /* Allow initial connection to servers that don't support RI */
# define SSL_OP_LEGACY_SERVER_CONNECT                   SSL_OP_BIT(2)
    /* Enable support for Kernel TLS */
# define SSL_OP_ENABLE_KTLS                             SSL_OP_BIT(3)
# define SSL_OP_TLSEXT_PADDING                          SSL_OP_BIT(4)
# define SSL_OP_SAFARI_ECDHE_ECDSA_BUG                  SSL_OP_BIT(6)
# define SSL_OP_IGNORE_UNEXPECTED_EOF                   SSL_OP_BIT(7)
# define SSL_OP_ALLOW_CLIENT_RENEGOTIATION              SSL_OP_BIT(8)
# define SSL_OP_DISABLE_TLSEXT_CA_NAMES                 SSL_OP_BIT(9)
   /* In TLSv1.3 allow a non-(ec)dhe based kex_mode */
# define SSL_OP_ALLOW_NO_DHE_KEX                        SSL_OP_BIT(10)
   /*
    * Disable SSL 3.0/TLS 1.0 CBC vulnerability workaround that was added
    * in OpenSSL 0.9.6d.  Usually (depending on the application protocol)
    * the workaround is not needed.  Unfortunately some broken SSL/TLS
    * implementations cannot handle it at all, which is why we include it
    * in SSL_OP_ALL. Added in 0.9.6e
    */
# define SSL_OP_DONT_INSERT_EMPTY_FRAGMENTS
            SSL_OP_BIT(11)
   /* DTLS options */
# define SSL_OP_NO_QUERY_MTU                            SSL_OP_BIT(12)
   /* Turn on Cookie Exchange (on relevant for servers) */
# define SSL_OP_COOKIE_EXCHANGE                         SSL_OP_BIT(13)
   /* Don't use RFC4507 ticket extension */
# define SSL_OP_NO_TICKET                               SSL_OP_BIT(14)
# ifndef OPENSSL_NO_DTLS1_METHOD
   /*
    * Use Cisco's version identifier of DTLS_BAD_VER
    * (only with deprecated DTLSv1_client_method())
    */
#  define SSL_OP_CISCO_ANYCONNECT                       SSL_OP_BIT(15)
# endif
   /* As server, disallow session resumption on renegotiation */
# define SSL_OP_NO_SESSION_RESUMPTION_ON_RENEGOTIATION   SSL_OP_BIT(16)
```

```
   /* Don't use compression even if supported */
# define SSL_OP_NO_COMPRESSION                  SSL_OP_BIT(17)
   /* Permit unsafe legacy renegotiation */
# define SSL_OP_ALLOW_UNSAFE_LEGACY_RENEGOTIATION       SSL_OP_BIT(18)
   /* Disable
 encrypt-then-mac */
# define SSL_OP_NO_ENCRYPT_THEN_MAC             SSL_OP_BIT(19)
   /*
    * Enable TLSv1.3 Compatibility mode. This is on by default. A future
    * version of OpenSSL may have this disabled by default.
    */
# define SSL_OP_ENABLE_MIDDLEBOX_COMPAT         SSL_OP_BIT(20)
   /*
    * Prioritize Chacha20Poly1305 when client does.
    * Modifies SSL_OP_CIPHER_SERVER_PREFERENCE
    */
# define SSL_OP_PRIORITIZE_CHACHA               SSL_OP_BIT(21)
   /*
    * Set on servers to choose the cipher according to server's preferences.
    */
# define SSL_OP_CIPHER_SERVER_PREFERENCE        SSL_OP_BIT(22)
   /*
    * If set, a server will allow a client to issue a SSLv3.0 version
    * number as latest version supported in the premaster secret, even when
    * TLSv1.0 (version 3.1) was announced in the client hello. Normally
    * this is forbidden to prevent version rollback attacks.
    */
# define SSL_OP_TLS_ROLLBACK_BUG
                SSL_OP_BIT(23)
   /*
    * Switches off automatic TLSv1.3 anti-replay protection for early data.
    * This is a server-side option only (no effect on the client).
    */
# define SSL_OP_NO_ANTI_REPLAY                  SSL_OP_BIT(24)
# define SSL_OP_NO_SSLv3                        SSL_OP_BIT(25)
# define SSL_OP_NO_TLSv1                        SSL_OP_BIT(26)
# define SSL_OP_NO_TLSv1_2                      SSL_OP_BIT(27)
# define SSL_OP_NO_TLSv1_1                      SSL_OP_BIT(28)
# define SSL_OP_NO_TLSv1_3                      SSL_OP_BIT(29)
# define SSL_OP_NO_DTLSv1                       SSL_OP_BIT(26)
# define SSL_OP_NO_DTLSv1_2                     SSL_OP_BIT(27)
   /* Disallow all renegotiation */
# define SSL_OP_NO_RENEGOTIATION                SSL_OP_BIT(30)
   /*
    * Make server add server-hello extension from early version of
    * cryptopro draft, when GOST ciphersuite
 is negotiated. Required for
    * interoperability with CryptoPro CSP 3.x
```

```
   */
# define SSL_OP_CRYPTOPRO_TLSEXT_BUG                SSL_OP_BIT(31)

/*
* Option "collections."
*/
# define SSL_OP_NO_SSL_MASK \
      ( SSL_OP_NO_SSLv3 | SSL_OP_NO_TLSv1 | SSL_OP_NO_TLSv1_1 \
        | SSL_OP_NO_TLSv1_2 | SSL_OP_NO_TLSv1_3 )
# define SSL_OP_NO_DTLS_MASK \
      ( SSL_OP_NO_DTLSv1 | SSL_OP_NO_DTLSv1_2 )

/* Various bug workarounds that should be rather harmless. */
# define SSL_OP_ALL \
      ( SSL_OP_CRYPTOPRO_TLSEXT_BUG | SSL_OP_DONT_INSERT_EMPTY_FRAGMENTS \
        | SSL_OP_TLSEXT_PADDING | SSL_OP_SAFARI_ECDHE_ECDSA_BUG )

/*
* OBSOLETE OPTIONS retained for compatibility
*/

# define SSL_OP_MICROSOFT_SESS_ID_BUG               0x0
# define SSL_OP_NETSCAPE_CHALLENGE_BUG              0x0
# define SSL_OP_NETSCAPE_REUSE_CIPHER_CHANGE_BUG    0x0
# define SSL_OP_SSLREF2_REUSE_CERT_TYPE_BUG         0x0
# define SSL_OP_MICROSOFT_BIG_SSLV3_BUFFER
      0x0
# define SSL_OP_MSIE_SSLV2_RSA_PADDING              0x0
# define SSL_OP_SSLEAY_080_CLIENT_DH_BUG            0x0
# define SSL_OP_TLS_D5_BUG                          0x0
# define SSL_OP_TLS_BLOCK_PADDING_BUG               0x0
# define SSL_OP_SINGLE_ECDH_USE                     0x0
# define SSL_OP_SINGLE_DH_USE                       0x0
# define SSL_OP_EPHEMERAL_RSA                       0x0
# define SSL_OP_NO_SSLv2                            0x0
# define SSL_OP_PKCS1_CHECK_1                       0x0
# define SSL_OP_PKCS1_CHECK_2                       0x0
# define SSL_OP_NETSCAPE_CA_DN_BUG                  0x0
# define SSL_OP_NETSCAPE_DEMO_CIPHER_CHANGE_BUG     0x0

/*
* Allow SSL_write(..., n) to return r with 0 < r < n (i.e. report success
* when just a single record has been written):
*/
# define SSL_MODE_ENABLE_PARTIAL_WRITE       0x00000001U
/*
* Make it possible to retry SSL_write() with changed buffer location
```

```
 (buffer
* contents must stay the same!); this is not the default to avoid the
* misconception that non-blocking SSL_write() behaves like non-blocking
* write():
*/
# define SSL_MODE_ACCEPT_MOVING_WRITE_BUFFER 0x00000002U
/*
* Never bother the application with retries if the transport is blocking:
*/
# define SSL_MODE_AUTO_RETRY 0x00000004U
/* Don't attempt to automatically build certificate chain */
# define SSL_MODE_NO_AUTO_CHAIN 0x00000008U
/*
* Save RAM by releasing read and write buffers when they're empty. (SSL3 and
* TLS only.) Released buffers are freed.
*/
# define SSL_MODE_RELEASE_BUFFERS 0x00000010U
/*
* Send the current time in the Random fields of the ClientHello and
* ServerHello records for compatibility with hypothetical implementations
* that require it.
*/
# define SSL_MODE_SEND_CLIENTHELLO_TIME 0x00000020U
# define SSL_MODE_SEND_SERVERHELLO_TIME 0x00000040U
/*
* Send TLS_FALLBACK_SCSV in the ClientHello. To be set only by applications
* that reconnect
 with a downgraded protocol version; see
* draft-ietf-tls-downgrade-scsv-00 for details. DO NOT ENABLE THIS if your
* application attempts a normal handshake. Only use this in explicit
* fallback retries, following the guidance in
* draft-ietf-tls-downgrade-scsv-00.
*/
# define SSL_MODE_SEND_FALLBACK_SCSV 0x00000080U
/*
* Support Asynchronous operation
*/
# define SSL_MODE_ASYNC 0x00000100U

/*
* When using DTLS/SCTP, include the terminating zero in the label
* used for computing the endpoint-pair shared secret. Required for
* interoperability with implementations having this bug like these
* older version of OpenSSL:
* - OpenSSL 1.0.0 series
* - OpenSSL 1.0.1 series
* - OpenSSL 1.0.2 series
* - OpenSSL 1.1.0 series
```

```
* - OpenSSL 1.1.1 and 1.1.1a
*/
# define SSL_MODE_DTLS_SCTP_LABEL_LENGTH_BUG 0x00000400U

/* Cert related flags */
/*
* Many implementations ignore some aspects of the TLS standards such as
* enforcing certificate chain algorithms. When this is set we enforce
 them.
*/
# define SSL_CERT_FLAG_TLS_STRICT               0x00000001U

/* Suite B modes, takes same values as certificate verify flags */
# define SSL_CERT_FLAG_SUITEB_128_LOS_ONLY      0x10000
/* Suite B 192 bit only mode */
# define SSL_CERT_FLAG_SUITEB_192_LOS           0x20000
/* Suite B 128 bit mode allowing 192 bit algorithms */
# define SSL_CERT_FLAG_SUITEB_128_LOS           0x30000

/* Perform all sorts of protocol violations for testing purposes */
# define SSL_CERT_FLAG_BROKEN_PROTOCOL          0x10000000

/* Flags for building certificate chains */
/* Treat any existing certificates as untrusted CAs */
# define SSL_BUILD_CHAIN_FLAG_UNTRUSTED         0x1
/* Don't include root CA in chain */
# define SSL_BUILD_CHAIN_FLAG_NO_ROOT           0x2
/* Just check certificates already there */
# define SSL_BUILD_CHAIN_FLAG_CHECK             0x4
/* Ignore verification errors */
# define SSL_BUILD_CHAIN_FLAG_IGNORE_ERROR      0x8
/* Clear verification errors from queue */
#
 define SSL_BUILD_CHAIN_FLAG_CLEAR_ERROR       0x10

/* Flags returned by SSL_check_chain */
/* Certificate can be used with this session */
# define CERT_PKEY_VALID         0x1
/* Certificate can also be used for signing */
# define CERT_PKEY_SIGN          0x2
/* EE certificate signing algorithm OK */
# define CERT_PKEY_EE_SIGNATURE  0x10
/* CA signature algorithms OK */
# define CERT_PKEY_CA_SIGNATURE  0x20
/* EE certificate parameters OK */
# define CERT_PKEY_EE_PARAM      0x40
/* CA certificate parameters OK */
# define CERT_PKEY_CA_PARAM      0x80
```

```
/* Signing explicitly allowed as opposed to SHA1 fallback */
# define CERT_PKEY_EXPLICIT_SIGN 0x100
/* Client CA issuer names match (always set for server cert) */
# define CERT_PKEY_ISSUER_NAME   0x200
/* Cert type matches client types (always set for server cert) */
# define CERT_PKEY_CERT_TYPE     0x400
/* Cert chain suitable to Suite B */
# define CERT_PKEY_SUITEB        0x800

# define SSL_CONF_FLAG_CMDLINE          0x1
# define
 SSL_CONF_FLAG_FILE             0x2
# define SSL_CONF_FLAG_CLIENT           0x4
# define SSL_CONF_FLAG_SERVER           0x8
# define SSL_CONF_FLAG_SHOW_ERRORS      0x10
# define SSL_CONF_FLAG_CERTIFICATE      0x20
# define SSL_CONF_FLAG_REQUIRE_PRIVATE  0x40
/* Configuration value types */
# define SSL_CONF_TYPE_UNKNOWN          0x0
# define SSL_CONF_TYPE_STRING           0x1
# define SSL_CONF_TYPE_FILE             0x2
# define SSL_CONF_TYPE_DIR              0x3
# define SSL_CONF_TYPE_NONE             0x4
# define SSL_CONF_TYPE_STORE            0x5

/* Maximum length of the application-controlled segment of a a TLSv1.3 cookie */
# define SSL_COOKIE_LENGTH                      4096

/*
* Note: SSL[_CTX]_set_{options,mode} use |= op on the previous value, they
* cannot be used to clear bits.
*/

uint64_t SSL_CTX_get_options(const SSL_CTX *ctx);
uint64_t SSL_get_options(const SSL *s);
uint64_t SSL_CTX_clear_options(SSL_CTX *ctx, uint64_t op);
uint64_t SSL_clear_options(SSL
 *s, uint64_t op);
uint64_t SSL_CTX_set_options(SSL_CTX *ctx, uint64_t op);
uint64_t SSL_set_options(SSL *s, uint64_t op);

# define SSL_CTX_set_mode(ctx,op) \
      SSL_CTX_ctrl((ctx),SSL_CTRL_MODE,(op),NULL)
# define SSL_CTX_clear_mode(ctx,op) \
      SSL_CTX_ctrl((ctx),SSL_CTRL_CLEAR_MODE,(op),NULL)
# define SSL_CTX_get_mode(ctx) \
      SSL_CTX_ctrl((ctx),SSL_CTRL_MODE,0,NULL)
# define SSL_clear_mode(ssl,op) \
```

```
     SSL_ctrl((ssl),SSL_CTRL_CLEAR_MODE,(op),NULL)
# define SSL_set_mode(ssl,op) \
     SSL_ctrl((ssl),SSL_CTRL_MODE,(op),NULL)
# define SSL_get_mode(ssl) \
     SSL_ctrl((ssl),SSL_CTRL_MODE,0,NULL)
# define SSL_set_mtu(ssl, mtu) \
     SSL_ctrl((ssl),SSL_CTRL_SET_MTU,(mtu),NULL)
# define DTLS_set_link_mtu(ssl, mtu) \
     SSL_ctrl((ssl),DTLS_CTRL_SET_LINK_MTU,(mtu),NULL)
# define DTLS_get_link_min_mtu(ssl) \
     SSL_ctrl((ssl),DTLS_CTRL_GET_LINK_MIN_MTU,0,NULL)

# define SSL_get_secure_renegotiation_support(ssl) \
     SSL_ctrl((ssl), SSL_CTRL_GET_RI_SUPPORT,
 0, NULL)

# define SSL_CTX_set_cert_flags(ctx,op) \
     SSL_CTX_ctrl((ctx),SSL_CTRL_CERT_FLAGS,(op),NULL)
# define SSL_set_cert_flags(s,op) \
     SSL_ctrl((s),SSL_CTRL_CERT_FLAGS,(op),NULL)
# define SSL_CTX_clear_cert_flags(ctx,op) \
     SSL_CTX_ctrl((ctx),SSL_CTRL_CLEAR_CERT_FLAGS,(op),NULL)
# define SSL_clear_cert_flags(s,op) \
     SSL_ctrl((s),SSL_CTRL_CLEAR_CERT_FLAGS,(op),NULL)

void SSL_CTX_set_msg_callback(SSL_CTX *ctx,
                      void (*cb) (int write_p, int version,
                                  int content_type, const void *buf,
                                  size_t len, SSL *ssl, void *arg));
void SSL_set_msg_callback(SSL *ssl,
                    void (*cb) (int write_p, int version,
                                int content_type, const void *buf,
                                size_t len, SSL *ssl, void *arg));
# define SSL_CTX_set_msg_callback_arg(ctx, arg) SSL_CTX_ctrl((ctx),
SSL_CTRL_SET_MSG_CALLBACK_ARG,
 0, (arg))
# define SSL_set_msg_callback_arg(ssl, arg) SSL_ctrl((ssl), SSL_CTRL_SET_MSG_CALLBACK_ARG, 0, (arg))

# define SSL_get_extms_support(s) \
     SSL_ctrl((s),SSL_CTRL_GET_EXTMS_SUPPORT,0,NULL)

# ifndef OPENSSL_NO_SRP
/* see tls_srp.c */
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 __owur int SSL_SRP_CTX_init(SSL *s);
OSSL_DEPRECATEDIN_3_0 __owur int SSL_CTX_SRP_CTX_init(SSL_CTX *ctx);
OSSL_DEPRECATEDIN_3_0 int SSL_SRP_CTX_free(SSL *ctx);
OSSL_DEPRECATEDIN_3_0 int SSL_CTX_SRP_CTX_free(SSL_CTX *ctx);
```

```
OSSL_DEPRECATEDIN_3_0 __owur int SSL_srp_server_param_with_username(SSL *s,
                                                    int *ad);
OSSL_DEPRECATEDIN_3_0 __owur int SRP_Calc_A_param(SSL *s);
#  endif
# endif

/* 100k max cert list */
# define SSL_MAX_CERT_LIST_DEFAULT (1024*100)

# define SSL_SESSION_CACHE_MAX_SIZE_DEFAULT      (1024*20)

/*
* This callback type is used inside SSL_CTX, SSL, and in the functions that
 * set them. It is used to override the generation of SSL/TLS session IDs in
* a server. Return value should be zero on an error, non-zero to proceed.
* Also, callbacks should themselves check if the id they generate is unique
* otherwise the SSL handshake will fail with an error - callbacks can do
* this using the 'ssl' value they're passed by;
* SSL_has_matching_session_id(ssl, id, *id_len) The length value passed in
* is set at the maximum size the session ID can be. In SSLv3/TLSv1 it is 32
* bytes. The callback can alter this length to be less if desired. It is
* also an error for the callback to set the size to zero.
*/
typedef int (*GEN_SESSION_CB) (SSL *ssl, unsigned char *id,
                               unsigned int *id_len);

# define SSL_SESS_CACHE_OFF                      0x0000
# define SSL_SESS_CACHE_CLIENT                   0x0001
# define SSL_SESS_CACHE_SERVER                   0x0002
# define SSL_SESS_CACHE_BOTH     (SSL_SESS_CACHE_CLIENT|SSL_SESS_CACHE_SERVER)
#
 define SSL_SESS_CACHE_NO_AUTO_CLEAR            0x0080
/* enough comments already ... see SSL_CTX_set_session_cache_mode(3) */
# define SSL_SESS_CACHE_NO_INTERNAL_LOOKUP       0x0100
# define SSL_SESS_CACHE_NO_INTERNAL_STORE        0x0200
# define SSL_SESS_CACHE_NO_INTERNAL \
     (SSL_SESS_CACHE_NO_INTERNAL_LOOKUP|SSL_SESS_CACHE_NO_INTERNAL_STORE)
# define SSL_SESS_CACHE_UPDATE_TIME              0x0400

LHASH_OF(SSL_SESSION) *SSL_CTX_sessions(SSL_CTX *ctx);
# define SSL_CTX_sess_number(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_NUMBER,0,NULL)
# define SSL_CTX_sess_connect(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_CONNECT,0,NULL)
# define SSL_CTX_sess_connect_good(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_CONNECT_GOOD,0,NULL)
# define SSL_CTX_sess_connect_renegotiate(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_CONNECT_RENEGOTIATE,0,NULL)
```

```
# define SSL_CTX_sess_accept(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_ACCEPT,0,NULL)
# define SSL_CTX_sess_accept_renegotiate(ctx)
 \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_ACCEPT_RENEGOTIATE,0,NULL)
# define SSL_CTX_sess_accept_good(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_ACCEPT_GOOD,0,NULL)
# define SSL_CTX_sess_hits(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_HIT,0,NULL)
# define SSL_CTX_sess_cb_hits(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_CB_HIT,0,NULL)
# define SSL_CTX_sess_misses(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_MISSES,0,NULL)
# define SSL_CTX_sess_timeouts(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_TIMEOUTS,0,NULL)
# define SSL_CTX_sess_cache_full(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SESS_CACHE_FULL,0,NULL)

void SSL_CTX_sess_set_new_cb(SSL_CTX *ctx,
                     int (*new_session_cb) (struct ssl_st *ssl,
                                            SSL_SESSION *sess));
int (*SSL_CTX_sess_get_new_cb(SSL_CTX *ctx)) (struct ssl_st *ssl,
                                       SSL_SESSION *sess);
void SSL_CTX_sess_set_remove_cb(SSL_CTX *ctx,
                        void (*remove_session_cb) (struct ssl_ctx_st
                                                   *ctx,
                                                   SSL_SESSION *sess));
void (*SSL_CTX_sess_get_remove_cb(SSL_CTX *ctx)) (struct ssl_ctx_st *ctx,
                                       SSL_SESSION *sess);
void SSL_CTX_sess_set_get_cb(SSL_CTX *ctx,
                     SSL_SESSION *(*get_session_cb) (struct ssl_st
                                                     *ssl,
                                                     const unsigned char
                                                     *data, int len,
                                                     int *copy));
SSL_SESSION *(*SSL_CTX_sess_get_get_cb(SSL_CTX *ctx)) (struct ssl_st *ssl,
                                       const unsigned char *data,
                                       int len,
 int *copy);
void SSL_CTX_set_info_callback(SSL_CTX *ctx,
                       void (*cb) (const SSL *ssl, int type, int val));
void (*SSL_CTX_get_info_callback(SSL_CTX *ctx)) (const SSL *ssl, int type,
                                      int val);
void SSL_CTX_set_client_cert_cb(SSL_CTX *ctx,
                        int (*client_cert_cb) (SSL *ssl, X509 **x509,
                                               EVP_PKEY **pkey));
int (*SSL_CTX_get_client_cert_cb(SSL_CTX *ctx)) (SSL *ssl, X509 **x509,
                                      EVP_PKEY **pkey);
```

```
# ifndef OPENSSL_NO_ENGINE
__owur int SSL_CTX_set_client_cert_engine(SSL_CTX *ctx, ENGINE *e);
# endif
void SSL_CTX_set_cookie_generate_cb(SSL_CTX *ctx,
                            int (*app_gen_cookie_cb) (SSL *ssl,
                                                      unsigned char
                                                      *cookie,

                                      unsigned int
                                                      *cookie_len));
void SSL_CTX_set_cookie_verify_cb(SSL_CTX *ctx,
                           int (*app_verify_cookie_cb) (SSL *ssl,
                                                        const unsigned
                                                        char *cookie,
                                                        unsigned int
                                                        cookie_len));

void SSL_CTX_set_stateless_cookie_generate_cb(
  SSL_CTX *ctx,
  int (*gen_stateless_cookie_cb) (SSL *ssl,
                             unsigned char *cookie,
                             size_t *cookie_len));
void SSL_CTX_set_stateless_cookie_verify_cb(
  SSL_CTX *ctx,
  int (*verify_stateless_cookie_cb) (SSL *ssl,
                               const unsigned char *cookie,

           size_t cookie_len));
# ifndef OPENSSL_NO_NEXTPROTONEG

typedef int (*SSL_CTX_npn_advertised_cb_func)(SSL *ssl,
                                    const unsigned char **out,
                                    unsigned int *outlen,
                                    void *arg);
void SSL_CTX_set_next_protos_advertised_cb(SSL_CTX *s,
                                   SSL_CTX_npn_advertised_cb_func cb,
                                   void *arg);
#  define SSL_CTX_set_npn_advertised_cb SSL_CTX_set_next_protos_advertised_cb

typedef int (*SSL_CTX_npn_select_cb_func)(SSL *s,
                                    unsigned char **out,
                                    unsigned char *outlen,
                                    const unsigned char *in,
                                    unsigned int inlen,
                                    void *arg);
void SSL_CTX_set_next_proto_select_cb(SSL_CTX *s,
                                SSL_CTX_npn_select_cb_func cb,
                               void *arg);
```

```
# define SSL_CTX_set_npn_select_cb SSL_CTX_set_next_proto_select_cb

void SSL_get0_next_proto_negotiated(const SSL *s, const unsigned char **data,
                                    unsigned *len);
# define SSL_get0_npn_negotiated SSL_get0_next_proto_negotiated
# endif

__owur int SSL_select_next_proto(unsigned char **out, unsigned char *outlen,
                                 const unsigned char *in, unsigned int inlen,
                                 const unsigned char *client,
                                 unsigned int client_len);

# define OPENSSL_NPN_UNSUPPORTED 0
# define OPENSSL_NPN_NEGOTIATED  1
# define OPENSSL_NPN_NO_OVERLAP  2

__owur int SSL_CTX_set_alpn_protos(SSL_CTX *ctx, const unsigned char *protos,
                                   unsigned int protos_len);
__owur int SSL_set_alpn_protos(SSL *ssl, const unsigned char *protos,

                               unsigned int protos_len);
typedef int (*SSL_CTX_alpn_select_cb_func)(SSL *ssl,
                                           const unsigned char **out,
                                           unsigned char *outlen,
                                           const unsigned char *in,
                                           unsigned int inlen,
                                           void *arg);
void SSL_CTX_set_alpn_select_cb(SSL_CTX *ctx,
                                SSL_CTX_alpn_select_cb_func cb,
                                void *arg);
void SSL_get0_alpn_selected(const SSL *ssl, const unsigned char **data,
                            unsigned int *len);

# ifndef OPENSSL_NO_PSK
/*
* the maximum length of the buffer given to callbacks containing the
* resulting identity/psk
*/
# define PSK_MAX_IDENTITY_LEN 256
# define PSK_MAX_PSK_LEN 512
typedef unsigned int (*SSL_psk_client_cb_func)(SSL *ssl,
                                               const char
 *hint,
                                               char *identity,
                                               unsigned int max_identity_len,
                                               unsigned char *psk,
                                               unsigned int max_psk_len);
void SSL_CTX_set_psk_client_callback(SSL_CTX *ctx, SSL_psk_client_cb_func cb);
```

```
void SSL_set_psk_client_callback(SSL *ssl, SSL_psk_client_cb_func cb);

typedef unsigned int (*SSL_psk_server_cb_func)(SSL *ssl,
                                               const char *identity,
                                               unsigned char *psk,
                                               unsigned int max_psk_len);
void SSL_CTX_set_psk_server_callback(SSL_CTX *ctx, SSL_psk_server_cb_func cb);
void SSL_set_psk_server_callback(SSL *ssl, SSL_psk_server_cb_func cb);

__owur int SSL_CTX_use_psk_identity_hint(SSL_CTX *ctx, const char *identity_hint);
__owur int SSL_use_psk_identity_hint(SSL *s, const char *identity_hint);
const
 char *SSL_get_psk_identity_hint(const SSL *s);
const char *SSL_get_psk_identity(const SSL *s);
# endif

typedef int (*SSL_psk_find_session_cb_func)(SSL *ssl,
                                            const unsigned char *identity,
                                            size_t identity_len,
                                            SSL_SESSION **sess);
typedef int (*SSL_psk_use_session_cb_func)(SSL *ssl, const EVP_MD *md,
                                           const unsigned char **id,
                                           size_t *idlen,
                                           SSL_SESSION **sess);

void SSL_set_psk_find_session_callback(SSL *s, SSL_psk_find_session_cb_func cb);
void SSL_CTX_set_psk_find_session_callback(SSL_CTX *ctx,
                                           SSL_psk_find_session_cb_func cb);
void SSL_set_psk_use_session_callback(SSL *s, SSL_psk_use_session_cb_func cb);
void SSL_CTX_set_psk_use_session_callback(SSL_CTX *ctx,

                                          SSL_psk_use_session_cb_func cb);

/* Register callbacks to handle custom TLS Extensions for client or server. */

__owur int SSL_CTX_has_client_custom_ext(const SSL_CTX *ctx,
                                         unsigned int ext_type);

__owur int SSL_CTX_add_client_custom_ext(SSL_CTX *ctx,
                                         unsigned int ext_type,
                                         custom_ext_add_cb add_cb,
                                         custom_ext_free_cb free_cb,
                                         void *add_arg,
                                         custom_ext_parse_cb parse_cb,
                                         void *parse_arg);

__owur int SSL_CTX_add_server_custom_ext(SSL_CTX *ctx,
                                         unsigned int ext_type,
```

```
                        custom_ext_add_cb add_cb,
                        custom_ext_free_cb free_cb,

                void *add_arg,
                        custom_ext_parse_cb parse_cb,
                        void *parse_arg);

__owur int SSL_CTX_add_custom_ext(SSL_CTX *ctx, unsigned int ext_type,
                        unsigned int context,
                        SSL_custom_ext_add_cb_ex add_cb,
                        SSL_custom_ext_free_cb_ex free_cb,
                        void *add_arg,
                        SSL_custom_ext_parse_cb_ex parse_cb,
                        void *parse_arg);

__owur int SSL_extension_supported(unsigned int ext_type);

# define SSL_NOTHING            1
# define SSL_WRITING            2
# define SSL_READING            3
# define SSL_X509_LOOKUP        4
# define SSL_ASYNC_PAUSED       5
# define SSL_ASYNC_NO_JOBS      6
# define SSL_CLIENT_HELLO_CB    7
# define SSL_RETRY_VERIFY       8

/* These will only be used when doing non-blocking IO */
# define SSL_want_nothing(s)
        (SSL_want(s) == SSL_NOTHING)
# define SSL_want_read(s)           (SSL_want(s) == SSL_READING)
# define SSL_want_write(s)          (SSL_want(s) == SSL_WRITING)
# define SSL_want_x509_lookup(s)    (SSL_want(s) == SSL_X509_LOOKUP)
# define SSL_want_retry_verify(s)   (SSL_want(s) == SSL_RETRY_VERIFY)
# define SSL_want_async(s)          (SSL_want(s) == SSL_ASYNC_PAUSED)
# define SSL_want_async_job(s)      (SSL_want(s) == SSL_ASYNC_NO_JOBS)
# define SSL_want_client_hello_cb(s) (SSL_want(s) == SSL_CLIENT_HELLO_CB)

# define SSL_MAC_FLAG_READ_MAC_STREAM 1
# define SSL_MAC_FLAG_WRITE_MAC_STREAM 2
# define SSL_MAC_FLAG_READ_MAC_TLSTREE 4
# define SSL_MAC_FLAG_WRITE_MAC_TLSTREE 8

/*
* A callback for logging out TLS key material. This callback should log out
* |line| followed by a newline.
*/
typedef void (*SSL_CTX_keylog_cb_func)(const SSL *ssl, const char *line);
```

```
/*
* SSL_CTX_set_keylog_callback configures a callback to log key material. This
* is intended
 for debugging use with tools like Wireshark. The cb function
* should log line followed by a newline.
*/
void SSL_CTX_set_keylog_callback(SSL_CTX *ctx, SSL_CTX_keylog_cb_func cb);

/*
* SSL_CTX_get_keylog_callback returns the callback configured by
* SSL_CTX_set_keylog_callback.
*/
SSL_CTX_keylog_cb_func SSL_CTX_get_keylog_callback(const SSL_CTX *ctx);

int SSL_CTX_set_max_early_data(SSL_CTX *ctx, uint32_t max_early_data);
uint32_t SSL_CTX_get_max_early_data(const SSL_CTX *ctx);
int SSL_set_max_early_data(SSL *s, uint32_t max_early_data);
uint32_t SSL_get_max_early_data(const SSL *s);
int SSL_CTX_set_recv_max_early_data(SSL_CTX *ctx, uint32_t recv_max_early_data);
uint32_t SSL_CTX_get_recv_max_early_data(const SSL_CTX *ctx);
int SSL_set_recv_max_early_data(SSL *s, uint32_t recv_max_early_data);
uint32_t SSL_get_recv_max_early_data(const SSL *s);

#ifdef __cplusplus
}
#endif

# include <openssl/ssl2.h>
# include <openssl/ssl3.h>
# include <openssl/tls1.h>      /* This is mostly sslv3
 with a few tweaks */
# include <openssl/dtls1.h>     /* Datagram TLS */
# include <openssl/srtp.h>      /* Support for the use_srtp extension */

#ifdef  __cplusplus
extern "C" {
#endif

/*
* These need to be after the above set of includes due to a compiler bug
* in VisualStudio 2015
*/
SKM_DEFINE_STACK_OF_INTERNAL(SSL_CIPHER, const SSL_CIPHER, SSL_CIPHER)
#define sk_SSL_CIPHER_num(sk) OPENSSL_sk_num(ossl_check_const_SSL_CIPHER_sk_type(sk))
#define sk_SSL_CIPHER_value(sk, idx) ((const SSL_CIPHER
*)OPENSSL_sk_value(ossl_check_const_SSL_CIPHER_sk_type(sk), (idx)))
#define sk_SSL_CIPHER_new(cmp) ((STACK_OF(SSL_CIPHER)
*)OPENSSL_sk_new(ossl_check_SSL_CIPHER_compfunc_type(cmp)))
```

```
#define sk_SSL_CIPHER_new_null() ((STACK_OF(SSL_CIPHER) *)OPENSSL_sk_new_null())
#define sk_SSL_CIPHER_new_reserve(cmp, n) ((STACK_OF(SSL_CIPHER)
*)OPENSSL_sk_new_reserve(ossl_check_SSL_CIPHER_compfunc_type(cmp), (n)))
#define sk_SSL_CIPHER_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_SSL_CIPHER_sk_type(sk),
 (n))
#define sk_SSL_CIPHER_free(sk) OPENSSL_sk_free(ossl_check_SSL_CIPHER_sk_type(sk))
#define sk_SSL_CIPHER_zero(sk) OPENSSL_sk_zero(ossl_check_SSL_CIPHER_sk_type(sk))
#define sk_SSL_CIPHER_delete(sk, i) ((const SSL_CIPHER
*)OPENSSL_sk_delete(ossl_check_SSL_CIPHER_sk_type(sk), (i)))
#define sk_SSL_CIPHER_delete_ptr(sk, ptr) ((const SSL_CIPHER
*)OPENSSL_sk_delete_ptr(ossl_check_SSL_CIPHER_sk_type(sk), ossl_check_SSL_CIPHER_type(ptr)))
#define sk_SSL_CIPHER_push(sk, ptr) OPENSSL_sk_push(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_type(ptr))
#define sk_SSL_CIPHER_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_type(ptr))
#define sk_SSL_CIPHER_pop(sk) ((const SSL_CIPHER
*)OPENSSL_sk_pop(ossl_check_SSL_CIPHER_sk_type(sk)))
#define sk_SSL_CIPHER_shift(sk) ((const SSL_CIPHER
*)OPENSSL_sk_shift(ossl_check_SSL_CIPHER_sk_type(sk)))
#define sk_SSL_CIPHER_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SSL_CIPHER_sk_type(sk),ossl_check_SSL_CIPHER_freefunc_type(freefunc
))
#define
 sk_SSL_CIPHER_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_type(ptr), (idx))
#define sk_SSL_CIPHER_set(sk, idx, ptr) ((const SSL_CIPHER
*)OPENSSL_sk_set(ossl_check_SSL_CIPHER_sk_type(sk), (idx), ossl_check_SSL_CIPHER_type(ptr)))
#define sk_SSL_CIPHER_find(sk, ptr) OPENSSL_sk_find(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_type(ptr))
#define sk_SSL_CIPHER_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_type(ptr))
#define sk_SSL_CIPHER_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_type(ptr), pnum)
#define sk_SSL_CIPHER_sort(sk) OPENSSL_sk_sort(ossl_check_SSL_CIPHER_sk_type(sk))
#define sk_SSL_CIPHER_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SSL_CIPHER_sk_type(sk))
#define sk_SSL_CIPHER_dup(sk) ((STACK_OF(SSL_CIPHER)
*)OPENSSL_sk_dup(ossl_check_const_SSL_CIPHER_sk_type(sk)))
#define
 sk_SSL_CIPHER_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(SSL_CIPHER)
*)OPENSSL_sk_deep_copy(ossl_check_const_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_copyfunc_type(copyfunc), ossl_check_SSL_CIPHER_freefunc_type(freefunc)))
#define sk_SSL_CIPHER_set_cmp_func(sk, cmp)
((sk_SSL_CIPHER_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SSL_CIPHER_sk_type(sk),
ossl_check_SSL_CIPHER_compfunc_type(cmp)))
SKM_DEFINE_STACK_OF_INTERNAL(SSL_COMP, SSL_COMP, SSL_COMP)
#define sk_SSL_COMP_num(sk) OPENSSL_sk_num(ossl_check_const_SSL_COMP_sk_type(sk))
#define sk_SSL_COMP_value(sk, idx) ((SSL_COMP
*)OPENSSL_sk_value(ossl_check_const_SSL_COMP_sk_type(sk), (idx)))
```

```
#define sk_SSL_COMP_new(cmp) ((STACK_OF(SSL_COMP)
*)OPENSSL_sk_new(ossl_check_SSL_COMP_compfunc_type(cmp)))
#define sk_SSL_COMP_new_null() ((STACK_OF(SSL_COMP) *)OPENSSL_sk_new_null())
#define sk_SSL_COMP_new_reserve(cmp, n) ((STACK_OF(SSL_COMP)
*)OPENSSL_sk_new_reserve(ossl_check_SSL_COMP_compfunc_type(cmp), (n)))
#define sk_SSL_COMP_reserve(sk,
 n) OPENSSL_sk_reserve(ossl_check_SSL_COMP_sk_type(sk), (n))
#define sk_SSL_COMP_free(sk) OPENSSL_sk_free(ossl_check_SSL_COMP_sk_type(sk))
#define sk_SSL_COMP_zero(sk) OPENSSL_sk_zero(ossl_check_SSL_COMP_sk_type(sk))
#define sk_SSL_COMP_delete(sk, i) ((SSL_COMP *)OPENSSL_sk_delete(ossl_check_SSL_COMP_sk_type(sk),
(i)))
#define sk_SSL_COMP_delete_ptr(sk, ptr) ((SSL_COMP
*)OPENSSL_sk_delete_ptr(ossl_check_SSL_COMP_sk_type(sk), ossl_check_SSL_COMP_type(ptr)))
#define sk_SSL_COMP_push(sk, ptr) OPENSSL_sk_push(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_type(ptr))
#define sk_SSL_COMP_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_type(ptr))
#define sk_SSL_COMP_pop(sk) ((SSL_COMP *)OPENSSL_sk_pop(ossl_check_SSL_COMP_sk_type(sk)))
#define sk_SSL_COMP_shift(sk) ((SSL_COMP *)OPENSSL_sk_shift(ossl_check_SSL_COMP_sk_type(sk)))
#define sk_SSL_COMP_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_SSL_COMP_sk_type(sk),ossl_check_SSL_COMP_freefunc_type(freefunc))
#define
 sk_SSL_COMP_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_type(ptr), (idx))
#define sk_SSL_COMP_set(sk, idx, ptr) ((SSL_COMP *)OPENSSL_sk_set(ossl_check_SSL_COMP_sk_type(sk),
(idx), ossl_check_SSL_COMP_type(ptr)))
#define sk_SSL_COMP_find(sk, ptr) OPENSSL_sk_find(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_type(ptr))
#define sk_SSL_COMP_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_type(ptr))
#define sk_SSL_COMP_find_all(sk, ptr, pnum) OPENSSL_sk_find_all(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_type(ptr), pnum)
#define sk_SSL_COMP_sort(sk) OPENSSL_sk_sort(ossl_check_SSL_COMP_sk_type(sk))
#define sk_SSL_COMP_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_SSL_COMP_sk_type(sk))
#define sk_SSL_COMP_dup(sk) ((STACK_OF(SSL_COMP)
*)OPENSSL_sk_dup(ossl_check_const_SSL_COMP_sk_type(sk)))
#define sk_SSL_COMP_deep_copy(sk, copyfunc, freefunc)
 ((STACK_OF(SSL_COMP) *)OPENSSL_sk_deep_copy(ossl_check_const_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_copyfunc_type(copyfunc), ossl_check_SSL_COMP_freefunc_type(freefunc)))
#define sk_SSL_COMP_set_cmp_func(sk, cmp)
((sk_SSL_COMP_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_SSL_COMP_sk_type(sk),
ossl_check_SSL_COMP_compfunc_type(cmp)))


/* compatibility */
# define SSL_set_app_data(s,arg)         (SSL_set_ex_data(s,0,(char *)(arg)))
# define SSL_get_app_data(s)             (SSL_get_ex_data(s,0))
# define SSL_SESSION_set_app_data(s,a)   (SSL_SESSION_set_ex_data(s,0, \
```

```
                                        (char *)(a)))
# define SSL_SESSION_get_app_data(s)     (SSL_SESSION_get_ex_data(s,0))
# define SSL_CTX_get_app_data(ctx)       (SSL_CTX_get_ex_data(ctx,0))
# define SSL_CTX_set_app_data(ctx,arg)   (SSL_CTX_set_ex_data(ctx,0, \
                                        (char *)(arg)))
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0
 void SSL_set_debug(SSL *s, int debug);
# endif

/* TLSv1.3 KeyUpdate message types */
/* -1 used so that this is an invalid value for the on-the-wire protocol */
#define SSL_KEY_UPDATE_NONE             -1
/* Values as defined for the on-the-wire protocol */
#define SSL_KEY_UPDATE_NOT_REQUESTED     0
#define SSL_KEY_UPDATE_REQUESTED         1

/*
* The valid handshake states (one for each type message sent and one for each
* type of message received). There are also two "special" states:
* TLS = TLS or DTLS state
* DTLS = DTLS specific state
* CR/SR = Client Read/Server Read
* CW/SW = Client Write/Server Write
*
* The "special" states are:
* TLS_ST_BEFORE = No handshake has been initiated yet
* TLS_ST_OK = A handshake has been successfully completed
*/
typedef enum {
  TLS_ST_BEFORE,
  TLS_ST_OK,
  DTLS_ST_CR_HELLO_VERIFY_REQUEST,
  TLS_ST_CR_SRVR_HELLO,
  TLS_ST_CR_CERT,
  TLS_ST_CR_CERT_STATUS,
  TLS_ST_CR_KEY_EXCH,
  TLS_ST_CR_CERT_REQ,
  TLS_ST_CR_SRVR_DONE,
   TLS_ST_CR_SESSION_TICKET,
  TLS_ST_CR_CHANGE,
  TLS_ST_CR_FINISHED,
  TLS_ST_CW_CLNT_HELLO,
  TLS_ST_CW_CERT,
  TLS_ST_CW_KEY_EXCH,
  TLS_ST_CW_CERT_VRFY,
  TLS_ST_CW_CHANGE,
  TLS_ST_CW_NEXT_PROTO,
```

```
  TLS_ST_CW_FINISHED,
  TLS_ST_SW_HELLO_REQ,
  TLS_ST_SR_CLNT_HELLO,
  DTLS_ST_SW_HELLO_VERIFY_REQUEST,
  TLS_ST_SW_SRVR_HELLO,
  TLS_ST_SW_CERT,
  TLS_ST_SW_KEY_EXCH,
  TLS_ST_SW_CERT_REQ,
  TLS_ST_SW_SRVR_DONE,
  TLS_ST_SR_CERT,
  TLS_ST_SR_KEY_EXCH,
  TLS_ST_SR_CERT_VRFY,
  TLS_ST_SR_NEXT_PROTO,
  TLS_ST_SR_CHANGE,
  TLS_ST_SR_FINISHED,
  TLS_ST_SW_SESSION_TICKET,
  TLS_ST_SW_CERT_STATUS,
  TLS_ST_SW_CHANGE,
  TLS_ST_SW_FINISHED,
  TLS_ST_SW_ENCRYPTED_EXTENSIONS,
  TLS_ST_CR_ENCRYPTED_EXTENSIONS,
  TLS_ST_CR_CERT_VRFY,
  TLS_ST_SW_CERT_VRFY,
  TLS_ST_CR_HELLO_REQ,
  TLS_ST_SW_KEY_UPDATE,
  TLS_ST_CW_KEY_UPDATE,
  TLS_ST_SR_KEY_UPDATE,
  TLS_ST_CR_KEY_UPDATE,
  TLS_ST_EARLY_DATA,
  TLS_ST_PENDING_EARLY_DATA_END,
   TLS_ST_CW_END_OF_EARLY_DATA,
  TLS_ST_SR_END_OF_EARLY_DATA
} OSSL_HANDSHAKE_STATE;

/*
* Most of the following state values are no longer used and are defined to be
* the closest equivalent value in the current state machine code. Not all
* defines have an equivalent and are set to a dummy value (-1). SSL_ST_CONNECT
* and SSL_ST_ACCEPT are still in use in the definition of SSL_CB_ACCEPT_LOOP,
* SSL_CB_ACCEPT_EXIT, SSL_CB_CONNECT_LOOP and SSL_CB_CONNECT_EXIT.
*/

# define SSL_ST_CONNECT               0x1000
# define SSL_ST_ACCEPT                0x2000

# define SSL_ST_MASK                  0x0FFF

# define SSL_CB_LOOP                  0x01
```

```
# define SSL_CB_EXIT                 0x02
# define SSL_CB_READ                 0x04
# define SSL_CB_WRITE                0x08
# define SSL_CB_ALERT                0x4000/* used in callback */
# define SSL_CB_READ_ALERT           (SSL_CB_ALERT|SSL_CB_READ)
# define SSL_CB_WRITE_ALERT
   (SSL_CB_ALERT|SSL_CB_WRITE)
# define SSL_CB_ACCEPT_LOOP          (SSL_ST_ACCEPT|SSL_CB_LOOP)
# define SSL_CB_ACCEPT_EXIT          (SSL_ST_ACCEPT|SSL_CB_EXIT)
# define SSL_CB_CONNECT_LOOP         (SSL_ST_CONNECT|SSL_CB_LOOP)
# define SSL_CB_CONNECT_EXIT         (SSL_ST_CONNECT|SSL_CB_EXIT)
# define SSL_CB_HANDSHAKE_START      0x10
# define SSL_CB_HANDSHAKE_DONE       0x20

/* Is the SSL_connection established? */
# define SSL_in_connect_init(a)      (SSL_in_init(a) && !SSL_is_server(a))
# define SSL_in_accept_init(a)       (SSL_in_init(a) && SSL_is_server(a))
int SSL_in_init(const SSL *s);
int SSL_in_before(const SSL *s);
int SSL_is_init_finished(const SSL *s);

/*
* The following 3 states are kept in ssl->rlayer.rstate when reads fail, you
* should not need these
*/
# define SSL_ST_READ_HEADER          0xF0
# define SSL_ST_READ_BODY            0xF1
# define SSL_ST_READ_DONE            0xF2

/*-
* Obtain latest
 Finished message
*   -- that we sent (SSL_get_finished)
*   -- that we expected from peer (SSL_get_peer_finished).
* Returns length (0 == no Finished so far), copies up to 'count' bytes.
*/
size_t SSL_get_finished(const SSL *s, void *buf, size_t count);
size_t SSL_get_peer_finished(const SSL *s, void *buf, size_t count);

/*
* use either SSL_VERIFY_NONE or SSL_VERIFY_PEER, the last 3 options are
* 'ored' with SSL_VERIFY_PEER if they are desired
*/
# define SSL_VERIFY_NONE             0x00
# define SSL_VERIFY_PEER             0x01
# define SSL_VERIFY_FAIL_IF_NO_PEER_CERT 0x02
# define SSL_VERIFY_CLIENT_ONCE      0x04
# define SSL_VERIFY_POST_HANDSHAKE   0x08
```

```
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define OpenSSL_add_ssl_algorithms()   SSL_library_init()
#  define SSLeay_add_ssl_algorithms()    SSL_library_init()
# endif

/* More backward compatibility */
# define SSL_get_cipher(s) \
            SSL_CIPHER_get_name(SSL_get_current_cipher(s))
# define SSL_get_cipher_bits(s,np)
 \
            SSL_CIPHER_get_bits(SSL_get_current_cipher(s),np)
# define SSL_get_cipher_version(s) \
            SSL_CIPHER_get_version(SSL_get_current_cipher(s))
# define SSL_get_cipher_name(s) \
            SSL_CIPHER_get_name(SSL_get_current_cipher(s))
# define SSL_get_time(a)        SSL_SESSION_get_time(a)
# define SSL_set_time(a,b)      SSL_SESSION_set_time((a),(b))
# define SSL_get_timeout(a)     SSL_SESSION_get_timeout(a)
# define SSL_set_timeout(a,b)   SSL_SESSION_set_timeout((a),(b))

# define d2i_SSL_SESSION_bio(bp,s_id)
ASN1_d2i_bio_of(SSL_SESSION,SSL_SESSION_new,d2i_SSL_SESSION,bp,s_id)
# define i2d_SSL_SESSION_bio(bp,s_id) ASN1_i2d_bio_of(SSL_SESSION,i2d_SSL_SESSION,bp,s_id)

DECLARE_PEM_rw(SSL_SESSION, SSL_SESSION)
# define SSL_AD_REASON_OFFSET           1000/* offset to get SSL_R_... value
                                * from SSL_AD_... */
/* These alert types are for SSLv3 and TLSv1 */
# define SSL_AD_CLOSE_NOTIFY
     SSL3_AD_CLOSE_NOTIFY
/* fatal */
# define SSL_AD_UNEXPECTED_MESSAGE      SSL3_AD_UNEXPECTED_MESSAGE
/* fatal */
# define SSL_AD_BAD_RECORD_MAC          SSL3_AD_BAD_RECORD_MAC
# define SSL_AD_DECRYPTION_FAILED       TLS1_AD_DECRYPTION_FAILED
# define SSL_AD_RECORD_OVERFLOW         TLS1_AD_RECORD_OVERFLOW
/* fatal */
# define SSL_AD_DECOMPRESSION_FAILURE   SSL3_AD_DECOMPRESSION_FAILURE
/* fatal */
# define SSL_AD_HANDSHAKE_FAILURE       SSL3_AD_HANDSHAKE_FAILURE
/* Not for TLS */
# define SSL_AD_NO_CERTIFICATE          SSL3_AD_NO_CERTIFICATE
# define SSL_AD_BAD_CERTIFICATE         SSL3_AD_BAD_CERTIFICATE
# define SSL_AD_UNSUPPORTED_CERTIFICATE  SSL3_AD_UNSUPPORTED_CERTIFICATE
# define SSL_AD_CERTIFICATE_REVOKED     SSL3_AD_CERTIFICATE_REVOKED
# define SSL_AD_CERTIFICATE_EXPIRED     SSL3_AD_CERTIFICATE_EXPIRED
# define SSL_AD_CERTIFICATE_UNKNOWN     SSL3_AD_CERTIFICATE_UNKNOWN
```

```
/* fatal */
# define SSL_AD_ILLEGAL_PARAMETER       SSL3_AD_ILLEGAL_PARAMETER
/* fatal */
# define
 SSL_AD_UNKNOWN_CA             TLS1_AD_UNKNOWN_CA
/* fatal */
# define SSL_AD_ACCESS_DENIED          TLS1_AD_ACCESS_DENIED
/* fatal */
# define SSL_AD_DECODE_ERROR           TLS1_AD_DECODE_ERROR
# define SSL_AD_DECRYPT_ERROR          TLS1_AD_DECRYPT_ERROR
/* fatal */
# define SSL_AD_EXPORT_RESTRICTION      TLS1_AD_EXPORT_RESTRICTION
/* fatal */
# define SSL_AD_PROTOCOL_VERSION        TLS1_AD_PROTOCOL_VERSION
/* fatal */
# define SSL_AD_INSUFFICIENT_SECURITY    TLS1_AD_INSUFFICIENT_SECURITY
/* fatal */
# define SSL_AD_INTERNAL_ERROR          TLS1_AD_INTERNAL_ERROR
# define SSL_AD_USER_CANCELLED          TLS1_AD_USER_CANCELLED
# define SSL_AD_NO_RENEGOTIATION        TLS1_AD_NO_RENEGOTIATION
# define SSL_AD_MISSING_EXTENSION       TLS13_AD_MISSING_EXTENSION
# define SSL_AD_CERTIFICATE_REQUIRED     TLS13_AD_CERTIFICATE_REQUIRED
# define SSL_AD_UNSUPPORTED_EXTENSION    TLS1_AD_UNSUPPORTED_EXTENSION
# define SSL_AD_CERTIFICATE_UNOBTAINABLE TLS1_AD_CERTIFICATE_UNOBTAINABLE
#
 define SSL_AD_UNRECOGNIZED_NAME       TLS1_AD_UNRECOGNIZED_NAME
# define SSL_AD_BAD_CERTIFICATE_STATUS_RESPONSE
TLS1_AD_BAD_CERTIFICATE_STATUS_RESPONSE
# define SSL_AD_BAD_CERTIFICATE_HASH_VALUE TLS1_AD_BAD_CERTIFICATE_HASH_VALUE
/* fatal */
# define SSL_AD_UNKNOWN_PSK_IDENTITY     TLS1_AD_UNKNOWN_PSK_IDENTITY
/* fatal */
# define SSL_AD_INAPPROPRIATE_FALLBACK   TLS1_AD_INAPPROPRIATE_FALLBACK
# define SSL_AD_NO_APPLICATION_PROTOCOL  TLS1_AD_NO_APPLICATION_PROTOCOL
# define SSL_ERROR_NONE                 0
# define SSL_ERROR_SSL                  1
# define SSL_ERROR_WANT_READ            2
# define SSL_ERROR_WANT_WRITE           3
# define SSL_ERROR_WANT_X509_LOOKUP      4
# define SSL_ERROR_SYSCALL              5/* look at error stack/return
                                 * value/errno */
# define SSL_ERROR_ZERO_RETURN          6
# define SSL_ERROR_WANT_CONNECT         7
# define SSL_ERROR_WANT_ACCEPT          8
# define SSL_ERROR_WANT_ASYNC           9
# define SSL_ERROR_WANT_ASYNC_JOB
      10
# define SSL_ERROR_WANT_CLIENT_HELLO_CB 11
```

```
# define SSL_ERROR_WANT_RETRY_VERIFY    12

# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SSL_CTRL_SET_TMP_DH                 3
#  define SSL_CTRL_SET_TMP_ECDH               4
#  define SSL_CTRL_SET_TMP_DH_CB              6
# endif

# define SSL_CTRL_GET_CLIENT_CERT_REQUEST       9
# define SSL_CTRL_GET_NUM_RENEGOTIATIONS        10
# define SSL_CTRL_CLEAR_NUM_RENEGOTIATIONS      11
# define SSL_CTRL_GET_TOTAL_RENEGOTIATIONS      12
# define SSL_CTRL_GET_FLAGS                     13
# define SSL_CTRL_EXTRA_CHAIN_CERT              14
# define SSL_CTRL_SET_MSG_CALLBACK              15
# define SSL_CTRL_SET_MSG_CALLBACK_ARG          16
/* only applies to datagram connections */
# define SSL_CTRL_SET_MTU               17
/* Stats */
# define SSL_CTRL_SESS_NUMBER                   20
# define SSL_CTRL_SESS_CONNECT                  21
# define SSL_CTRL_SESS_CONNECT_GOOD             22
# define SSL_CTRL_SESS_CONNECT_RENEGOTIATE
      23
# define SSL_CTRL_SESS_ACCEPT                   24
# define SSL_CTRL_SESS_ACCEPT_GOOD              25
# define SSL_CTRL_SESS_ACCEPT_RENEGOTIATE       26
# define SSL_CTRL_SESS_HIT                      27
# define SSL_CTRL_SESS_CB_HIT                   28
# define SSL_CTRL_SESS_MISSES                   29
# define SSL_CTRL_SESS_TIMEOUTS                 30
# define SSL_CTRL_SESS_CACHE_FULL               31
# define SSL_CTRL_MODE                          33
# define SSL_CTRL_GET_READ_AHEAD                40
# define SSL_CTRL_SET_READ_AHEAD                41
# define SSL_CTRL_SET_SESS_CACHE_SIZE           42
# define SSL_CTRL_GET_SESS_CACHE_SIZE           43
# define SSL_CTRL_SET_SESS_CACHE_MODE           44
# define SSL_CTRL_GET_SESS_CACHE_MODE           45
# define SSL_CTRL_GET_MAX_CERT_LIST             50
# define SSL_CTRL_SET_MAX_CERT_LIST             51
# define SSL_CTRL_SET_MAX_SEND_FRAGMENT         52
/* see tls1.h for macros based
 on these */
# define SSL_CTRL_SET_TLSEXT_SERVERNAME_CB      53
# define SSL_CTRL_SET_TLSEXT_SERVERNAME_ARG     54
# define SSL_CTRL_SET_TLSEXT_HOSTNAME           55
# define SSL_CTRL_SET_TLSEXT_DEBUG_CB           56
```

```
# define SSL_CTRL_SET_TLSEXT_DEBUG_ARG          57
# define SSL_CTRL_GET_TLSEXT_TICKET_KEYS        58
# define SSL_CTRL_SET_TLSEXT_TICKET_KEYS        59
/*# define SSL_CTRL_SET_TLSEXT_OPAQUE_PRF_INPUT    60 */
/*# define SSL_CTRL_SET_TLSEXT_OPAQUE_PRF_INPUT_CB 61 */
/*# define SSL_CTRL_SET_TLSEXT_OPAQUE_PRF_INPUT_CB_ARG 62 */
# define SSL_CTRL_SET_TLSEXT_STATUS_REQ_CB      63
# define SSL_CTRL_SET_TLSEXT_STATUS_REQ_CB_ARG   64
# define SSL_CTRL_SET_TLSEXT_STATUS_REQ_TYPE     65
# define SSL_CTRL_GET_TLSEXT_STATUS_REQ_EXTS     66
# define SSL_CTRL_SET_TLSEXT_STATUS_REQ_EXTS     67
# define SSL_CTRL_GET_TLSEXT_STATUS_REQ_IDS      68
# define SSL_CTRL_SET_TLSEXT_STATUS_REQ_IDS      69
# define SSL_CTRL_GET_TLSEXT_STATUS_REQ_OCSP_RESP        70
# define SSL_CTRL_SET_TLSEXT_STATUS_REQ_OCSP_RESP
      71
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SSL_CTRL_SET_TLSEXT_TICKET_KEY_CB      72
# endif
# define SSL_CTRL_SET_TLS_EXT_SRP_USERNAME_CB    75
# define SSL_CTRL_SET_SRP_VERIFY_PARAM_CB              76
# define SSL_CTRL_SET_SRP_GIVE_CLIENT_PWD_CB           77
# define SSL_CTRL_SET_SRP_ARG           78
# define SSL_CTRL_SET_TLS_EXT_SRP_USERNAME             79
# define SSL_CTRL_SET_TLS_EXT_SRP_STRENGTH             80
# define SSL_CTRL_SET_TLS_EXT_SRP_PASSWORD             81
# define DTLS_CTRL_GET_TIMEOUT          73
# define DTLS_CTRL_HANDLE_TIMEOUT       74
# define SSL_CTRL_GET_RI_SUPPORT              76
# define SSL_CTRL_CLEAR_MODE                  78
# define SSL_CTRL_SET_NOT_RESUMABLE_SESS_CB      79
# define SSL_CTRL_GET_EXTRA_CHAIN_CERTS         82
# define SSL_CTRL_CLEAR_EXTRA_CHAIN_CERTS       83
# define SSL_CTRL_CHAIN                       88
# define SSL_CTRL_CHAIN_CERT                  89
# define SSL_CTRL_GET_GROUPS
              90
# define SSL_CTRL_SET_GROUPS                  91
# define SSL_CTRL_SET_GROUPS_LIST             92
# define SSL_CTRL_GET_SHARED_GROUP            93
# define SSL_CTRL_SET_SIGALGS                 97
# define SSL_CTRL_SET_SIGALGS_LIST            98
# define SSL_CTRL_CERT_FLAGS                  99
# define SSL_CTRL_CLEAR_CERT_FLAGS            100
# define SSL_CTRL_SET_CLIENT_SIGALGS          101
# define SSL_CTRL_SET_CLIENT_SIGALGS_LIST       102
# define SSL_CTRL_GET_CLIENT_CERT_TYPES         103
# define SSL_CTRL_SET_CLIENT_CERT_TYPES         104
```

```
# define SSL_CTRL_BUILD_CERT_CHAIN              105
# define SSL_CTRL_SET_VERIFY_CERT_STORE         106
# define SSL_CTRL_SET_CHAIN_CERT_STORE          107
# define SSL_CTRL_GET_PEER_SIGNATURE_NID        108
# define SSL_CTRL_GET_PEER_TMP_KEY              109
# define SSL_CTRL_GET_RAW_CIPHERLIST            110
# define SSL_CTRL_GET_EC_POINT_FORMATS          111
# define SSL_CTRL_GET_CHAIN_CERTS
            115
# define SSL_CTRL_SELECT_CURRENT_CERT           116
# define SSL_CTRL_SET_CURRENT_CERT              117
# define SSL_CTRL_SET_DH_AUTO                   118
# define DTLS_CTRL_SET_LINK_MTU                 120
# define DTLS_CTRL_GET_LINK_MIN_MTU             121
# define SSL_CTRL_GET_EXTMS_SUPPORT             122
# define SSL_CTRL_SET_MIN_PROTO_VERSION         123
# define SSL_CTRL_SET_MAX_PROTO_VERSION         124
# define SSL_CTRL_SET_SPLIT_SEND_FRAGMENT       125
# define SSL_CTRL_SET_MAX_PIPELINES             126
# define SSL_CTRL_GET_TLSEXT_STATUS_REQ_TYPE    127
# define SSL_CTRL_GET_TLSEXT_STATUS_REQ_CB      128
# define SSL_CTRL_GET_TLSEXT_STATUS_REQ_CB_ARG  129
# define SSL_CTRL_GET_MIN_PROTO_VERSION         130
# define SSL_CTRL_GET_MAX_PROTO_VERSION         131
# define SSL_CTRL_GET_SIGNATURE_NID             132
# define SSL_CTRL_GET_TMP_KEY                   133
# define SSL_CTRL_GET_NEGOTIATED_GROUP          134
# define SSL_CTRL_SET_RETRY_VERIFY
            136
# define SSL_CTRL_GET_VERIFY_CERT_STORE         137
# define SSL_CTRL_GET_CHAIN_CERT_STORE          138
# define SSL_CERT_SET_FIRST                     1
# define SSL_CERT_SET_NEXT                      2
# define SSL_CERT_SET_SERVER                    3
# define DTLSv1_get_timeout(ssl, arg) \
     SSL_ctrl(ssl,DTLS_CTRL_GET_TIMEOUT,0, (void *)(arg))
# define DTLSv1_handle_timeout(ssl) \
     SSL_ctrl(ssl,DTLS_CTRL_HANDLE_TIMEOUT,0, NULL)
# define SSL_num_renegotiations(ssl) \
     SSL_ctrl((ssl),SSL_CTRL_GET_NUM_RENEGOTIATIONS,0,NULL)
# define SSL_clear_num_renegotiations(ssl) \
     SSL_ctrl((ssl),SSL_CTRL_CLEAR_NUM_RENEGOTIATIONS,0,NULL)
# define SSL_total_renegotiations(ssl) \
     SSL_ctrl((ssl),SSL_CTRL_GET_TOTAL_RENEGOTIATIONS,0,NULL)
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SSL_CTX_set_tmp_dh(ctx,dh) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_TMP_DH,0,(char *)(dh))
# endif
```

```
# define SSL_CTX_set_dh_auto(ctx, onoff) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_SET_DH_AUTO,onoff,NULL)
# define SSL_set_dh_auto(s, onoff) \
        SSL_ctrl(s,SSL_CTRL_SET_DH_AUTO,onoff,NULL)
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SSL_set_tmp_dh(ssl,dh) \
        SSL_ctrl(ssl,SSL_CTRL_SET_TMP_DH,0,(char *)(dh))
# endif
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define SSL_CTX_set_tmp_ecdh(ctx,ecdh) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_SET_TMP_ECDH,0,(char *)(ecdh))
#  define SSL_set_tmp_ecdh(ssl,ecdh) \
        SSL_ctrl(ssl,SSL_CTRL_SET_TMP_ECDH,0,(char *)(ecdh))
# endif
# define SSL_CTX_add_extra_chain_cert(ctx,x509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_EXTRA_CHAIN_CERT,0,(char *)(x509))
# define SSL_CTX_get_extra_chain_certs(ctx,px509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_GET_EXTRA_CHAIN_CERTS,0,px509)
# define SSL_CTX_get_extra_chain_certs_only(ctx,px509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_GET_EXTRA_CHAIN_CERTS,1,px509)
# define SSL_CTX_clear_extra_chain_certs(ctx) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_CLEAR_EXTRA_CHAIN_CERTS,0,NULL)
#
 define SSL_CTX_set0_chain(ctx,sk) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_CHAIN,0,(char *)(sk))
# define SSL_CTX_set1_chain(ctx,sk) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_CHAIN,1,(char *)(sk))
# define SSL_CTX_add0_chain_cert(ctx,x509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_CHAIN_CERT,0,(char *)(x509))
# define SSL_CTX_add1_chain_cert(ctx,x509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_CHAIN_CERT,1,(char *)(x509))
# define SSL_CTX_get0_chain_certs(ctx,px509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_GET_CHAIN_CERTS,0,px509)
# define SSL_CTX_clear_chain_certs(ctx) \
        SSL_CTX_set0_chain(ctx,NULL)
# define SSL_CTX_build_cert_chain(ctx, flags) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_BUILD_CERT_CHAIN, flags, NULL)
# define SSL_CTX_select_current_cert(ctx,x509) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_SELECT_CURRENT_CERT,0,(char *)(x509))
# define SSL_CTX_set_current_cert(ctx, op) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_SET_CURRENT_CERT, op, NULL)
# define SSL_CTX_set0_verify_cert_store(ctx,st) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_SET_VERIFY_CERT_STORE,0,(char
 *)(st))
# define SSL_CTX_set1_verify_cert_store(ctx,st) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_SET_VERIFY_CERT_STORE,1,(char *)(st))
# define SSL_CTX_get0_verify_cert_store(ctx,st) \
        SSL_CTX_ctrl(ctx,SSL_CTRL_GET_VERIFY_CERT_STORE,0,(char *)(st))
```

```
# define SSL_CTX_set0_chain_cert_store(ctx,st) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_CHAIN_CERT_STORE,0,(char *)(st))
# define SSL_CTX_set1_chain_cert_store(ctx,st) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_CHAIN_CERT_STORE,1,(char *)(st))
# define SSL_CTX_get0_chain_cert_store(ctx,st) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_GET_CHAIN_CERT_STORE,0,(char *)(st))
# define SSL_set0_chain(s,sk) \
     SSL_ctrl(s,SSL_CTRL_CHAIN,0,(char *)(sk))
# define SSL_set1_chain(s,sk) \
     SSL_ctrl(s,SSL_CTRL_CHAIN,1,(char *)(sk))
# define SSL_add0_chain_cert(s,x509) \
     SSL_ctrl(s,SSL_CTRL_CHAIN_CERT,0,(char *)(x509))
# define SSL_add1_chain_cert(s,x509) \
     SSL_ctrl(s,SSL_CTRL_CHAIN_CERT,1,(char
 *)(x509))
# define SSL_get0_chain_certs(s,px509) \
     SSL_ctrl(s,SSL_CTRL_GET_CHAIN_CERTS,0,px509)
# define SSL_clear_chain_certs(s) \
     SSL_set0_chain(s,NULL)
# define SSL_build_cert_chain(s, flags) \
     SSL_ctrl(s,SSL_CTRL_BUILD_CERT_CHAIN, flags, NULL)
# define SSL_select_current_cert(s,x509) \
     SSL_ctrl(s,SSL_CTRL_SELECT_CURRENT_CERT,0,(char *)(x509))
# define SSL_set_current_cert(s,op) \
     SSL_ctrl(s,SSL_CTRL_SET_CURRENT_CERT, op, NULL)
# define SSL_set0_verify_cert_store(s,st) \
     SSL_ctrl(s,SSL_CTRL_SET_VERIFY_CERT_STORE,0,(char *)(st))
# define SSL_set1_verify_cert_store(s,st) \
     SSL_ctrl(s,SSL_CTRL_SET_VERIFY_CERT_STORE,1,(char *)(st))
#define SSL_get0_verify_cert_store(s,st) \
     SSL_ctrl(s,SSL_CTRL_GET_VERIFY_CERT_STORE,0,(char *)(st))
# define SSL_set0_chain_cert_store(s,st) \
     SSL_ctrl(s,SSL_CTRL_SET_CHAIN_CERT_STORE,0,(char *)(st))
# define SSL_set1_chain_cert_store(s,st) \
     SSL_ctrl(s,SSL_CTRL_SET_CHAIN_CERT_STORE,1,(char
 *)(st))
#define SSL_get0_chain_cert_store(s,st) \
     SSL_ctrl(s,SSL_CTRL_GET_CHAIN_CERT_STORE,0,(char *)(st))

# define SSL_get1_groups(s, glist) \
     SSL_ctrl(s,SSL_CTRL_GET_GROUPS,0,(int*)(glist))
# define SSL_CTX_set1_groups(ctx, glist, glistlen) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_GROUPS,glistlen,(int *)(glist))
# define SSL_CTX_set1_groups_list(ctx, s) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_GROUPS_LIST,0,(char *)(s))
# define SSL_set1_groups(s, glist, glistlen) \
     SSL_ctrl(s,SSL_CTRL_SET_GROUPS,glistlen,(char *)(glist))
# define SSL_set1_groups_list(s, str) \
```

```
     SSL_ctrl(s,SSL_CTRL_SET_GROUPS_LIST,0,(char *)(str))
# define SSL_get_shared_group(s, n) \
     SSL_ctrl(s,SSL_CTRL_GET_SHARED_GROUP,n,NULL)
# define SSL_get_negotiated_group(s) \
     SSL_ctrl(s,SSL_CTRL_GET_NEGOTIATED_GROUP,0,NULL)
# define SSL_CTX_set1_sigalgs(ctx, slist, slistlen) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_SIGALGS,slistlen,(int *)(slist))
# define SSL_CTX_set1_sigalgs_list(ctx,
 s) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_SIGALGS_LIST,0,(char *)(s))
# define SSL_set1_sigalgs(s, slist, slistlen) \
     SSL_ctrl(s,SSL_CTRL_SET_SIGALGS,slistlen,(int *)(slist))
# define SSL_set1_sigalgs_list(s, str) \
     SSL_ctrl(s,SSL_CTRL_SET_SIGALGS_LIST,0,(char *)(str))
# define SSL_CTX_set1_client_sigalgs(ctx, slist, slistlen) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_CLIENT_SIGALGS,slistlen,(int *)(slist))
# define SSL_CTX_set1_client_sigalgs_list(ctx, s) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_CLIENT_SIGALGS_LIST,0,(char *)(s))
# define SSL_set1_client_sigalgs(s, slist, slistlen) \
     SSL_ctrl(s,SSL_CTRL_SET_CLIENT_SIGALGS,slistlen,(int *)(slist))
# define SSL_set1_client_sigalgs_list(s, str) \
     SSL_ctrl(s,SSL_CTRL_SET_CLIENT_SIGALGS_LIST,0,(char *)(str))
# define SSL_get0_certificate_types(s, clist) \
     SSL_ctrl(s, SSL_CTRL_GET_CLIENT_CERT_TYPES, 0, (char *)(clist))
# define SSL_CTX_set1_client_certificate_types(ctx, clist, clistlen)
 \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_CLIENT_CERT_TYPES,clistlen, \
             (char *)(clist))
# define SSL_set1_client_certificate_types(s, clist, clistlen) \
     SSL_ctrl(s,SSL_CTRL_SET_CLIENT_CERT_TYPES,clistlen,(char *)(clist))
# define SSL_get_signature_nid(s, pn) \
     SSL_ctrl(s,SSL_CTRL_GET_SIGNATURE_NID,0,pn)
# define SSL_get_peer_signature_nid(s, pn) \
     SSL_ctrl(s,SSL_CTRL_GET_PEER_SIGNATURE_NID,0,pn)
# define SSL_get_peer_tmp_key(s, pk) \
     SSL_ctrl(s,SSL_CTRL_GET_PEER_TMP_KEY,0,pk)
# define SSL_get_tmp_key(s, pk) \
     SSL_ctrl(s,SSL_CTRL_GET_TMP_KEY,0,pk)
# define SSL_get0_raw_cipherlist(s, plst) \
     SSL_ctrl(s,SSL_CTRL_GET_RAW_CIPHERLIST,0,plst)
# define SSL_get0_ec_point_formats(s, plst) \
     SSL_ctrl(s,SSL_CTRL_GET_EC_POINT_FORMATS,0,plst)
# define SSL_CTX_set_min_proto_version(ctx, version) \
     SSL_CTX_ctrl(ctx, SSL_CTRL_SET_MIN_PROTO_VERSION, version, NULL)
# define SSL_CTX_set_max_proto_version(ctx, version)
 \
     SSL_CTX_ctrl(ctx, SSL_CTRL_SET_MAX_PROTO_VERSION, version, NULL)
# define SSL_CTX_get_min_proto_version(ctx) \
```

```
     SSL_CTX_ctrl(ctx, SSL_CTRL_GET_MIN_PROTO_VERSION, 0, NULL)
# define SSL_CTX_get_max_proto_version(ctx) \
     SSL_CTX_ctrl(ctx, SSL_CTRL_GET_MAX_PROTO_VERSION, 0, NULL)
# define SSL_set_min_proto_version(s, version) \
     SSL_ctrl(s, SSL_CTRL_SET_MIN_PROTO_VERSION, version, NULL)
# define SSL_set_max_proto_version(s, version) \
     SSL_ctrl(s, SSL_CTRL_SET_MAX_PROTO_VERSION, version, NULL)
# define SSL_get_min_proto_version(s) \
     SSL_ctrl(s, SSL_CTRL_GET_MIN_PROTO_VERSION, 0, NULL)
# define SSL_get_max_proto_version(s) \
     SSL_ctrl(s, SSL_CTRL_GET_MAX_PROTO_VERSION, 0, NULL)

const char *SSL_group_to_name(SSL *s, int id);

/* Backwards compatibility, original 1.1.0 names */
# define SSL_CTRL_GET_SERVER_TMP_KEY \
      SSL_CTRL_GET_PEER_TMP_KEY
# define SSL_get_server_tmp_key(s, pk) \
      SSL_get_peer_tmp_key(s, pk)

int SSL_set0_tmp_dh_pkey(SSL
 *s, EVP_PKEY *dhpkey);
int SSL_CTX_set0_tmp_dh_pkey(SSL_CTX *ctx, EVP_PKEY *dhpkey);

/*
* The following symbol names are old and obsolete. They are kept
* for compatibility reasons only and should not be used anymore.
*/
# define SSL_CTRL_GET_CURVES          SSL_CTRL_GET_GROUPS
# define SSL_CTRL_SET_CURVES          SSL_CTRL_SET_GROUPS
# define SSL_CTRL_SET_CURVES_LIST     SSL_CTRL_SET_GROUPS_LIST
# define SSL_CTRL_GET_SHARED_CURVE    SSL_CTRL_GET_SHARED_GROUP

# define SSL_get1_curves              SSL_get1_groups
# define SSL_CTX_set1_curves          SSL_CTX_set1_groups
# define SSL_CTX_set1_curves_list     SSL_CTX_set1_groups_list
# define SSL_set1_curves              SSL_set1_groups
# define SSL_set1_curves_list         SSL_set1_groups_list
# define SSL_get_shared_curve         SSL_get_shared_group


# ifndef OPENSSL_NO_DEPRECATED_1_1_0
/* Provide some compatibility macros for removed functionality. */
#  define SSL_CTX_need_tmp_RSA(ctx)
     0
#  define SSL_CTX_set_tmp_rsa(ctx,rsa)           1
#  define SSL_need_tmp_RSA(ssl)                  0
#  define SSL_set_tmp_rsa(ssl,rsa)               1
```

```
# define SSL_CTX_set_ecdh_auto(dummy, onoff)     ((onoff) != 0)
# define SSL_set_ecdh_auto(dummy, onoff)         ((onoff) != 0)
/*
* We "pretend" to call the callback to avoid warnings about unused static
* functions.
*/
# define SSL_CTX_set_tmp_rsa_callback(ctx, cb)   while(0) (cb)(NULL, 0, 0)
# define SSL_set_tmp_rsa_callback(ssl, cb)       while(0) (cb)(NULL, 0, 0)
# endif
__owur const BIO_METHOD *BIO_f_ssl(void);
__owur BIO *BIO_new_ssl(SSL_CTX *ctx, int client);
__owur BIO *BIO_new_ssl_connect(SSL_CTX *ctx);
__owur BIO *BIO_new_buffer_ssl_connect(SSL_CTX *ctx);
__owur int BIO_ssl_copy_session_id(BIO *to, BIO *from);
void BIO_ssl_shutdown(BIO *ssl_bio);

__owur int SSL_CTX_set_cipher_list(SSL_CTX *, const char *str);
__owur SSL_CTX *SSL_CTX_new(const SSL_METHOD *meth);
__owur SSL_CTX *SSL_CTX_new_ex(OSSL_LIB_CTX
 *libctx, const char *propq,
                               const SSL_METHOD *meth);
int SSL_CTX_up_ref(SSL_CTX *ctx);
void SSL_CTX_free(SSL_CTX *);
__owur long SSL_CTX_set_timeout(SSL_CTX *ctx, long t);
__owur long SSL_CTX_get_timeout(const SSL_CTX *ctx);
__owur X509_STORE *SSL_CTX_get_cert_store(const SSL_CTX *);
void SSL_CTX_set_cert_store(SSL_CTX *, X509_STORE *);
void SSL_CTX_set1_cert_store(SSL_CTX *, X509_STORE *);
__owur int SSL_want(const SSL *s);
__owur int SSL_clear(SSL *s);

void SSL_CTX_flush_sessions(SSL_CTX *ctx, long tm);

__owur const SSL_CIPHER *SSL_get_current_cipher(const SSL *s);
__owur const SSL_CIPHER *SSL_get_pending_cipher(const SSL *s);
__owur int SSL_CIPHER_get_bits(const SSL_CIPHER *c, int *alg_bits);
__owur const char *SSL_CIPHER_get_version(const SSL_CIPHER *c);
__owur const char *SSL_CIPHER_get_name(const SSL_CIPHER *c);
__owur const char *SSL_CIPHER_standard_name(const SSL_CIPHER *c);
__owur const char *OPENSSL_cipher_name(const char *rfc_name);
__owur
 uint32_t SSL_CIPHER_get_id(const SSL_CIPHER *c);
__owur uint16_t SSL_CIPHER_get_protocol_id(const SSL_CIPHER *c);
__owur int SSL_CIPHER_get_kx_nid(const SSL_CIPHER *c);
__owur int SSL_CIPHER_get_auth_nid(const SSL_CIPHER *c);
__owur const EVP_MD *SSL_CIPHER_get_handshake_digest(const SSL_CIPHER *c);
__owur int SSL_CIPHER_is_aead(const SSL_CIPHER *c);
```

```
__owur int SSL_get_fd(const SSL *s);
__owur int SSL_get_rfd(const SSL *s);
__owur int SSL_get_wfd(const SSL *s);
__owur const char *SSL_get_cipher_list(const SSL *s, int n);
__owur char *SSL_get_shared_ciphers(const SSL *s, char *buf, int size);
__owur int SSL_get_read_ahead(const SSL *s);
__owur int SSL_pending(const SSL *s);
__owur int SSL_has_pending(const SSL *s);
# ifndef OPENSSL_NO_SOCK
__owur int SSL_set_fd(SSL *s, int fd);
__owur int SSL_set_rfd(SSL *s, int fd);
__owur int SSL_set_wfd(SSL *s, int fd);
# endif
void SSL_set0_rbio(SSL *s, BIO *rbio);
void SSL_set0_wbio(SSL *s, BIO *wbio);
void SSL_set_bio(SSL *s, BIO *rbio, BIO *wbio);
__owur
 BIO *SSL_get_rbio(const SSL *s);
__owur BIO *SSL_get_wbio(const SSL *s);
__owur int SSL_set_cipher_list(SSL *s, const char *str);
__owur int SSL_CTX_set_ciphersuites(SSL_CTX *ctx, const char *str);
__owur int SSL_set_ciphersuites(SSL *s, const char *str);
void SSL_set_read_ahead(SSL *s, int yes);
__owur int SSL_get_verify_mode(const SSL *s);
__owur int SSL_get_verify_depth(const SSL *s);
__owur SSL_verify_cb SSL_get_verify_callback(const SSL *s);
void SSL_set_verify(SSL *s, int mode, SSL_verify_cb callback);
void SSL_set_verify_depth(SSL *s, int depth);
void SSL_set_cert_cb(SSL *s, int (*cb) (SSL *ssl, void *arg), void *arg);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 __owur int SSL_use_RSAPrivateKey(SSL *ssl, RSA *rsa);
OSSL_DEPRECATEDIN_3_0
__owur int SSL_use_RSAPrivateKey_ASN1(SSL *ssl,
                                      const unsigned char *d, long len);
# endif
__owur int SSL_use_PrivateKey(SSL *ssl, EVP_PKEY *pkey);
__owur int SSL_use_PrivateKey_ASN1(int
 pk, SSL *ssl, const unsigned char *d,
                                   long len);
__owur int SSL_use_certificate(SSL *ssl, X509 *x);
__owur int SSL_use_certificate_ASN1(SSL *ssl, const unsigned char *d, int len);
__owur int SSL_use_cert_and_key(SSL *ssl, X509 *x509, EVP_PKEY *privatekey,
                                STACK_OF(X509) *chain, int override);


/* serverinfo file format versions */
# define SSL_SERVERINFOV1   1
# define SSL_SERVERINFOV2   2
```

```
/* Set serverinfo data for the current active cert. */
__owur int SSL_CTX_use_serverinfo(SSL_CTX *ctx, const unsigned char *serverinfo,
                                  size_t serverinfo_length);
__owur int SSL_CTX_use_serverinfo_ex(SSL_CTX *ctx, unsigned int version,
                                     const unsigned char *serverinfo,
                                     size_t serverinfo_length);
__owur int SSL_CTX_use_serverinfo_file(SSL_CTX *ctx, const char *file);

#ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
__owur
 int SSL_use_RSAPrivateKey_file(SSL *ssl, const char *file, int type);
#endif

__owur int SSL_use_PrivateKey_file(SSL *ssl, const char *file, int type);
__owur int SSL_use_certificate_file(SSL *ssl, const char *file, int type);

#ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
__owur int SSL_CTX_use_RSAPrivateKey_file(SSL_CTX *ctx, const char *file,
                                          int type);
#endif
__owur int SSL_CTX_use_PrivateKey_file(SSL_CTX *ctx, const char *file,
                                       int type);
__owur int SSL_CTX_use_certificate_file(SSL_CTX *ctx, const char *file,
                                        int type);
/* PEM type */
__owur int SSL_CTX_use_certificate_chain_file(SSL_CTX *ctx, const char *file);
__owur int SSL_use_certificate_chain_file(SSL *ssl, const char *file);
__owur STACK_OF(X509_NAME) *SSL_load_client_CA_file(const char *file);
__owur STACK_OF(X509_NAME)
*SSL_load_client_CA_file_ex(const char *file, OSSL_LIB_CTX *libctx,
                            const char *propq);
__owur int SSL_add_file_cert_subjects_to_stack(STACK_OF(X509_NAME) *stackCAs,
                                               const char *file);
int SSL_add_dir_cert_subjects_to_stack(STACK_OF(X509_NAME) *stackCAs,
                                       const char *dir);
int SSL_add_store_cert_subjects_to_stack(STACK_OF(X509_NAME) *stackCAs,
                                         const char *uri);

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define SSL_load_error_strings() \
  OPENSSL_init_ssl(OPENSSL_INIT_LOAD_SSL_STRINGS \
                   | OPENSSL_INIT_LOAD_CRYPTO_STRINGS, NULL)
# endif

__owur const char *SSL_state_string(const SSL *s);
```

```
__owur const char *SSL_rstate_string(const SSL *s);
__owur const char *SSL_state_string_long(const SSL *s);
__owur const char *SSL_rstate_string_long(const SSL *s);
__owur long SSL_SESSION_get_time(const SSL_SESSION *s);
__owur long SSL_SESSION_set_time(SSL_SESSION *s, long t);
__owur long SSL_SESSION_get_timeout(const
 SSL_SESSION *s);
__owur long SSL_SESSION_set_timeout(SSL_SESSION *s, long t);
__owur int SSL_SESSION_get_protocol_version(const SSL_SESSION *s);
__owur int SSL_SESSION_set_protocol_version(SSL_SESSION *s, int version);

__owur const char *SSL_SESSION_get0_hostname(const SSL_SESSION *s);
__owur int SSL_SESSION_set1_hostname(SSL_SESSION *s, const char *hostname);
void SSL_SESSION_get0_alpn_selected(const SSL_SESSION *s,
                                    const unsigned char **alpn,
                                    size_t *len);
__owur int SSL_SESSION_set1_alpn_selected(SSL_SESSION *s,
                                      const unsigned char *alpn,
                                      size_t len);
__owur const SSL_CIPHER *SSL_SESSION_get0_cipher(const SSL_SESSION *s);
__owur int SSL_SESSION_set_cipher(SSL_SESSION *s, const SSL_CIPHER *cipher);
__owur int SSL_SESSION_has_ticket(const SSL_SESSION *s);
__owur unsigned long SSL_SESSION_get_ticket_lifetime_hint(const
 SSL_SESSION *s);
void SSL_SESSION_get0_ticket(const SSL_SESSION *s, const unsigned char **tick,
                             size_t *len);
__owur uint32_t SSL_SESSION_get_max_early_data(const SSL_SESSION *s);
__owur int SSL_SESSION_set_max_early_data(SSL_SESSION *s,
                                      uint32_t max_early_data);
__owur int SSL_copy_session_id(SSL *to, const SSL *from);
__owur X509 *SSL_SESSION_get0_peer(SSL_SESSION *s);
__owur int SSL_SESSION_set1_id_context(SSL_SESSION *s,
                                   const unsigned char *sid_ctx,
                                   unsigned int sid_ctx_len);
__owur int SSL_SESSION_set1_id(SSL_SESSION *s, const unsigned char *sid,
                               unsigned int sid_len);
__owur int SSL_SESSION_is_resumable(const SSL_SESSION *s);

__owur SSL_SESSION *SSL_SESSION_new(void);
__owur SSL_SESSION *SSL_SESSION_dup(const SSL_SESSION *src);
const unsigned char *SSL_SESSION_get_id(const SSL_SESSION *s,

                                   unsigned int *len);
const unsigned char *SSL_SESSION_get0_id_context(const SSL_SESSION *s,
                                             unsigned int *len);
__owur unsigned int SSL_SESSION_get_compress_id(const SSL_SESSION *s);
# ifndef OPENSSL_NO_STDIO
int SSL_SESSION_print_fp(FILE *fp, const SSL_SESSION *ses);
```

```
# endif
int SSL_SESSION_print(BIO *fp, const SSL_SESSION *ses);
int SSL_SESSION_print_keylog(BIO *bp, const SSL_SESSION *x);
int SSL_SESSION_up_ref(SSL_SESSION *ses);
void SSL_SESSION_free(SSL_SESSION *ses);
__owur int i2d_SSL_SESSION(const SSL_SESSION *in, unsigned char **pp);
__owur int SSL_set_session(SSL *to, SSL_SESSION *session);
int SSL_CTX_add_session(SSL_CTX *ctx, SSL_SESSION *session);
int SSL_CTX_remove_session(SSL_CTX *ctx, SSL_SESSION *session);
__owur int SSL_CTX_set_generate_session_id(SSL_CTX *ctx, GEN_SESSION_CB cb);
__owur int SSL_set_generate_session_id(SSL *s, GEN_SESSION_CB cb);
__owur int SSL_has_matching_session_id(const
 SSL *s,
                                const unsigned char *id,
                                unsigned int id_len);
SSL_SESSION *d2i_SSL_SESSION(SSL_SESSION **a, const unsigned char **pp,
                     long length);

# ifdef OPENSSL_X509_H
__owur X509 *SSL_get0_peer_certificate(const SSL *s);
__owur X509 *SSL_get1_peer_certificate(const SSL *s);
/* Deprecated in 3.0.0 */
#  ifndef OPENSSL_NO_DEPRECATED_3_0
#   define SSL_get_peer_certificate SSL_get1_peer_certificate
#  endif
# endif

__owur STACK_OF(X509) *SSL_get_peer_cert_chain(const SSL *s);

__owur int SSL_CTX_get_verify_mode(const SSL_CTX *ctx);
__owur int SSL_CTX_get_verify_depth(const SSL_CTX *ctx);
__owur SSL_verify_cb SSL_CTX_get_verify_callback(const SSL_CTX *ctx);
void SSL_CTX_set_verify(SSL_CTX *ctx, int mode, SSL_verify_cb callback);
void SSL_CTX_set_verify_depth(SSL_CTX *ctx, int depth);
void SSL_CTX_set_cert_verify_callback(SSL_CTX *ctx,
                              int (*cb)
 (X509_STORE_CTX *, void *),
                              void *arg);
void SSL_CTX_set_cert_cb(SSL_CTX *c, int (*cb) (SSL *ssl, void *arg),
                 void *arg);
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
__owur int SSL_CTX_use_RSAPrivateKey(SSL_CTX *ctx, RSA *rsa);
OSSL_DEPRECATEDIN_3_0
__owur int SSL_CTX_use_RSAPrivateKey_ASN1(SSL_CTX *ctx, const unsigned char *d,
                                  long len);
# endif
__owur int SSL_CTX_use_PrivateKey(SSL_CTX *ctx, EVP_PKEY *pkey);
```

```
__owur int SSL_CTX_use_PrivateKey_ASN1(int pk, SSL_CTX *ctx,
                                       const unsigned char *d, long len);
__owur int SSL_CTX_use_certificate(SSL_CTX *ctx, X509 *x);
__owur int SSL_CTX_use_certificate_ASN1(SSL_CTX *ctx, int len,
                                        const unsigned char *d);
__owur int SSL_CTX_use_cert_and_key(SSL_CTX *ctx, X509 *x509, EVP_PKEY *privatekey,
                                    STACK_OF(X509) *chain,
 int override);

void SSL_CTX_set_default_passwd_cb(SSL_CTX *ctx, pem_password_cb *cb);
void SSL_CTX_set_default_passwd_cb_userdata(SSL_CTX *ctx, void *u);
pem_password_cb *SSL_CTX_get_default_passwd_cb(SSL_CTX *ctx);
void *SSL_CTX_get_default_passwd_cb_userdata(SSL_CTX *ctx);
void SSL_set_default_passwd_cb(SSL *s, pem_password_cb *cb);
void SSL_set_default_passwd_cb_userdata(SSL *s, void *u);
pem_password_cb *SSL_get_default_passwd_cb(SSL *s);
void *SSL_get_default_passwd_cb_userdata(SSL *s);

__owur int SSL_CTX_check_private_key(const SSL_CTX *ctx);
__owur int SSL_check_private_key(const SSL *ctx);

__owur int SSL_CTX_set_session_id_context(SSL_CTX *ctx,
                                          const unsigned char *sid_ctx,
                                          unsigned int sid_ctx_len);

SSL *SSL_new(SSL_CTX *ctx);
int SSL_up_ref(SSL *s);
int SSL_is_dtls(const SSL *s);
__owur int SSL_set_session_id_context(SSL *ssl, const unsigned char *sid_ctx,

     unsigned int sid_ctx_len);

__owur int SSL_CTX_set_purpose(SSL_CTX *ctx, int purpose);
__owur int SSL_set_purpose(SSL *ssl, int purpose);
__owur int SSL_CTX_set_trust(SSL_CTX *ctx, int trust);
__owur int SSL_set_trust(SSL *ssl, int trust);

__owur int SSL_set1_host(SSL *s, const char *hostname);
__owur int SSL_add1_host(SSL *s, const char *hostname);
__owur const char *SSL_get0_peername(SSL *s);
void SSL_set_hostflags(SSL *s, unsigned int flags);

__owur int SSL_CTX_dane_enable(SSL_CTX *ctx);
__owur int SSL_CTX_dane_mtype_set(SSL_CTX *ctx, const EVP_MD *md,
                                  uint8_t mtype, uint8_t ord);
__owur int SSL_dane_enable(SSL *s, const char *basedomain);
__owur int SSL_dane_tlsa_add(SSL *s, uint8_t usage, uint8_t selector,
                             uint8_t mtype, const unsigned char *data, size_t dlen);
```

```
__owur int SSL_get0_dane_authority(SSL *s, X509 **mcert, EVP_PKEY **mspki);
__owur int SSL_get0_dane_tlsa(SSL *s, uint8_t *usage, uint8_t *selector,

                              uint8_t *mtype, const unsigned char **data,
                               size_t *dlen);
/*
* Bridge opacity barrier between libcrypt and libssl, also needed to support
* offline testing in test/danetest.c
*/
SSL_DANE *SSL_get0_dane(SSL *ssl);
/*
* DANE flags
*/
unsigned long SSL_CTX_dane_set_flags(SSL_CTX *ctx, unsigned long flags);
unsigned long SSL_CTX_dane_clear_flags(SSL_CTX *ctx, unsigned long flags);
unsigned long SSL_dane_set_flags(SSL *ssl, unsigned long flags);
unsigned long SSL_dane_clear_flags(SSL *ssl, unsigned long flags);

__owur int SSL_CTX_set1_param(SSL_CTX *ctx, X509_VERIFY_PARAM *vpm);
__owur int SSL_set1_param(SSL *ssl, X509_VERIFY_PARAM *vpm);

__owur X509_VERIFY_PARAM *SSL_CTX_get0_param(SSL_CTX *ctx);
__owur X509_VERIFY_PARAM *SSL_get0_param(SSL *ssl);

# ifndef OPENSSL_NO_SRP
#  ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0 int SSL_CTX_set_srp_username(SSL_CTX *ctx, char *name);
OSSL_DEPRECATEDIN_3_0 int SSL_CTX_set_srp_password(SSL_CTX
 *ctx, char *password);
OSSL_DEPRECATEDIN_3_0 int SSL_CTX_set_srp_strength(SSL_CTX *ctx, int strength);
OSSL_DEPRECATEDIN_3_0
int SSL_CTX_set_srp_client_pwd_callback(SSL_CTX *ctx,
                                char *(*cb) (SSL *, void *));
OSSL_DEPRECATEDIN_3_0
int SSL_CTX_set_srp_verify_param_callback(SSL_CTX *ctx,
                                  int (*cb) (SSL *, void *));
OSSL_DEPRECATEDIN_3_0
int SSL_CTX_set_srp_username_callback(SSL_CTX *ctx,
                                int (*cb) (SSL *, int *, void *));
OSSL_DEPRECATEDIN_3_0 int SSL_CTX_set_srp_cb_arg(SSL_CTX *ctx, void *arg);

OSSL_DEPRECATEDIN_3_0
int SSL_set_srp_server_param(SSL *s, const BIGNUM *N, const BIGNUM *g,
                         BIGNUM *sa, BIGNUM *v, char *info);
OSSL_DEPRECATEDIN_3_0
int SSL_set_srp_server_param_pw(SSL *s, const char *user, const char *pass,
                           const char *grp);
```

```
OSSL_DEPRECATEDIN_3_0 __owur BIGNUM *SSL_get_srp_g(SSL *s);
OSSL_DEPRECATEDIN_3_0
 __owur BIGNUM *SSL_get_srp_N(SSL *s);

OSSL_DEPRECATEDIN_3_0 __owur char *SSL_get_srp_username(SSL *s);
OSSL_DEPRECATEDIN_3_0 __owur char *SSL_get_srp_userinfo(SSL *s);
#  endif
# endif

/*
* ClientHello callback and helpers.
*/

# define SSL_CLIENT_HELLO_SUCCESS 1
# define SSL_CLIENT_HELLO_ERROR   0
# define SSL_CLIENT_HELLO_RETRY   (-1)

typedef int (*SSL_client_hello_cb_fn) (SSL *s, int *al, void *arg);
void SSL_CTX_set_client_hello_cb(SSL_CTX *c, SSL_client_hello_cb_fn cb,
                                 void *arg);
int SSL_client_hello_isv2(SSL *s);
unsigned int SSL_client_hello_get0_legacy_version(SSL *s);
size_t SSL_client_hello_get0_random(SSL *s, const unsigned char **out);
size_t SSL_client_hello_get0_session_id(SSL *s, const unsigned char **out);
size_t SSL_client_hello_get0_ciphers(SSL *s, const unsigned char **out);
size_t SSL_client_hello_get0_compression_methods(SSL *s,
                                                 const unsigned char **out);
int
 SSL_client_hello_get1_extensions_present(SSL *s, int **out, size_t *outlen);
int SSL_client_hello_get0_ext(SSL *s, unsigned int type,
                              const unsigned char **out, size_t *outlen);

void SSL_certs_clear(SSL *s);
void SSL_free(SSL *ssl);
# ifdef OSSL_ASYNC_FD
/*
* Windows application developer has to include windows.h to use these.
*/
__owur int SSL_waiting_for_async(SSL *s);
__owur int SSL_get_all_async_fds(SSL *s, OSSL_ASYNC_FD *fds, size_t *numfds);
__owur int SSL_get_changed_async_fds(SSL *s, OSSL_ASYNC_FD *addfd,
                                     size_t *numaddfds, OSSL_ASYNC_FD *delfd,
                                     size_t *numdelfds);
__owur int SSL_CTX_set_async_callback(SSL_CTX *ctx, SSL_async_callback_fn callback);
__owur int SSL_CTX_set_async_callback_arg(SSL_CTX *ctx, void *arg);
__owur int SSL_set_async_callback(SSL *s, SSL_async_callback_fn callback);
__owur int SSL_set_async_callback_arg(SSL *s, void *arg);
__owur int SSL_get_async_status(SSL
```

```
 *s, int *status);

# endif
__owur int SSL_accept(SSL *ssl);
__owur int SSL_stateless(SSL *s);
__owur int SSL_connect(SSL *ssl);
__owur int SSL_read(SSL *ssl, void *buf, int num);
__owur int SSL_read_ex(SSL *ssl, void *buf, size_t num, size_t *readbytes);

# define SSL_READ_EARLY_DATA_ERROR   0
# define SSL_READ_EARLY_DATA_SUCCESS 1
# define SSL_READ_EARLY_DATA_FINISH  2

__owur int SSL_read_early_data(SSL *s, void *buf, size_t num,
                               size_t *readbytes);
__owur int SSL_peek(SSL *ssl, void *buf, int num);
__owur int SSL_peek_ex(SSL *ssl, void *buf, size_t num, size_t *readbytes);
__owur ossl_ssize_t SSL_sendfile(SSL *s, int fd, off_t offset, size_t size,
                                 int flags);
__owur int SSL_write(SSL *ssl, const void *buf, int num);
__owur int SSL_write_ex(SSL *s, const void *buf, size_t num, size_t *written);
__owur int SSL_write_early_data(SSL *s, const void *buf, size_t num,
                                size_t *written);
long
 SSL_ctrl(SSL *ssl, int cmd, long larg, void *parg);
long SSL_callback_ctrl(SSL *, int, void (*)(void));
long SSL_CTX_ctrl(SSL_CTX *ctx, int cmd, long larg, void *parg);
long SSL_CTX_callback_ctrl(SSL_CTX *, int, void (*)(void));

# define SSL_EARLY_DATA_NOT_SENT    0
# define SSL_EARLY_DATA_REJECTED    1
# define SSL_EARLY_DATA_ACCEPTED    2

__owur int SSL_get_early_data_status(const SSL *s);

__owur int SSL_get_error(const SSL *s, int ret_code);
__owur const char *SSL_get_version(const SSL *s);

/* This sets the 'default' SSL version that SSL_new() will create */
# ifndef OPENSSL_NO_DEPRECATED_3_0
OSSL_DEPRECATEDIN_3_0
__owur int SSL_CTX_set_ssl_version(SSL_CTX *ctx, const SSL_METHOD *meth);
# endif

# ifndef OPENSSL_NO_SSL3_METHOD
#  ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *SSLv3_method(void); /* SSLv3 */
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *SSLv3_server_method(void);
```

```
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *SSLv3_client_method(void);
#
 endif
# endif

#define SSLv23_method          TLS_method
#define SSLv23_server_method    TLS_server_method
#define SSLv23_client_method    TLS_client_method

/* Negotiate highest available SSL/TLS version */
__owur const SSL_METHOD *TLS_method(void);
__owur const SSL_METHOD *TLS_server_method(void);
__owur const SSL_METHOD *TLS_client_method(void);

# ifndef OPENSSL_NO_TLS1_METHOD
#  ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_method(void); /* TLSv1.0 */
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_server_method(void);
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_client_method(void);
#  endif
# endif

# ifndef OPENSSL_NO_TLS1_1_METHOD
#  ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_1_method(void); /* TLSv1.1 */
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_1_server_method(void);
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_1_client_method(void);
#
 endif
# endif

# ifndef OPENSSL_NO_TLS1_2_METHOD
#  ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_2_method(void); /* TLSv1.2 */
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_2_server_method(void);
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *TLSv1_2_client_method(void);
#  endif
# endif

# ifndef OPENSSL_NO_DTLS1_METHOD
#  ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *DTLSv1_method(void); /* DTLSv1.0 */
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *DTLSv1_server_method(void);
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *DTLSv1_client_method(void);
#  endif
# endif

# ifndef OPENSSL_NO_DTLS1_2_METHOD
```

```
/* DTLSv1.2 */
#  ifndef OPENSSL_NO_DEPRECATED_1_1_0
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *DTLSv1_2_method(void);
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *DTLSv1_2_server_method(void);
OSSL_DEPRECATEDIN_1_1_0 __owur const SSL_METHOD *DTLSv1_2_client_method(void);
#
 endif
# endif

__owur const SSL_METHOD *DTLS_method(void); /* DTLS 1.0 and 1.2 */
__owur const SSL_METHOD *DTLS_server_method(void); /* DTLS 1.0 and 1.2 */
__owur const SSL_METHOD *DTLS_client_method(void); /* DTLS 1.0 and 1.2 */

__owur size_t DTLS_get_data_mtu(const SSL *s);

__owur STACK_OF(SSL_CIPHER) *SSL_get_ciphers(const SSL *s);
__owur STACK_OF(SSL_CIPHER) *SSL_CTX_get_ciphers(const SSL_CTX *ctx);
__owur STACK_OF(SSL_CIPHER) *SSL_get_client_ciphers(const SSL *s);
__owur STACK_OF(SSL_CIPHER) *SSL_get1_supported_ciphers(SSL *s);

__owur int SSL_do_handshake(SSL *s);
int SSL_key_update(SSL *s, int updatetype);
int SSL_get_key_update_type(const SSL *s);
int SSL_renegotiate(SSL *s);
int SSL_renegotiate_abbreviated(SSL *s);
__owur int SSL_renegotiate_pending(const SSL *s);
int SSL_new_session_ticket(SSL *s);
int SSL_shutdown(SSL *s);
__owur int SSL_verify_client_post_handshake(SSL *s);
void SSL_CTX_set_post_handshake_auth(SSL_CTX *ctx, int val);
void SSL_set_post_handshake_auth(SSL
 *s, int val);

__owur const SSL_METHOD *SSL_CTX_get_ssl_method(const SSL_CTX *ctx);
__owur const SSL_METHOD *SSL_get_ssl_method(const SSL *s);
__owur int SSL_set_ssl_method(SSL *s, const SSL_METHOD *method);
__owur const char *SSL_alert_type_string_long(int value);
__owur const char *SSL_alert_type_string(int value);
__owur const char *SSL_alert_desc_string_long(int value);
__owur const char *SSL_alert_desc_string(int value);

void SSL_set0_CA_list(SSL *s, STACK_OF(X509_NAME) *name_list);
void SSL_CTX_set0_CA_list(SSL_CTX *ctx, STACK_OF(X509_NAME) *name_list);
__owur const STACK_OF(X509_NAME) *SSL_get0_CA_list(const SSL *s);
__owur const STACK_OF(X509_NAME) *SSL_CTX_get0_CA_list(const SSL_CTX *ctx);
__owur int SSL_add1_to_CA_list(SSL *ssl, const X509 *x);
__owur int SSL_CTX_add1_to_CA_list(SSL_CTX *ctx, const X509 *x);
__owur const STACK_OF(X509_NAME) *SSL_get0_peer_CA_list(const SSL *s);
```

```
void SSL_set_client_CA_list(SSL *s, STACK_OF(X509_NAME) *name_list);
void SSL_CTX_set_client_CA_list(SSL_CTX
 *ctx, STACK_OF(X509_NAME) *name_list);
__owur STACK_OF(X509_NAME) *SSL_get_client_CA_list(const SSL *s);
__owur STACK_OF(X509_NAME) *SSL_CTX_get_client_CA_list(const SSL_CTX *s);
__owur int SSL_add_client_CA(SSL *ssl, X509 *x);
__owur int SSL_CTX_add_client_CA(SSL_CTX *ctx, X509 *x);

void SSL_set_connect_state(SSL *s);
void SSL_set_accept_state(SSL *s);

__owur long SSL_get_default_timeout(const SSL *s);

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define SSL_library_init() OPENSSL_init_ssl(0, NULL)
# endif

__owur char *SSL_CIPHER_description(const SSL_CIPHER *, char *buf, int size);
__owur STACK_OF(X509_NAME) *SSL_dup_CA_list(const STACK_OF(X509_NAME) *sk);

__owur SSL *SSL_dup(SSL *ssl);

__owur X509 *SSL_get_certificate(const SSL *ssl);
/*
* EVP_PKEY
*/
struct evp_pkey_st *SSL_get_privatekey(const SSL *ssl);

__owur X509 *SSL_CTX_get0_certificate(const SSL_CTX *ctx);
__owur EVP_PKEY *SSL_CTX_get0_privatekey(const SSL_CTX *ctx);

void SSL_CTX_set_quiet_shutdown(SSL_CTX
 *ctx, int mode);
__owur int SSL_CTX_get_quiet_shutdown(const SSL_CTX *ctx);
void SSL_set_quiet_shutdown(SSL *ssl, int mode);
__owur int SSL_get_quiet_shutdown(const SSL *ssl);
void SSL_set_shutdown(SSL *ssl, int mode);
__owur int SSL_get_shutdown(const SSL *ssl);
__owur int SSL_version(const SSL *ssl);
__owur int SSL_client_version(const SSL *s);
__owur int SSL_CTX_set_default_verify_paths(SSL_CTX *ctx);
__owur int SSL_CTX_set_default_verify_dir(SSL_CTX *ctx);
__owur int SSL_CTX_set_default_verify_file(SSL_CTX *ctx);
__owur int SSL_CTX_set_default_verify_store(SSL_CTX *ctx);
__owur int SSL_CTX_load_verify_file(SSL_CTX *ctx, const char *CAfile);
__owur int SSL_CTX_load_verify_dir(SSL_CTX *ctx, const char *CApath);
__owur int SSL_CTX_load_verify_store(SSL_CTX *ctx, const char *CAstore);
```

```
__owur int SSL_CTX_load_verify_locations(SSL_CTX *ctx,
                                         const char *CAfile,
                                         const
 char *CApath);
# define SSL_get0_session SSL_get_session/* just peek at pointer */
__owur SSL_SESSION *SSL_get_session(const SSL *ssl);
__owur SSL_SESSION *SSL_get1_session(SSL *ssl); /* obtain a reference count */
__owur SSL_CTX *SSL_get_SSL_CTX(const SSL *ssl);
SSL_CTX *SSL_set_SSL_CTX(SSL *ssl, SSL_CTX *ctx);
void SSL_set_info_callback(SSL *ssl,
                           void (*cb) (const SSL *ssl, int type, int val));
void (*SSL_get_info_callback(const SSL *ssl)) (const SSL *ssl, int type,
                                               int val);
__owur OSSL_HANDSHAKE_STATE SSL_get_state(const SSL *ssl);

void SSL_set_verify_result(SSL *ssl, long v);
__owur long SSL_get_verify_result(const SSL *ssl);
__owur STACK_OF(X509) *SSL_get0_verified_chain(const SSL *s);

__owur size_t SSL_get_client_random(const SSL *ssl, unsigned char *out,
                                    size_t outlen);
__owur size_t SSL_get_server_random(const SSL *ssl, unsigned char *out,

                                    size_t outlen);
__owur size_t SSL_SESSION_get_master_key(const SSL_SESSION *sess,
                                         unsigned char *out, size_t outlen);
__owur int SSL_SESSION_set1_master_key(SSL_SESSION *sess,
                                       const unsigned char *in, size_t len);
uint8_t SSL_SESSION_get_max_fragment_length(const SSL_SESSION *sess);

#define SSL_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_SSL, l, p, newf, dupf, freef)
__owur int SSL_set_ex_data(SSL *ssl, int idx, void *data);
void *SSL_get_ex_data(const SSL *ssl, int idx);
#define SSL_SESSION_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_SSL_SESSION, l, p, newf, dupf, freef)
__owur int SSL_SESSION_set_ex_data(SSL_SESSION *ss, int idx, void *data);
void *SSL_SESSION_get_ex_data(const SSL_SESSION *ss, int idx);
#define SSL_CTX_get_ex_new_index(l, p, newf, dupf, freef) \
  CRYPTO_get_ex_new_index(CRYPTO_EX_INDEX_SSL_CTX,
 l, p, newf, dupf, freef)
__owur int SSL_CTX_set_ex_data(SSL_CTX *ssl, int idx, void *data);
void *SSL_CTX_get_ex_data(const SSL_CTX *ssl, int idx);

__owur int SSL_get_ex_data_X509_STORE_CTX_idx(void);

# define SSL_CTX_sess_set_cache_size(ctx,t) \
      SSL_CTX_ctrl(ctx,SSL_CTRL_SET_SESS_CACHE_SIZE,t,NULL)
```

```
# define SSL_CTX_sess_get_cache_size(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_GET_SESS_CACHE_SIZE,0,NULL)
# define SSL_CTX_set_session_cache_mode(ctx,m) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_SESS_CACHE_MODE,m,NULL)
# define SSL_CTX_get_session_cache_mode(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_GET_SESS_CACHE_MODE,0,NULL)

# define SSL_CTX_get_default_read_ahead(ctx) SSL_CTX_get_read_ahead(ctx)
# define SSL_CTX_set_default_read_ahead(ctx,m) SSL_CTX_set_read_ahead(ctx,m)
# define SSL_CTX_get_read_ahead(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_GET_READ_AHEAD,0,NULL)
# define SSL_CTX_set_read_ahead(ctx,m) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_READ_AHEAD,m,NULL)
# define
 SSL_CTX_get_max_cert_list(ctx) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_GET_MAX_CERT_LIST,0,NULL)
# define SSL_CTX_set_max_cert_list(ctx,m) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_MAX_CERT_LIST,m,NULL)
# define SSL_get_max_cert_list(ssl) \
     SSL_ctrl(ssl,SSL_CTRL_GET_MAX_CERT_LIST,0,NULL)
# define SSL_set_max_cert_list(ssl,m) \
     SSL_ctrl(ssl,SSL_CTRL_SET_MAX_CERT_LIST,m,NULL)

# define SSL_CTX_set_max_send_fragment(ctx,m) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_MAX_SEND_FRAGMENT,m,NULL)
# define SSL_set_max_send_fragment(ssl,m) \
     SSL_ctrl(ssl,SSL_CTRL_SET_MAX_SEND_FRAGMENT,m,NULL)
# define SSL_CTX_set_split_send_fragment(ctx,m) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_SPLIT_SEND_FRAGMENT,m,NULL)
# define SSL_set_split_send_fragment(ssl,m) \
     SSL_ctrl(ssl,SSL_CTRL_SET_SPLIT_SEND_FRAGMENT,m,NULL)
# define SSL_CTX_set_max_pipelines(ctx,m) \
     SSL_CTX_ctrl(ctx,SSL_CTRL_SET_MAX_PIPELINES,m,NULL)
# define SSL_set_max_pipelines(ssl,m) \
     SSL_ctrl(ssl,SSL_CTRL_SET_MAX_PIPELINES,m,NULL)
#
 define SSL_set_retry_verify(ssl) \
     (SSL_ctrl(ssl,SSL_CTRL_SET_RETRY_VERIFY,0,NULL) > 0)

void SSL_CTX_set_default_read_buffer_len(SSL_CTX *ctx, size_t len);
void SSL_set_default_read_buffer_len(SSL *s, size_t len);

# ifndef OPENSSL_NO_DH
#  ifndef OPENSSL_NO_DEPRECATED_3_0
/* NB: the |keylength| is only applicable when is_export is true */
OSSL_DEPRECATEDIN_3_0
void SSL_CTX_set_tmp_dh_callback(SSL_CTX *ctx,
                         DH *(*dh) (SSL *ssl, int is_export,
```

```
                                int keylength));
OSSL_DEPRECATEDIN_3_0
void SSL_set_tmp_dh_callback(SSL *ssl,
                             DH *(*dh) (SSL *ssl, int is_export,
                                        int keylength));
#  endif
# endif

__owur const COMP_METHOD *SSL_get_current_compression(const SSL *s);
__owur const COMP_METHOD *SSL_get_current_expansion(const SSL *s);
__owur const char *SSL_COMP_get_name(const COMP_METHOD *comp);
__owur const char *SSL_COMP_get0_name(const
 SSL_COMP *comp);
__owur int SSL_COMP_get_id(const SSL_COMP *comp);
STACK_OF(SSL_COMP) *SSL_COMP_get_compression_methods(void);
__owur STACK_OF(SSL_COMP) *SSL_COMP_set0_compression_methods(STACK_OF(SSL_COMP)
                                             *meths);
# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define SSL_COMP_free_compression_methods() while(0) continue
# endif
__owur int SSL_COMP_add_compression_method(int id, COMP_METHOD *cm);

const SSL_CIPHER *SSL_CIPHER_find(SSL *ssl, const unsigned char *ptr);
int SSL_CIPHER_get_cipher_nid(const SSL_CIPHER *c);
int SSL_CIPHER_get_digest_nid(const SSL_CIPHER *c);
int SSL_bytes_to_cipher_list(SSL *s, const unsigned char *bytes, size_t len,
                             int isv2format, STACK_OF(SSL_CIPHER) **sk,
                             STACK_OF(SSL_CIPHER) **scsvs);

/* TLS extensions functions */
__owur int SSL_set_session_ticket_ext(SSL *s, void *ext_data, int ext_len);

__owur int SSL_set_session_ticket_ext_cb(SSL
 *s,
                                         tls_session_ticket_ext_cb_fn cb,
                                         void *arg);

/* Pre-shared secret session resumption functions */
__owur int SSL_set_session_secret_cb(SSL *s,
                                     tls_session_secret_cb_fn session_secret_cb,
                                     void *arg);

void SSL_CTX_set_not_resumable_session_callback(SSL_CTX *ctx,
                                                int (*cb) (SSL *ssl,
                                                           int
                                                           is_forward_secure));

void SSL_set_not_resumable_session_callback(SSL *ssl,
```

```
                                int (*cb) (SSL *ssl,
                                           int is_forward_secure));

void SSL_CTX_set_record_padding_callback(SSL_CTX *ctx,
                                         size_t (*cb) (SSL *ssl, int type,

                                                       size_t len, void *arg));
void SSL_CTX_set_record_padding_callback_arg(SSL_CTX *ctx, void *arg);
void *SSL_CTX_get_record_padding_callback_arg(const SSL_CTX *ctx);
int SSL_CTX_set_block_padding(SSL_CTX *ctx, size_t block_size);

int SSL_set_record_padding_callback(SSL *ssl,
                                    size_t (*cb) (SSL *ssl, int type,
                                                  size_t len, void *arg));
void SSL_set_record_padding_callback_arg(SSL *ssl, void *arg);
void *SSL_get_record_padding_callback_arg(const SSL *ssl);
int SSL_set_block_padding(SSL *ssl, size_t block_size);

int SSL_set_num_tickets(SSL *s, size_t num_tickets);
size_t SSL_get_num_tickets(const SSL *s);
int SSL_CTX_set_num_tickets(SSL_CTX *ctx, size_t num_tickets);
size_t SSL_CTX_get_num_tickets(const SSL_CTX *ctx);

# ifndef OPENSSL_NO_DEPRECATED_1_1_0
#  define SSL_cache_hit(s) SSL_session_reused(s)
# endif

__owur int SSL_session_reused(const SSL *s);
__owur int
 SSL_is_server(const SSL *s);

__owur __owur SSL_CONF_CTX *SSL_CONF_CTX_new(void);
int SSL_CONF_CTX_finish(SSL_CONF_CTX *cctx);
void SSL_CONF_CTX_free(SSL_CONF_CTX *cctx);
unsigned int SSL_CONF_CTX_set_flags(SSL_CONF_CTX *cctx, unsigned int flags);
__owur unsigned int SSL_CONF_CTX_clear_flags(SSL_CONF_CTX *cctx,
                                             unsigned int flags);
__owur int SSL_CONF_CTX_set1_prefix(SSL_CONF_CTX *cctx, const char *pre);

void SSL_CONF_CTX_set_ssl(SSL_CONF_CTX *cctx, SSL *ssl);
void SSL_CONF_CTX_set_ssl_ctx(SSL_CONF_CTX *cctx, SSL_CTX *ctx);

__owur int SSL_CONF_cmd(SSL_CONF_CTX *cctx, const char *cmd, const char *value);
__owur int SSL_CONF_cmd_argv(SSL_CONF_CTX *cctx, int *pargc, char ***pargv);
__owur int SSL_CONF_cmd_value_type(SSL_CONF_CTX *cctx, const char *cmd);

void SSL_add_ssl_module(void);
int SSL_config(SSL *s, const char *name);
```

```
int SSL_CTX_config(SSL_CTX *ctx, const char *name);

# ifndef OPENSSL_NO_SSL_TRACE
void SSL_trace(int write_p, int version,
 int content_type,
            const void *buf, size_t len, SSL *ssl, void *arg);
# endif

# ifndef OPENSSL_NO_SOCK
int DTLSv1_listen(SSL *s, BIO_ADDR *client);
# endif

# ifndef OPENSSL_NO_CT

/*
* A callback for verifying that the received SCTs are sufficient.
* Expected to return 1 if they are sufficient, otherwise 0.
* May return a negative integer if an error occurs.
* A connection should be aborted if the SCTs are deemed insufficient.
*/
typedef int (*ssl_ct_validation_cb)(const CT_POLICY_EVAL_CTX *ctx,
                            const STACK_OF(SCT) *scts, void *arg);

/*
* Sets a |callback| that is invoked upon receipt of ServerHelloDone to validate
* the received SCTs.
* If the callback returns a non-positive result, the connection is terminated.
* Call this function before beginning a handshake.
* If a NULL |callback| is provided, SCT validation is disabled.
* |arg| is arbitrary userdata that will be passed to the callback whenever it
* is invoked.
 Ownership of |arg| remains with the caller.
*
* NOTE: A side-effect of setting a CT callback is that an OCSP stapled response
*       will be requested.
*/
int SSL_set_ct_validation_callback(SSL *s, ssl_ct_validation_cb callback,
                           void *arg);
int SSL_CTX_set_ct_validation_callback(SSL_CTX *ctx,
                               ssl_ct_validation_cb callback,
                               void *arg);
#define SSL_disable_ct(s) \
      ((void) SSL_set_validation_callback((s), NULL, NULL))
#define SSL_CTX_disable_ct(ctx) \
      ((void) SSL_CTX_set_validation_callback((ctx), NULL, NULL))

/*
* The validation type enumerates the available behaviours of the built-in SSL
```

```
* CT validation callback selected via SSL_enable_ct() and SSL_CTX_enable_ct().
* The underlying callback is a static function in libssl.
*/
enum {
  SSL_CT_VALIDATION_PERMISSIVE = 0,
  SSL_CT_VALIDATION_STRICT
};

/*
* Enable CT by setting up a callback that implements
 one of the built-in
* validation variants.  The SSL_CT_VALIDATION_PERMISSIVE variant always
* continues the handshake, the application can make appropriate decisions at
* handshake completion.  The SSL_CT_VALIDATION_STRICT variant requires at
* least one valid SCT, or else handshake termination will be requested.  The
* handshake may continue anyway if SSL_VERIFY_NONE is in effect.
*/
int SSL_enable_ct(SSL *s, int validation_mode);
int SSL_CTX_enable_ct(SSL_CTX *ctx, int validation_mode);

/*
* Report whether a non-NULL callback is enabled.
*/
int SSL_ct_is_enabled(const SSL *s);
int SSL_CTX_ct_is_enabled(const SSL_CTX *ctx);

/* Gets the SCTs received from a connection */
const STACK_OF(SCT) *SSL_get0_peer_scts(SSL *s);

/*
* Loads the CT log list from the default location.
* If a CTLOG_STORE has previously been set using SSL_CTX_set_ctlog_store,
* the log information loaded from this file will be appended to the
* CTLOG_STORE.
* Returns 1 on success, 0 otherwise.
 */
int SSL_CTX_set_default_ctlog_list_file(SSL_CTX *ctx);

/*
* Loads the CT log list from the specified file path.
* If a CTLOG_STORE has previously been set using SSL_CTX_set_ctlog_store,
* the log information loaded from this file will be appended to the
* CTLOG_STORE.
* Returns 1 on success, 0 otherwise.
*/
int SSL_CTX_set_ctlog_list_file(SSL_CTX *ctx, const char *path);

/*
```

```
* Sets the CT log list used by all SSL connections created from this SSL_CTX.
* Ownership of the CTLOG_STORE is transferred to the SSL_CTX.
*/
void SSL_CTX_set0_ctlog_store(SSL_CTX *ctx, CTLOG_STORE *logs);

/*
* Gets the CT log list used by all SSL connections created from this SSL_CTX.
* This will be NULL unless one of the following functions has been called:
* - SSL_CTX_set_default_ctlog_list_file
* - SSL_CTX_set_ctlog_list_file
* - SSL_CTX_set_ctlog_store
*/
const CTLOG_STORE *SSL_CTX_get0_ctlog_store(const SSL_CTX *ctx);

# endif /* OPENSSL_NO_CT */

/* What the "other" parameter contains
 in security callback */
/* Mask for type */
# define SSL_SECOP_OTHER_TYPE    0xffff0000
# define SSL_SECOP_OTHER_NONE    0
# define SSL_SECOP_OTHER_CIPHER  (1 << 16)
# define SSL_SECOP_OTHER_CURVE   (2 << 16)
# define SSL_SECOP_OTHER_DH      (3 << 16)
# define SSL_SECOP_OTHER_PKEY    (4 << 16)
# define SSL_SECOP_OTHER_SIGALG  (5 << 16)
# define SSL_SECOP_OTHER_CERT    (6 << 16)

/* Indicated operation refers to peer key or certificate */
# define SSL_SECOP_PEER          0x1000

/* Values for "op" parameter in security callback */

/* Called to filter ciphers */
/* Ciphers client supports */
# define SSL_SECOP_CIPHER_SUPPORTED      (1 | SSL_SECOP_OTHER_CIPHER)
/* Cipher shared by client/server */
# define SSL_SECOP_CIPHER_SHARED         (2 | SSL_SECOP_OTHER_CIPHER)
/* Sanity check of cipher server selects */
# define SSL_SECOP_CIPHER_CHECK          (3 | SSL_SECOP_OTHER_CIPHER)
/* Curves supported by client */
# define SSL_SECOP_CURVE_SUPPORTED       (4 | SSL_SECOP_OTHER_CURVE)
/* Curves
 shared by client/server */
# define SSL_SECOP_CURVE_SHARED          (5 | SSL_SECOP_OTHER_CURVE)
/* Sanity check of curve server selects */
# define SSL_SECOP_CURVE_CHECK           (6 | SSL_SECOP_OTHER_CURVE)
/* Temporary DH key */
```

```
# define SSL_SECOP_TMP_DH                (7 | SSL_SECOP_OTHER_PKEY)
/* SSL/TLS version */
# define SSL_SECOP_VERSION               (9 | SSL_SECOP_OTHER_NONE)
/* Session tickets */
# define SSL_SECOP_TICKET                (10 | SSL_SECOP_OTHER_NONE)
/* Supported signature algorithms sent to peer */
# define SSL_SECOP_SIGALG_SUPPORTED      (11 | SSL_SECOP_OTHER_SIGALG)
/* Shared signature algorithm */
# define SSL_SECOP_SIGALG_SHARED         (12 | SSL_SECOP_OTHER_SIGALG)
/* Sanity check signature algorithm allowed */
# define SSL_SECOP_SIGALG_CHECK          (13 | SSL_SECOP_OTHER_SIGALG)
/* Used to get mask of supported public key signature algorithms */
# define SSL_SECOP_SIGALG_MASK           (14 | SSL_SECOP_OTHER_SIGALG)
/* Use to see if compression is allowed
 */
# define SSL_SECOP_COMPRESSION           (15 | SSL_SECOP_OTHER_NONE)
/* EE key in certificate */
# define SSL_SECOP_EE_KEY                (16 | SSL_SECOP_OTHER_CERT)
/* CA key in certificate */
# define SSL_SECOP_CA_KEY                (17 | SSL_SECOP_OTHER_CERT)
/* CA digest algorithm in certificate */
# define SSL_SECOP_CA_MD                 (18 | SSL_SECOP_OTHER_CERT)
/* Peer EE key in certificate */
# define SSL_SECOP_PEER_EE_KEY           (SSL_SECOP_EE_KEY | SSL_SECOP_PEER)
/* Peer CA key in certificate */
# define SSL_SECOP_PEER_CA_KEY           (SSL_SECOP_CA_KEY | SSL_SECOP_PEER)
/* Peer CA digest algorithm in certificate */
# define SSL_SECOP_PEER_CA_MD            (SSL_SECOP_CA_MD | SSL_SECOP_PEER)

void SSL_set_security_level(SSL *s, int level);
__owur int SSL_get_security_level(const SSL *s);
void SSL_set_security_callback(SSL *s,
                               int (*cb) (const SSL *s, const SSL_CTX *ctx,
                                          int op, int bits, int nid,
                                          void *other, void *ex));
int (*SSL_get_security_callback(const SSL *s)) (const SSL *s,
                                                const SSL_CTX *ctx, int op,
                                                int bits, int nid, void *other,
                                                void *ex);
void SSL_set0_security_ex_data(SSL *s, void *ex);
__owur void *SSL_get0_security_ex_data(const SSL *s);

void SSL_CTX_set_security_level(SSL_CTX *ctx, int level);
__owur int SSL_CTX_get_security_level(const SSL_CTX *ctx);
void SSL_CTX_set_security_callback(SSL_CTX *ctx,
                                   int (*cb) (const SSL *s, const SSL_CTX *ctx,
                                              int op, int bits, int nid,
                                              void *other, void *ex));
```

```
int (*SSL_CTX_get_security_callback(const SSL_CTX *ctx)) (const SSL *s,
                                                          const SSL_CTX *ctx,

                                                          int op, int bits,
                                                          int nid,
                                                          void *other,
                                                          void *ex);
void SSL_CTX_set0_security_ex_data(SSL_CTX *ctx, void *ex);
__owur void *SSL_CTX_get0_security_ex_data(const SSL_CTX *ctx);

/* OPENSSL_INIT flag 0x010000 reserved for internal use */
# define OPENSSL_INIT_NO_LOAD_SSL_STRINGS    0x00100000L
# define OPENSSL_INIT_LOAD_SSL_STRINGS       0x00200000L

# define OPENSSL_INIT_SSL_DEFAULT \
      (OPENSSL_INIT_LOAD_SSL_STRINGS | OPENSSL_INIT_LOAD_CRYPTO_STRINGS)

int OPENSSL_init_ssl(uint64_t opts, const OPENSSL_INIT_SETTINGS *settings);

# ifndef OPENSSL_NO_UNIT_TEST
__owur const struct openssl_ssl_test_functions *SSL_test_functions(void);
# endif

__owur int SSL_free_buffers(SSL *ssl);
__owur int SSL_alloc_buffers(SSL *ssl);

/* Status codes passed to the decrypt session
 ticket callback. Some of these
* are for internal use only and are never passed to the callback. */
typedef int SSL_TICKET_STATUS;

/* Support for ticket appdata */
/* fatal error, malloc failure */
# define SSL_TICKET_FATAL_ERR_MALLOC 0
/* fatal error, either from parsing or decrypting the ticket */
# define SSL_TICKET_FATAL_ERR_OTHER  1
/* No ticket present */
# define SSL_TICKET_NONE             2
/* Empty ticket present */
# define SSL_TICKET_EMPTY            3
/* the ticket couldn't be decrypted */
# define SSL_TICKET_NO_DECRYPT       4
/* a ticket was successfully decrypted */
# define SSL_TICKET_SUCCESS          5
/* same as above but the ticket needs to be renewed */
# define SSL_TICKET_SUCCESS_RENEW    6

/* Return codes for the decrypt session ticket callback */
```

```
typedef int SSL_TICKET_RETURN;

/* An error occurred */
#define SSL_TICKET_RETURN_ABORT            0
/* Do not use the ticket, do not send a renewed ticket to the client */
#define SSL_TICKET_RETURN_IGNORE
    1
/* Do not use the ticket, send a renewed ticket to the client */
#define SSL_TICKET_RETURN_IGNORE_RENEW     2
/* Use the ticket, do not send a renewed ticket to the client */
#define SSL_TICKET_RETURN_USE              3
/* Use the ticket, send a renewed ticket to the client */
#define SSL_TICKET_RETURN_USE_RENEW        4

typedef int (*SSL_CTX_generate_session_ticket_fn)(SSL *s, void *arg);
typedef SSL_TICKET_RETURN (*SSL_CTX_decrypt_session_ticket_fn)(SSL *s, SSL_SESSION *ss,
                                          const unsigned char *keyname,
                                          size_t keyname_length,
                                          SSL_TICKET_STATUS status,
                                          void *arg);
int SSL_CTX_set_session_ticket_cb(SSL_CTX *ctx,
                        SSL_CTX_generate_session_ticket_fn gen_cb,
                        SSL_CTX_decrypt_session_ticket_fn
 dec_cb,
                        void *arg);
int SSL_SESSION_set1_ticket_appdata(SSL_SESSION *ss, const void *data, size_t len);
int SSL_SESSION_get0_ticket_appdata(SSL_SESSION *ss, void **data, size_t *len);

typedef unsigned int (*DTLS_timer_cb)(SSL *s, unsigned int timer_us);

void DTLS_set_timer_cb(SSL *s, DTLS_timer_cb cb);


typedef int (*SSL_allow_early_data_cb_fn)(SSL *s, void *arg);
void SSL_CTX_set_allow_early_data_cb(SSL_CTX *ctx,
                           SSL_allow_early_data_cb_fn cb,
                           void *arg);
void SSL_set_allow_early_data_cb(SSL *s,
                       SSL_allow_early_data_cb_fn cb,
                       void *arg);

/* store the default cipher strings inside the library */
const char *OSSL_default_cipher_list(void);
const char *OSSL_default_ciphersuites(void);

# ifdef  __cplusplus
}
# endif
```

#endif
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```
/*
* WARNING: do not edit!
* Generated by configdata.pm from Configurations/common0.tmpl, Configurations/unix-Makefile.tmpl
* via Makefile.in
*
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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#ifndef OPENSSL_CONFIGURATION_H
# define OPENSSL_CONFIGURATION_H
# pragma once

# ifdef  __cplusplus
extern "C" {
# endif

# ifdef OPENSSL_ALGORITHM_DEFINES
#  error OPENSSL_ALGORITHM_DEFINES no longer supported
# endif

/*
* OpenSSL was configured with the following options:
*/

# define OPENSSL_CONFIGURED_API 30000
```

```
# ifndef OPENSSL_RAND_SEED_OS
#  define OPENSSL_RAND_SEED_OS
# endif
# ifndef OPENSSL_THREADS
#  define OPENSSL_THREADS
# endif
# ifndef OPENSSL_NO_AFALGENG
#  define OPENSSL_NO_AFALGENG
# endif
# ifndef
 OPENSSL_NO_ASAN
#  define OPENSSL_NO_ASAN
# endif
# ifndef OPENSSL_NO_ASM
#  define OPENSSL_NO_ASM
# endif
# ifndef OPENSSL_NO_COMP
#  define OPENSSL_NO_COMP
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG
#  define OPENSSL_NO_CRYPTO_MDEBUG
# endif
# ifndef OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
#  define OPENSSL_NO_CRYPTO_MDEBUG_BACKTRACE
# endif
# ifndef OPENSSL_NO_EC_NISTP_64_GCC_128
#  define OPENSSL_NO_EC_NISTP_64_GCC_128
# endif
# ifndef OPENSSL_NO_EGD
#  define OPENSSL_NO_EGD
# endif
# ifndef OPENSSL_NO_EXTERNAL_TESTS
#  define OPENSSL_NO_EXTERNAL_TESTS
# endif
# ifndef OPENSSL_NO_FUZZ_AFL
#  define OPENSSL_NO_FUZZ_AFL
# endif
# ifndef OPENSSL_NO_FUZZ_LIBFUZZER
#  define OPENSSL_NO_FUZZ_LIBFUZZER
# endif
# ifndef OPENSSL_NO_KTLS
#  define OPENSSL_NO_KTLS
# endif
# ifndef OPENSSL_NO_LOADERENG
#  define OPENSSL_NO_LOADERENG
# endif
# ifndef OPENSSL_NO_MD2
#  define OPENSSL_NO_MD2
```

```
# endif
# ifndef OPENSSL_NO_MSAN
#  define OPENSSL_NO_MSAN
# endif
# ifndef OPENSSL_NO_RC5
#  define OPENSSL_NO_RC5
#
 endif
# ifndef OPENSSL_NO_SCTP
#  define OPENSSL_NO_SCTP
# endif
# ifndef OPENSSL_NO_SSL3
#  define OPENSSL_NO_SSL3
# endif
# ifndef OPENSSL_NO_SSL3_METHOD
#  define OPENSSL_NO_SSL3_METHOD
# endif
# ifndef OPENSSL_NO_TRACE
#  define OPENSSL_NO_TRACE
# endif
# ifndef OPENSSL_NO_UBSAN
#  define OPENSSL_NO_UBSAN
# endif
# ifndef OPENSSL_NO_UNIT_TEST
#  define OPENSSL_NO_UNIT_TEST
# endif
# ifndef OPENSSL_NO_UPLINK
#  define OPENSSL_NO_UPLINK
# endif
# ifndef OPENSSL_NO_WEAK_SSL_CIPHERS
#  define OPENSSL_NO_WEAK_SSL_CIPHERS
# endif
# ifndef OPENSSL_NO_DYNAMIC_ENGINE
#  define OPENSSL_NO_DYNAMIC_ENGINE
# endif


/* Generate 80386 code? */
# undef I386_ONLY

/*
* The following are cipher-specific, but are part of the public API.
*/
# if !defined(OPENSSL_SYS_UEFI)
#  define BN_LLONG
/* Only one for the following should be defined */
#  undef SIXTY_FOUR_BIT_LONG
#  undef SIXTY_FOUR_BIT
```

```
#  define THIRTY_TWO_BIT
# endif

# define RC4_INT unsigned int

# ifdef  __cplusplus
}
# endif

#endif
                    /* OPENSSL_CONFIGURATION_H */
```

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/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/asn1t.h.in
*
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*/
```

```
#ifndef OPENSSL_ASN1T_H
# define OPENSSL_ASN1T_H
# pragma once

# include <openssl/macros.h>
# ifndef OPENSSL_NO_DEPRECATED_3_0
#  define HEADER_ASN1T_H
# endif

# include <stddef.h>
# include <openssl/e_os2.h>
# include <openssl/asn1.h>

# ifdef OPENSSL_BUILD_SHLIBCRYPTO
#  undef OPENSSL_EXTERN
#  define OPENSSL_EXTERN OPENSSL_EXPORT
# endif

/* ASN1 template defines, structures and functions */

#ifdef  __cplusplus
extern "C" {
#endif

/*-
* These are the possible values for the itype field of the
* ASN1_ITEM structure and determine how it is interpreted.
*
* For PRIMITIVE
 types the underlying type
* determines the behaviour if items is NULL.
*
* Otherwise templates must contain a single
* template and the type is treated in the
* same way as the type specified in the template.
*
* For SEQUENCE types the templates field points
* to the members, the size field is the
* structure size.
*
* For CHOICE types the templates field points
* to each possible member (typically a union)
* and the 'size' field is the offset of the
* selector.
*
* The 'funcs' field is used for application-specific
```

```
* data and functions.
*
* The EXTERN type uses a new style d2i/i2d.
* The new style should be used where possible
* because it avoids things like the d2i IMPLICIT
* hack.
*
* MSTRING is a multiple string type, it is used
* for a CHOICE of character strings where the
* actual strings all occupy an ASN1_STRING
* structure. In this case the 'utype' field
* has a special meaning, it is used as a mask
* of acceptable types using the B_ASN1 constants.
 *
* NDEF_SEQUENCE is the same as SEQUENCE except
* that it will use indefinite length constructed
* encoding if requested.
*
*/

# define ASN1_ITYPE_PRIMITIVE           0x0
# define ASN1_ITYPE_SEQUENCE            0x1
# define ASN1_ITYPE_CHOICE              0x2
/* unused value                       0x3 */
# define ASN1_ITYPE_EXTERN              0x4
# define ASN1_ITYPE_MSTRING             0x5
# define ASN1_ITYPE_NDEF_SEQUENCE       0x6

/* Macro to obtain ASN1_ADB pointer from a type (only used internally) */
# define ASN1_ADB_ptr(iptr) ((const ASN1_ADB *)((iptr)()))

/* Macros for start and end of ASN1_ITEM definition */

# define ASN1_ITEM_start(itname) \
      const ASN1_ITEM * itname##_it(void) \
      { \
            static const ASN1_ITEM local_it = {

# define static_ASN1_ITEM_start(itname) \
      static ASN1_ITEM_start(itname)

# define ASN1_ITEM_end(itname) \
            }; \
      return &local_it; \
      }

/* Macros to aid ASN1 template
```

```
 writing */

# define ASN1_ITEM_TEMPLATE(tname) \
      static const ASN1_TEMPLATE tname##_item_tt

# define ASN1_ITEM_TEMPLATE_END(tname) \
      ;\
      ASN1_ITEM_start(tname) \
            ASN1_ITYPE_PRIMITIVE,\
            -1,\
            &tname##_item_tt,\
            0,\
            NULL,\
            0,\
            #tname \
      ASN1_ITEM_end(tname)
# define static_ASN1_ITEM_TEMPLATE_END(tname) \
      ;\
      static_ASN1_ITEM_start(tname) \
            ASN1_ITYPE_PRIMITIVE,\
            -1,\
            &tname##_item_tt,\
            0,\
            NULL,\
            0,\
            #tname \
      ASN1_ITEM_end(tname)

/* This is a ASN1 type which just embeds a template */

/*-
* This pair helps declare a SEQUENCE. We can do:
*
*      ASN1_SEQUENCE(stname) = {
*            ... SEQUENCE components ...
*      } ASN1_SEQUENCE_END(stname)
*
*      This will produce an ASN1_ITEM called stname_it
 *      for a structure called stname.
*
*      If you want the same structure but a different
*      name then use:
*
*      ASN1_SEQUENCE(itname) = {
*            ... SEQUENCE components ...
*      } ASN1_SEQUENCE_END_name(stname, itname)
*
*      This will create an item called itname_it using
```

```
*      a structure called stname.
*/

# define ASN1_SEQUENCE(tname) \
        static const ASN1_TEMPLATE tname##_seq_tt[]

# define ASN1_SEQUENCE_END(stname) ASN1_SEQUENCE_END_name(stname, stname)

# define static_ASN1_SEQUENCE_END(stname) static_ASN1_SEQUENCE_END_name(stname, stname)

# define ASN1_SEQUENCE_END_name(stname, tname) \
        ;\
        ASN1_ITEM_start(tname) \
                ASN1_ITYPE_SEQUENCE,\
                V_ASN1_SEQUENCE,\
                tname##_seq_tt,\
                sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
                NULL,\
                sizeof(stname),\
                #tname \
        ASN1_ITEM_end(tname)

# define static_ASN1_SEQUENCE_END_name(stname,
 tname) \
        ;\
        static_ASN1_ITEM_start(tname) \
                ASN1_ITYPE_SEQUENCE,\
                V_ASN1_SEQUENCE,\
                tname##_seq_tt,\
                sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
                NULL,\
                sizeof(stname),\
                #stname \
        ASN1_ITEM_end(tname)

# define ASN1_NDEF_SEQUENCE(tname) \
        ASN1_SEQUENCE(tname)

# define ASN1_NDEF_SEQUENCE_cb(tname, cb) \
        ASN1_SEQUENCE_cb(tname, cb)

# define ASN1_SEQUENCE_cb(tname, cb) \
        static const ASN1_AUX tname##_aux = {NULL, 0, 0, 0, cb, 0, NULL}; \
        ASN1_SEQUENCE(tname)

# define ASN1_SEQUENCE_const_cb(tname, const_cb) \
        static const ASN1_AUX tname##_aux = \
           {NULL, ASN1_AFLG_CONST_CB, 0, 0, NULL, 0, const_cb}; \
```

```
    ASN1_SEQUENCE(tname)

# define ASN1_SEQUENCE_cb_const_cb(tname, cb, const_cb) \
    static const ASN1_AUX tname##_aux = \
      {NULL, ASN1_AFLG_CONST_CB, 0, 0, cb,
 0, const_cb}; \
    ASN1_SEQUENCE(tname)

# define ASN1_SEQUENCE_ref(tname, cb) \
    static const ASN1_AUX tname##_aux = {NULL, ASN1_AFLG_REFCOUNT, offsetof(tname, references),
offsetof(tname, lock), cb, 0, NULL}; \
    ASN1_SEQUENCE(tname)

# define ASN1_SEQUENCE_enc(tname, enc, cb) \
    static const ASN1_AUX tname##_aux = {NULL, ASN1_AFLG_ENCODING, 0, 0, cb, offsetof(tname, enc),
NULL}; \
    ASN1_SEQUENCE(tname)

# define ASN1_NDEF_SEQUENCE_END(tname) \
    ;\
    ASN1_ITEM_start(tname) \
        ASN1_ITYPE_NDEF_SEQUENCE,\
        V_ASN1_SEQUENCE,\
        tname##_seq_tt,\
        sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
        NULL,\
        sizeof(tname),\
        #tname \
    ASN1_ITEM_end(tname)
# define static_ASN1_NDEF_SEQUENCE_END(tname) \
    ;\
    static_ASN1_ITEM_start(tname) \
        ASN1_ITYPE_NDEF_SEQUENCE,\
        V_ASN1_SEQUENCE,\

    tname##_seq_tt,\
        sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
        NULL,\
        sizeof(tname),\
        #tname \
    ASN1_ITEM_end(tname)


# define ASN1_SEQUENCE_END_enc(stname, tname) ASN1_SEQUENCE_END_ref(stname, tname)

# define ASN1_SEQUENCE_END_cb(stname, tname) ASN1_SEQUENCE_END_ref(stname, tname)
# define static_ASN1_SEQUENCE_END_cb(stname, tname) static_ASN1_SEQUENCE_END_ref(stname, tname)
```

```
# define ASN1_SEQUENCE_END_ref(stname, tname) \
	;\
	ASN1_ITEM_start(tname) \
		ASN1_ITYPE_SEQUENCE,\
		V_ASN1_SEQUENCE,\
		tname##_seq_tt,\
		sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
		&tname##_aux,\
		sizeof(stname),\
		#tname \
	ASN1_ITEM_end(tname)
# define static_ASN1_SEQUENCE_END_ref(stname, tname) \
	;\
	static_ASN1_ITEM_start(tname) \
		ASN1_ITYPE_SEQUENCE,\

  V_ASN1_SEQUENCE,\
		tname##_seq_tt,\
		sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
		&tname##_aux,\
		sizeof(stname),\
		#stname \
	ASN1_ITEM_end(tname)

# define ASN1_NDEF_SEQUENCE_END_cb(stname, tname) \
	;\
	ASN1_ITEM_start(tname) \
		ASN1_ITYPE_NDEF_SEQUENCE,\
		V_ASN1_SEQUENCE,\
		tname##_seq_tt,\
		sizeof(tname##_seq_tt) / sizeof(ASN1_TEMPLATE),\
		&tname##_aux,\
		sizeof(stname),\
		#stname \
	ASN1_ITEM_end(tname)

/*-
* This pair helps declare a CHOICE type. We can do:
*
*	ASN1_CHOICE(chname) = {
*		... CHOICE options ...
*	ASN1_CHOICE_END(chname)
*
*	This will produce an ASN1_ITEM called chname_it
*	for a structure called chname. The structure
*	definition must look like this:
*	typedef struct {
*		int type;
```

```
*
        union {
*               ASN1_SOMETHING *opt1;
*               ASN1_SOMEOTHER *opt2;
*         } value;
*    } chname;
*
*    the name of the selector must be 'type'.
*    to use an alternative selector name use the
*    ASN1_CHOICE_END_selector() version.
*/

# define ASN1_CHOICE(tname) \
    static const ASN1_TEMPLATE tname##_ch_tt[]

# define ASN1_CHOICE_cb(tname, cb) \
    static const ASN1_AUX tname##_aux = {NULL, 0, 0, 0, cb, 0, NULL}; \
    ASN1_CHOICE(tname)

# define ASN1_CHOICE_END(stname) ASN1_CHOICE_END_name(stname, stname)

# define static_ASN1_CHOICE_END(stname) static_ASN1_CHOICE_END_name(stname, stname)

# define ASN1_CHOICE_END_name(stname, tname) ASN1_CHOICE_END_selector(stname, tname, type)

# define static_ASN1_CHOICE_END_name(stname, tname) static_ASN1_CHOICE_END_selector(stname, tname,
type)

# define ASN1_CHOICE_END_selector(stname, tname, selname) \
    ;\
    ASN1_ITEM_start(tname) \

   ASN1_ITYPE_CHOICE,\
        offsetof(stname,selname) ,\
        tname##_ch_tt,\
        sizeof(tname##_ch_tt) / sizeof(ASN1_TEMPLATE),\
        NULL,\
        sizeof(stname),\
        #stname \
    ASN1_ITEM_end(tname)

# define static_ASN1_CHOICE_END_selector(stname, tname, selname) \
    ;\
    static_ASN1_ITEM_start(tname) \
        ASN1_ITYPE_CHOICE,\
        offsetof(stname,selname) ,\
        tname##_ch_tt,\
        sizeof(tname##_ch_tt) / sizeof(ASN1_TEMPLATE),\
```

```
            NULL,\
            sizeof(stname),\
            #stname \
        ASN1_ITEM_end(tname)

# define ASN1_CHOICE_END_cb(stname, tname, selname) \
        ;\
        ASN1_ITEM_start(tname) \
            ASN1_ITYPE_CHOICE,\
            offsetof(stname,selname) ,\
            tname##_ch_tt,\
            sizeof(tname##_ch_tt) / sizeof(ASN1_TEMPLATE),\
            &tname##_aux,\

      sizeof(stname),\
            #stname \
        ASN1_ITEM_end(tname)

/* This helps with the template wrapper form of ASN1_ITEM */

# define ASN1_EX_TEMPLATE_TYPE(flags, tag, name, type) { \
        (flags), (tag), 0,\
        #name, ASN1_ITEM_ref(type) }

/* These help with SEQUENCE or CHOICE components */

/* used to declare other types */

# define ASN1_EX_TYPE(flags, tag, stname, field, type) { \
        (flags), (tag), offsetof(stname, field),\
        #field, ASN1_ITEM_ref(type) }

/* implicit and explicit helper macros */

# define ASN1_IMP_EX(stname, field, type, tag, ex) \
         ASN1_EX_TYPE(ASN1_TFLG_IMPLICIT | (ex), tag, stname, field, type)

# define ASN1_EXP_EX(stname, field, type, tag, ex) \
         ASN1_EX_TYPE(ASN1_TFLG_EXPLICIT | (ex), tag, stname, field, type)

/* Any defined by macros: the field used is in the table itself */

# define ASN1_ADB_OBJECT(tblname) { ASN1_TFLG_ADB_OID, -1, 0, #tblname, tblname##_adb }
# define ASN1_ADB_INTEGER(tblname) { ASN1_TFLG_ADB_INT,
 -1, 0, #tblname, tblname##_adb }

/* Plain simple type */
# define ASN1_SIMPLE(stname, field, type) ASN1_EX_TYPE(0,0, stname, field, type)
```

```
/* Embedded simple type */
# define ASN1_EMBED(stname, field, type) ASN1_EX_TYPE(ASN1_TFLG_EMBED,0, stname, field, type)

/* OPTIONAL simple type */
# define ASN1_OPT(stname, field, type) ASN1_EX_TYPE(ASN1_TFLG_OPTIONAL, 0, stname, field, type)
# define ASN1_OPT_EMBED(stname, field, type)
ASN1_EX_TYPE(ASN1_TFLG_OPTIONAL|ASN1_TFLG_EMBED, 0, stname, field, type)

/* IMPLICIT tagged simple type */
# define ASN1_IMP(stname, field, type, tag) ASN1_IMP_EX(stname, field, type, tag, 0)
# define ASN1_IMP_EMBED(stname, field, type, tag) ASN1_IMP_EX(stname, field, type, tag,
ASN1_TFLG_EMBED)

/* IMPLICIT tagged OPTIONAL simple type */
# define ASN1_IMP_OPT(stname, field, type, tag) ASN1_IMP_EX(stname, field, type, tag,
ASN1_TFLG_OPTIONAL)
# define ASN1_IMP_OPT_EMBED(stname, field, type, tag) ASN1_IMP_EX(stname, field, type, tag,
ASN1_TFLG_OPTIONAL|ASN1_TFLG_EMBED)

/*
 Same as above but EXPLICIT */

# define ASN1_EXP(stname, field, type, tag) ASN1_EXP_EX(stname, field, type, tag, 0)
# define ASN1_EXP_EMBED(stname, field, type, tag) ASN1_EXP_EX(stname, field, type, tag,
ASN1_TFLG_EMBED)
# define ASN1_EXP_OPT(stname, field, type, tag) ASN1_EXP_EX(stname, field, type, tag,
ASN1_TFLG_OPTIONAL)
# define ASN1_EXP_OPT_EMBED(stname, field, type, tag) ASN1_EXP_EX(stname, field, type, tag,
ASN1_TFLG_OPTIONAL|ASN1_TFLG_EMBED)

/* SEQUENCE OF type */
# define ASN1_SEQUENCE_OF(stname, field, type) \
        ASN1_EX_TYPE(ASN1_TFLG_SEQUENCE_OF, 0, stname, field, type)

/* OPTIONAL SEQUENCE OF */
# define ASN1_SEQUENCE_OF_OPT(stname, field, type) \
        ASN1_EX_TYPE(ASN1_TFLG_SEQUENCE_OF|ASN1_TFLG_OPTIONAL, 0, stname, field, type)

/* Same as above but for SET OF */

# define ASN1_SET_OF(stname, field, type) \
        ASN1_EX_TYPE(ASN1_TFLG_SET_OF, 0, stname, field, type)

# define ASN1_SET_OF_OPT(stname, field, type)
 \
        ASN1_EX_TYPE(ASN1_TFLG_SET_OF|ASN1_TFLG_OPTIONAL, 0, stname, field, type)

/* Finally compound types of SEQUENCE, SET, IMPLICIT, EXPLICIT and OPTIONAL */
```

```
# define ASN1_IMP_SET_OF(stname, field, type, tag) \
                ASN1_IMP_EX(stname, field, type, tag, ASN1_TFLG_SET_OF)

# define ASN1_EXP_SET_OF(stname, field, type, tag) \
                ASN1_EXP_EX(stname, field, type, tag, ASN1_TFLG_SET_OF)

# define ASN1_IMP_SET_OF_OPT(stname, field, type, tag) \
                ASN1_IMP_EX(stname, field, type, tag, ASN1_TFLG_SET_OF|ASN1_TFLG_OPTIONAL)

# define ASN1_EXP_SET_OF_OPT(stname, field, type, tag) \
                ASN1_EXP_EX(stname, field, type, tag, ASN1_TFLG_SET_OF|ASN1_TFLG_OPTIONAL)

# define ASN1_IMP_SEQUENCE_OF(stname, field, type, tag) \
                ASN1_IMP_EX(stname, field, type, tag, ASN1_TFLG_SEQUENCE_OF)

# define ASN1_IMP_SEQUENCE_OF_OPT(stname, field, type, tag) \
                ASN1_IMP_EX(stname,
 field, type, tag, ASN1_TFLG_SEQUENCE_OF|ASN1_TFLG_OPTIONAL)

# define ASN1_EXP_SEQUENCE_OF(stname, field, type, tag) \
                ASN1_EXP_EX(stname, field, type, tag, ASN1_TFLG_SEQUENCE_OF)

# define ASN1_EXP_SEQUENCE_OF_OPT(stname, field, type, tag) \
                ASN1_EXP_EX(stname, field, type, tag,
ASN1_TFLG_SEQUENCE_OF|ASN1_TFLG_OPTIONAL)

/* EXPLICIT using indefinite length constructed form */
# define ASN1_NDEF_EXP(stname, field, type, tag) \
                ASN1_EXP_EX(stname, field, type, tag, ASN1_TFLG_NDEF)

/* EXPLICIT OPTIONAL using indefinite length constructed form */
# define ASN1_NDEF_EXP_OPT(stname, field, type, tag) \
                ASN1_EXP_EX(stname, field, type, tag, ASN1_TFLG_OPTIONAL|ASN1_TFLG_NDEF)

/* Macros for the ASN1_ADB structure */

# define ASN1_ADB(name) \
     static const ASN1_ADB_TABLE name##_adbtbl[]

# define ASN1_ADB_END(name, flags, field, adb_cb, def, none) \
     ;\
     static const ASN1_ITEM
 *name##_adb(void) \
     { \
     static const ASN1_ADB internal_adb = \
           {\
           flags,\
```

```
            offsetof(name, field),\
            adb_cb,\
            name##_adbtbl,\
            sizeof(name##_adbtbl) / sizeof(ASN1_ADB_TABLE),\
            def,\
            none\
            }; \
            return (const ASN1_ITEM *) &internal_adb; \
        } \
        void dummy_function(void)

# define ADB_ENTRY(val, template) {val, template}

# define ASN1_ADB_TEMPLATE(name) \
        static const ASN1_TEMPLATE name##_tt

/*
* This is the ASN1 template structure that defines a wrapper round the
* actual type. It determines the actual position of the field in the value
* structure, various flags such as OPTIONAL and the field name.
*/

struct ASN1_TEMPLATE_st {
  unsigned long flags;        /* Various flags */
  long tag;                   /* tag, not used if no tagging */
  unsigned long offset;       /* Offset
 of this field in structure */
  const char *field_name;     /* Field name */
  ASN1_ITEM_EXP *item;        /* Relevant ASN1_ITEM or ASN1_ADB */
};

/* Macro to extract ASN1_ITEM and ASN1_ADB pointer from ASN1_TEMPLATE */

# define ASN1_TEMPLATE_item(t) (t->item_ptr)
# define ASN1_TEMPLATE_adb(t) (t->item_ptr)

typedef struct ASN1_ADB_TABLE_st ASN1_ADB_TABLE;
typedef struct ASN1_ADB_st ASN1_ADB;

struct ASN1_ADB_st {
  unsigned long flags;        /* Various flags */
  unsigned long offset;       /* Offset of selector field */
  int (*adb_cb)(long *psel);  /* Application callback */
  const ASN1_ADB_TABLE *tbl;  /* Table of possible types */
  long tblcount;              /* Number of entries in tbl */
  const ASN1_TEMPLATE *default_tt; /* Type to use if no match */
  const ASN1_TEMPLATE *null_tt; /* Type to use if selector is NULL */
};
```

```
struct ASN1_ADB_TABLE_st {
  long value;               /* NID for an object or value for an int */
  const ASN1_TEMPLATE tt;
  /* item for this value */
};

/* template flags */

/* Field is optional */
# define ASN1_TFLG_OPTIONAL      (0x1)

/* Field is a SET OF */
# define ASN1_TFLG_SET_OF        (0x1 << 1)

/* Field is a SEQUENCE OF */
# define ASN1_TFLG_SEQUENCE_OF   (0x2 << 1)

/*
* Special case: this refers to a SET OF that will be sorted into DER order
* when encoded *and* the corresponding STACK will be modified to match the
* new order.
*/
# define ASN1_TFLG_SET_ORDER     (0x3 << 1)

/* Mask for SET OF or SEQUENCE OF */
# define ASN1_TFLG_SK_MASK       (0x3 << 1)

/*
* These flags mean the tag should be taken from the tag field. If EXPLICIT
* then the underlying type is used for the inner tag.
*/

/* IMPLICIT tagging */
# define ASN1_TFLG_IMPTAG        (0x1 << 3)

/* EXPLICIT tagging, inner tag from underlying type */
# define ASN1_TFLG_EXPTAG        (0x2 << 3)

# define ASN1_TFLG_TAG_MASK      (0x3 << 3)

/* context specific IMPLICIT */
# define ASN1_TFLG_IMPLICIT      (ASN1_TFLG_IMPTAG|ASN1_TFLG_CONTEXT)

/*
 context specific EXPLICIT */
# define ASN1_TFLG_EXPLICIT      (ASN1_TFLG_EXPTAG|ASN1_TFLG_CONTEXT)
```

```
/*
* If tagging is in force these determine the type of tag to use. Otherwise
* the tag is determined by the underlying type. These values reflect the
* actual octet format.
*/

/* Universal tag */
# define ASN1_TFLG_UNIVERSAL    (0x0<<6)
/* Application tag */
# define ASN1_TFLG_APPLICATION   (0x1<<6)
/* Context specific tag */
# define ASN1_TFLG_CONTEXT      (0x2<<6)
/* Private tag */
# define ASN1_TFLG_PRIVATE      (0x3<<6)

# define ASN1_TFLG_TAG_CLASS    (0x3<<6)

/*
* These are for ANY DEFINED BY type. In this case the 'item' field points to
* an ASN1_ADB structure which contains a table of values to decode the
* relevant type
*/

# define ASN1_TFLG_ADB_MASK     (0x3<<8)

# define ASN1_TFLG_ADB_OID      (0x1<<8)

# define ASN1_TFLG_ADB_INT      (0x1<<9)

/*
* This flag when present in a SEQUENCE OF, SET OF or EXPLICIT causes
* indefinite length constructed
 encoding to be used if required.
*/

# define ASN1_TFLG_NDEF         (0x1<<11)

/* Field is embedded and not a pointer */
# define ASN1_TFLG_EMBED        (0x1 << 12)

/* This is the actual ASN1 item itself */

struct ASN1_ITEM_st {
  char itype;               /* The item type, primitive, SEQUENCE, CHOICE
                       * or extern */
  long utype;               /* underlying type */
  const ASN1_TEMPLATE *templates; /* If SEQUENCE or CHOICE this contains
                           * the contents */
```

```
  long tcount;              /* Number of templates if SEQUENCE or CHOICE */
  const void *funcs;        /* further data and type-specific functions */
  /* funcs can be ASN1_PRIMITIVE_FUNCS*, ASN1_EXTERN_FUNCS*, or ASN1_AUX* */
  long size;                /* Structure size (usually) */
  const char *sname;        /* Structure name */
};

/*
* Cache for ASN1 tag and length, so we don't keep re-reading it for things
* like
 CHOICE
*/

struct ASN1_TLC_st {
  char valid;               /* Values below are valid */
  int ret;                  /* return value */
  long plen;                /* length */
  int ptag;                 /* class value */
  int pclass;               /* class value */
  int hdrlen;               /* header length */
};

/* Typedefs for ASN1 function pointers */
typedef int ASN1_ex_d2i(ASN1_VALUE **pval, const unsigned char **in, long len,
                        const ASN1_ITEM *it, int tag, int aclass, char opt,
                        ASN1_TLC *ctx);

typedef int ASN1_ex_d2i_ex(ASN1_VALUE **pval, const unsigned char **in, long len,
                           const ASN1_ITEM *it, int tag, int aclass, char opt,
                           ASN1_TLC *ctx, OSSL_LIB_CTX *libctx,
                           const char *propq);
typedef int ASN1_ex_i2d(const ASN1_VALUE **pval, unsigned char **out,
                        const ASN1_ITEM *it, int tag, int aclass);
typedef
 int ASN1_ex_new_func(ASN1_VALUE **pval, const ASN1_ITEM *it);
typedef int ASN1_ex_new_ex_func(ASN1_VALUE **pval, const ASN1_ITEM *it,
                                OSSL_LIB_CTX *libctx, const char *propq);
typedef void ASN1_ex_free_func(ASN1_VALUE **pval, const ASN1_ITEM *it);

typedef int ASN1_ex_print_func(BIO *out, const ASN1_VALUE **pval,
                               int indent, const char *fname,
                               const ASN1_PCTX *pctx);

typedef int ASN1_primitive_i2c(const ASN1_VALUE **pval, unsigned char *cont,
                               int *putype, const ASN1_ITEM *it);
typedef int ASN1_primitive_c2i(ASN1_VALUE **pval, const unsigned char *cont,
                               int len, int utype, char *free_cont,
                               const ASN1_ITEM *it);
```

```
typedef int ASN1_primitive_print(BIO *out, const ASN1_VALUE **pval,
                         const ASN1_ITEM *it, int indent,
                         const ASN1_PCTX *pctx);

typedef
 struct ASN1_EXTERN_FUNCS_st {
   void *app_data;
   ASN1_ex_new_func *asn1_ex_new;
   ASN1_ex_free_func *asn1_ex_free;
   ASN1_ex_free_func *asn1_ex_clear;
   ASN1_ex_d2i *asn1_ex_d2i;
   ASN1_ex_i2d *asn1_ex_i2d;
   ASN1_ex_print_func *asn1_ex_print;
   ASN1_ex_new_ex_func *asn1_ex_new_ex;
   ASN1_ex_d2i_ex *asn1_ex_d2i_ex;
} ASN1_EXTERN_FUNCS;

typedef struct ASN1_PRIMITIVE_FUNCS_st {
   void *app_data;
   unsigned long flags;
   ASN1_ex_new_func *prim_new;
   ASN1_ex_free_func *prim_free;
   ASN1_ex_free_func *prim_clear;
   ASN1_primitive_c2i *prim_c2i;
   ASN1_primitive_i2c *prim_i2c;
   ASN1_primitive_print *prim_print;
} ASN1_PRIMITIVE_FUNCS;

/*
* This is the ASN1_AUX structure: it handles various miscellaneous
* requirements. For example the use of reference counts and an informational
* callback. The "informational callback" is called at various points during
* the ASN1 encoding and decoding. It can be used to provide minor
* customisation of the
 structures used. This is most useful where the
* supplied routines *almost* do the right thing but need some extra help at
* a few points. If the callback returns zero then it is assumed a fatal
* error has occurred and the main operation should be abandoned. If major
* changes in the default behaviour are required then an external type is
* more appropriate.
* For the operations ASN1_OP_I2D_PRE, ASN1_OP_I2D_POST, ASN1_OP_PRINT_PRE, and
* ASN1_OP_PRINT_POST, meanwhile a variant of the callback with const parameter
* 'in' is provided to make clear statically that its input is not modified. If
* and only if this variant is in use the flag ASN1_AFLG_CONST_CB must be set.
*/

typedef int ASN1_aux_cb(int operation, ASN1_VALUE **in, const ASN1_ITEM *it,
                        void *exarg);
```

```
typedef int ASN1_aux_const_cb(int operation, const ASN1_VALUE **in,
                              const ASN1_ITEM *it, void *exarg);

typedef struct ASN1_AUX_st {
  void *app_data;
  int flags;
   int ref_offset;           /* Offset of reference value */
  int ref_lock;             /* Offset of lock value */
  ASN1_aux_cb *asn1_cb;
  int enc_offset;           /* Offset of ASN1_ENCODING structure */
  ASN1_aux_const_cb *asn1_const_cb; /* for ASN1_OP_I2D_ and ASN1_OP_PRINT_ */
} ASN1_AUX;

/* For print related callbacks exarg points to this structure */
typedef struct ASN1_PRINT_ARG_st {
  BIO *out;
  int indent;
  const ASN1_PCTX *pctx;
} ASN1_PRINT_ARG;

/* For streaming related callbacks exarg points to this structure */
typedef struct ASN1_STREAM_ARG_st {
  /* BIO to stream through */
  BIO *out;
  /* BIO with filters appended */
  BIO *ndef_bio;
  /* Streaming I/O boundary */
  unsigned char **boundary;
} ASN1_STREAM_ARG;

/* Flags in ASN1_AUX */

/* Use a reference count */
# define ASN1_AFLG_REFCOUNT      1
/* Save the encoding of structure (useful for signatures) */
# define ASN1_AFLG_ENCODING      2
/* The Sequence length is invalid
 */
# define ASN1_AFLG_BROKEN        4
/* Use the new asn1_const_cb */
# define ASN1_AFLG_CONST_CB      8

/* operation values for asn1_cb */

# define ASN1_OP_NEW_PRE         0
# define ASN1_OP_NEW_POST        1
# define ASN1_OP_FREE_PRE        2
# define ASN1_OP_FREE_POST       3
```

```
# define ASN1_OP_D2I_PRE        4
# define ASN1_OP_D2I_POST       5
# define ASN1_OP_I2D_PRE        6
# define ASN1_OP_I2D_POST       7
# define ASN1_OP_PRINT_PRE      8
# define ASN1_OP_PRINT_POST     9
# define ASN1_OP_STREAM_PRE     10
# define ASN1_OP_STREAM_POST    11
# define ASN1_OP_DETACHED_PRE   12
# define ASN1_OP_DETACHED_POST  13
# define ASN1_OP_DUP_PRE        14
# define ASN1_OP_DUP_POST       15
# define ASN1_OP_GET0_LIBCTX    16
# define ASN1_OP_GET0_PROPQ     17

/* Macro to implement a primitive type */
# define IMPLEMENT_ASN1_TYPE(stname) IMPLEMENT_ASN1_TYPE_ex(stname, stname, 0)
# define IMPLEMENT_ASN1_TYPE_ex(itname, vname, ex) \
                        ASN1_ITEM_start(itname)
 \
                              ASN1_ITYPE_PRIMITIVE, V_##vname, NULL, 0, NULL, ex, #itname \
                        ASN1_ITEM_end(itname)

/* Macro to implement a multi string type */
# define IMPLEMENT_ASN1_MSTRING(itname, mask) \
                        ASN1_ITEM_start(itname) \
                              ASN1_ITYPE_MSTRING, mask, NULL, 0, NULL, sizeof(ASN1_STRING), #itname \
                        ASN1_ITEM_end(itname)

# define IMPLEMENT_EXTERN_ASN1(sname, tag, fptrs) \
      ASN1_ITEM_start(sname) \
            ASN1_ITYPE_EXTERN, \
            tag, \
            NULL, \
            0, \
            &fptrs, \
            0, \
            #sname \
      ASN1_ITEM_end(sname)

/* Macro to implement standard functions in terms of ASN1_ITEM structures */

# define IMPLEMENT_ASN1_FUNCTIONS(stname) IMPLEMENT_ASN1_FUNCTIONS_fname(stname,
stname, stname)

# define IMPLEMENT_ASN1_FUNCTIONS_name(stname,
 itname) IMPLEMENT_ASN1_FUNCTIONS_fname(stname, itname, itname)
```

```
# define IMPLEMENT_ASN1_FUNCTIONS_ENCODE_name(stname, itname) \
                IMPLEMENT_ASN1_FUNCTIONS_ENCODE_fname(stname, itname, itname)

# define IMPLEMENT_STATIC_ASN1_ALLOC_FUNCTIONS(stname) \
        IMPLEMENT_ASN1_ALLOC_FUNCTIONS_pfname(static, stname, stname, stname)

# define IMPLEMENT_ASN1_ALLOC_FUNCTIONS(stname) \
        IMPLEMENT_ASN1_ALLOC_FUNCTIONS_fname(stname, stname, stname)

# define IMPLEMENT_ASN1_ALLOC_FUNCTIONS_pfname(pre, stname, itname, fname) \
    pre stname *fname##_new(void) \
    { \
        return (stname *)ASN1_item_new(ASN1_ITEM_rptr(itname)); \
    } \
    pre void fname##_free(stname *a) \
    { \
        ASN1_item_free((ASN1_VALUE *)a, ASN1_ITEM_rptr(itname)); \
    }

# define IMPLEMENT_ASN1_ALLOC_FUNCTIONS_fname(stname, itname, fname) \
    stname *fname##_new(void) \
    { \
        return (stname *)ASN1_item_new(ASN1_ITEM_rptr(itname));
\
    } \
    void fname##_free(stname *a) \
    { \
        ASN1_item_free((ASN1_VALUE *)a, ASN1_ITEM_rptr(itname)); \
    }

# define IMPLEMENT_ASN1_FUNCTIONS_fname(stname, itname, fname) \
    IMPLEMENT_ASN1_ENCODE_FUNCTIONS_fname(stname, itname, fname) \
    IMPLEMENT_ASN1_ALLOC_FUNCTIONS_fname(stname, itname, fname)

# define IMPLEMENT_ASN1_ENCODE_FUNCTIONS_fname(stname, itname, fname) \
    stname *d2i_##fname(stname **a, const unsigned char **in, long len) \
    { \
        return (stname *)ASN1_item_d2i((ASN1_VALUE **)a, in, len, ASN1_ITEM_rptr(itname));\
    } \
    int i2d_##fname(const stname *a, unsigned char **out) \
    { \
        return ASN1_item_i2d((const ASN1_VALUE *)a, out, ASN1_ITEM_rptr(itname));\
    }

# define IMPLEMENT_ASN1_NDEF_FUNCTION(stname) \
    int i2d_##stname##_NDEF(const stname *a, unsigned char **out) \
    { \
        return
```

```
 ASN1_item_ndef_i2d((const ASN1_VALUE *)a, out, ASN1_ITEM_rptr(stname));\
    }

# define IMPLEMENT_STATIC_ASN1_ENCODE_FUNCTIONS(stname) \
    static stname *d2i_##stname(stname **a, \
                        const unsigned char **in, long len) \
    { \
        return (stname *)ASN1_item_d2i((ASN1_VALUE **)a, in, len, \
                                ASN1_ITEM_rptr(stname)); \
    } \
    static int i2d_##stname(const stname *a, unsigned char **out) \
    { \
        return ASN1_item_i2d((const ASN1_VALUE *)a, out, \
                            ASN1_ITEM_rptr(stname)); \
    }

# define IMPLEMENT_ASN1_DUP_FUNCTION(stname) \
    stname * stname##_dup(const stname *x) \
    { \
    return ASN1_item_dup(ASN1_ITEM_rptr(stname), x); \
    }

# define IMPLEMENT_ASN1_PRINT_FUNCTION(stname) \
    IMPLEMENT_ASN1_PRINT_FUNCTION_fname(stname, stname, stname)

# define IMPLEMENT_ASN1_PRINT_FUNCTION_fname(stname,
 itname, fname) \
    int fname##_print_ctx(BIO *out, const stname *x, int indent, \
                                const ASN1_PCTX *pctx) \
    { \
        return ASN1_item_print(out, (const ASN1_VALUE *)x, indent, \
              ASN1_ITEM_rptr(itname), pctx); \
    }

/* external definitions for primitive types */

DECLARE_ASN1_ITEM(ASN1_BOOLEAN)
DECLARE_ASN1_ITEM(ASN1_TBOOLEAN)
DECLARE_ASN1_ITEM(ASN1_FBOOLEAN)
DECLARE_ASN1_ITEM(ASN1_SEQUENCE)
DECLARE_ASN1_ITEM(CBIGNUM)
DECLARE_ASN1_ITEM(BIGNUM)
DECLARE_ASN1_ITEM(INT32)
DECLARE_ASN1_ITEM(ZINT32)
DECLARE_ASN1_ITEM(UINT32)
DECLARE_ASN1_ITEM(ZUINT32)
DECLARE_ASN1_ITEM(INT64)
DECLARE_ASN1_ITEM(ZINT64)
```

```
DECLARE_ASN1_ITEM(UINT64)
DECLARE_ASN1_ITEM(ZUINT64)

# ifndef OPENSSL_NO_DEPRECATED_3_0
/*
* LONG and ZLONG are strongly discouraged for use as stored data, as the
* underlying C type (long) differs in size depending on the architecture.
* They are designed with 32-bit longs
 in mind.
*/
DECLARE_ASN1_ITEM(LONG)
DECLARE_ASN1_ITEM(ZLONG)
# endif

SKM_DEFINE_STACK_OF_INTERNAL(ASN1_VALUE, ASN1_VALUE, ASN1_VALUE)
#define sk_ASN1_VALUE_num(sk) OPENSSL_sk_num(ossl_check_const_ASN1_VALUE_sk_type(sk))
#define sk_ASN1_VALUE_value(sk, idx) ((ASN1_VALUE
*)OPENSSL_sk_value(ossl_check_const_ASN1_VALUE_sk_type(sk), (idx)))
#define sk_ASN1_VALUE_new(cmp) ((STACK_OF(ASN1_VALUE)
*)OPENSSL_sk_new(ossl_check_ASN1_VALUE_compfunc_type(cmp)))
#define sk_ASN1_VALUE_new_null() ((STACK_OF(ASN1_VALUE) *)OPENSSL_sk_new_null())
#define sk_ASN1_VALUE_new_reserve(cmp, n) ((STACK_OF(ASN1_VALUE)
*)OPENSSL_sk_new_reserve(ossl_check_ASN1_VALUE_compfunc_type(cmp), (n)))
#define sk_ASN1_VALUE_reserve(sk, n) OPENSSL_sk_reserve(ossl_check_ASN1_VALUE_sk_type(sk), (n))
#define sk_ASN1_VALUE_free(sk) OPENSSL_sk_free(ossl_check_ASN1_VALUE_sk_type(sk))
#define sk_ASN1_VALUE_zero(sk) OPENSSL_sk_zero(ossl_check_ASN1_VALUE_sk_type(sk))
#define sk_ASN1_VALUE_delete(sk, i) ((ASN1_VALUE
*)OPENSSL_sk_delete(ossl_check_ASN1_VALUE_sk_type(sk),
 (i)))
#define sk_ASN1_VALUE_delete_ptr(sk, ptr) ((ASN1_VALUE
*)OPENSSL_sk_delete_ptr(ossl_check_ASN1_VALUE_sk_type(sk), ossl_check_ASN1_VALUE_type(ptr)))
#define sk_ASN1_VALUE_push(sk, ptr) OPENSSL_sk_push(ossl_check_ASN1_VALUE_sk_type(sk),
ossl_check_ASN1_VALUE_type(ptr))
#define sk_ASN1_VALUE_unshift(sk, ptr) OPENSSL_sk_unshift(ossl_check_ASN1_VALUE_sk_type(sk),
ossl_check_ASN1_VALUE_type(ptr))
#define sk_ASN1_VALUE_pop(sk) ((ASN1_VALUE
*)OPENSSL_sk_pop(ossl_check_ASN1_VALUE_sk_type(sk)))
#define sk_ASN1_VALUE_shift(sk) ((ASN1_VALUE
*)OPENSSL_sk_shift(ossl_check_ASN1_VALUE_sk_type(sk)))
#define sk_ASN1_VALUE_pop_free(sk, freefunc)
OPENSSL_sk_pop_free(ossl_check_ASN1_VALUE_sk_type(sk),ossl_check_ASN1_VALUE_freefunc_type(freef
unc))
#define sk_ASN1_VALUE_insert(sk, ptr, idx) OPENSSL_sk_insert(ossl_check_ASN1_VALUE_sk_type(sk),
ossl_check_ASN1_VALUE_type(ptr), (idx))
#define sk_ASN1_VALUE_set(sk, idx, ptr) ((ASN1_VALUE
*)OPENSSL_sk_set(ossl_check_ASN1_VALUE_sk_type(sk),
 (idx), ossl_check_ASN1_VALUE_type(ptr)))
#define sk_ASN1_VALUE_find(sk, ptr) OPENSSL_sk_find(ossl_check_ASN1_VALUE_sk_type(sk),
```

```
ossl_check_ASN1_VALUE_type(ptr))
#define sk_ASN1_VALUE_find_ex(sk, ptr) OPENSSL_sk_find_ex(ossl_check_ASN1_VALUE_sk_type(sk),
ossl_check_ASN1_VALUE_type(ptr))
#define sk_ASN1_VALUE_find_all(sk, ptr, pnum)
OPENSSL_sk_find_all(ossl_check_ASN1_VALUE_sk_type(sk), ossl_check_ASN1_VALUE_type(ptr), pnum)
#define sk_ASN1_VALUE_sort(sk) OPENSSL_sk_sort(ossl_check_ASN1_VALUE_sk_type(sk))
#define sk_ASN1_VALUE_is_sorted(sk) OPENSSL_sk_is_sorted(ossl_check_const_ASN1_VALUE_sk_type(sk))
#define sk_ASN1_VALUE_dup(sk) ((STACK_OF(ASN1_VALUE)
*)OPENSSL_sk_dup(ossl_check_const_ASN1_VALUE_sk_type(sk)))
#define sk_ASN1_VALUE_deep_copy(sk, copyfunc, freefunc) ((STACK_OF(ASN1_VALUE)
*)OPENSSL_sk_deep_copy(ossl_check_const_ASN1_VALUE_sk_type(sk),
ossl_check_ASN1_VALUE_copyfunc_type(copyfunc), ossl_check_ASN1_VALUE_freefunc_type(freefunc)))
#define sk_ASN1_VALUE_set_cmp_func(sk,
 cmp) ((sk_ASN1_VALUE_compfunc)OPENSSL_sk_set_cmp_func(ossl_check_ASN1_VALUE_sk_type(sk),
ossl_check_ASN1_VALUE_compfunc_type(cmp)))



/* Functions used internally by the ASN1 code */

int ASN1_item_ex_new(ASN1_VALUE **pval, const ASN1_ITEM *it);
void ASN1_item_ex_free(ASN1_VALUE **pval, const ASN1_ITEM *it);

int ASN1_item_ex_d2i(ASN1_VALUE **pval, const unsigned char **in, long len,
                     const ASN1_ITEM *it, int tag, int aclass, char opt,
                     ASN1_TLC *ctx);

int ASN1_item_ex_i2d(const ASN1_VALUE **pval, unsigned char **out,
                     const ASN1_ITEM *it, int tag, int aclass);

/* Legacy compatibility */
# define IMPLEMENT_ASN1_FUNCTIONS_const(name) IMPLEMENT_ASN1_FUNCTIONS(name)
# define IMPLEMENT_ASN1_ENCODE_FUNCTIONS_const_fname(stname, itname, fname) \
        IMPLEMENT_ASN1_ENCODE_FUNCTIONS_fname(stname, itname, fname)

#ifdef  __cplusplus
}
#endif
#endif
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*/

#ifndef OPENSSL_FIPSKEY_H
define OPENSSL_FIPSKEY_H
pragma once

ifdef __cplusplus
extern "C" {
endif

/*

* The FIPS validation HMAC key, usable as an array initializer.
*/
#define FIPS_KEY_ELEMENTS \
  0xf4, 0x55, 0x66, 0x50, 0xac, 0x31, 0xd3, 0x54, 0x61, 0x61, 0x0b, 0xac, 0x4e, 0xd8, 0x1b, 0x1a, 0x18, 0x1b, 0x2d, 0x8a, 0x43, 0xea, 0x28, 0x54, 0xcb, 0xae, 0x22, 0xca, 0x74, 0x56, 0x08, 0x13

/*
* The FIPS validation key, as a string.
*/
#define FIPS_KEY_STRING "f4556650ac31d35461610bac4ed81b1a181b2d8a43ea2854cbae22ca74560813"

ifdef __cplusplus
}
endif

#endif
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1.710 validate-npm-package-name 5.0.1

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1.714 jetty 9.4.18.v20190429

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* org.eclipse.jetty.orbit:org.eclipse.jdt.core

The following artifacts are EPL and ASL2.
* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

Oracle

The following artifacts are CDDL + GPLv2 with classpath exception.
https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
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module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modifications
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http://openjdk.java.net/legal/gplv2+ce.html

OW2

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terms of http://asm.ow2.org/license.html

org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

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 licensed.

org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
 org.apache.tomcat:tomcat-el-api
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api

org.apache.tomcat:tomcat-util-scan
org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
org.apache.tomcat:tomcat-jasper-el
org.apache.tomcat:tomcat-el-api

Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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1.715 spdx-expression-parse 4.0.0

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1.716 iconv 2.35

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* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/internal/SimpleMongoClients.java
* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/MongoClientFactory.java
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 /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/internal/MongoClientImpl.java
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* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/gridfs/GridFSUploadStream.java
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* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/gridfs/GridFSUploadStreamImpl.java
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* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/vault/package-info.java
* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/internal/CryptConnection.java
* /mongodb-driver-sync-4-1-0-sources-jar/com/mongodb/client/internal/CollectionInfoRetriever.java

1.718 is-fullwidth-code-point 3.0.0

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Mesa 3-D Graphics Library v21.0.3

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Ext headers	GL/glext.h	Khronos
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	GL/wglext.h	Khronos
	KHR/khrplatform.h	Khronos

****

---
include/GL/gl.h :

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== Authors ==

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1.721 jnr-ffi 2.2.16

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* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/types/sa_family_t.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/converters/StructArrayParameterConverter.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/platform/x86_64/midnightbsd/TypeAliases.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/X86Disassembler.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/types/ino64_t.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/types/int8_t.java
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* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/annotations/TypeDefinition.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/Variable.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/mapper/DefaultSignatureType.java
*
/jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/types/pid_t.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/types/u_int32_t.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/platform/x86_64/solaris/TypeAliases.java
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* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/NativeVariable.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/NativeFunction.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/mapper/SimpleFunctionMapper.java
*
 /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/ResultType.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/Types.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/mapper/SimpleTypeMapper.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/FromNativeType.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/InterfaceScanner.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/AnnotationTypeMapper.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/StructByReferenceResultConverterFactory.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/ParameterType.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/SigType.java
* /jnr-ffi-2-2-16-sources-4-jar/jnr/ffi/provider/jffi/ConverterMetaData.java

1.722 dpkg 1.21.1ubuntu2.6

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* /guava-33-3-1-android-sources-jar/com/google/common/hash/BloomFilterStrategies.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingListeningExecutorService.java
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* /guava-33-3-1-android-sources-jar/com/google/common/hash/Hashing.java
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* /guava-33-3-1-android-sources-jar/com/google/common/math/IntMath.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AsyncFunction.java
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* /guava-33-3-1-android-sources-jar/com/google/common/base/PairwiseEquivalence.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredSetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingImmutableMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingNavigableSet.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedMultisetBridge.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredEntryMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredKeySetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/CompactHashMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingBlockingDeque.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AllEqualOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractSortedKeySortedSetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/CompactLinkedHashMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingNavigableMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TransformedListIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingBlockingDeque.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/CompactLinkedHashSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableEnumMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TreeRangeMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableAsList.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/DescendingImmutableSortedSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RangeMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingImmutableList.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/EvictingQueue.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TransformedIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/CompactHashSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredKeyListMultimap.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredEntrySetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractNavigableMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/DescendingMultiset.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingImmutableSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TreeTraverser.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractMultimap.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractRangeSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/GeneralRange.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/RangeSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedIterables.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableSortedMultiset.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedIterable.java
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/**
* Holder for web specializations of methods of {@code Ints}. Intended to be empty for regular
* version.
*/

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* /guava-33-3-1-android-sources-jar/com/google/common/hash/Striped64.java
* /guava-33-3-1-android-sources-jar/com/google/common/cache/LongAdder.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/LongAdder.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AtomicDoubleArray.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/cache/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/ElementTypesAreNonnullByDefault.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/base/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/xml/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/primitives/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/html/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/html/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/primitives/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ParametricNullness.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/xml/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ElementTypesAreNonnullByDefault.java

* /guava-33-3-1-android-sources-jar/com/google/common/base/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/net/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/cache/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ParametricNullness.java
* /guava-33-3-1-android-sources-jar/com/google/common/net/ParametricNullness.java
*
/guava-33-3-1-android-sources-jar/com/google/common/graph/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/ElementTypesAreNonnullByDefault.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/ParametricNullness.java
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* /guava-33-3-1-android-sources-jar/com/google/common/base/IgnoreJRERequirement.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/IgnoreJRERequirement.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/IgnoreJRERequirement.java
*
/guava-33-3-1-android-sources-jar/com/google/common/io/IgnoreJRERequirement.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/ComputationException.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/EmptyImmutableSetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableSetMultimap.java
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 /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableSortedSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TableCollectors.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/DiscreteDomain.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ArrayTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SingletonImmutableTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableClassToInstanceMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableAsList.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableList.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableEnumSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractIndexedListIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ComparisonChain.java
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* /guava-33-3-1-android-sources-jar/com/google/common/io/ByteArrayDataInput.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/Escapers.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableTable.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/cache/CacheBuilder.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AbstractIdleService.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ByteArrayDataOutput.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AbstractExecutionThreadService.java
* /guava-33-3-1-android-sources-jar/com/google/common/net/UrlEscapers.java
* /guava-33-3-1-android-sources-jar/com/google/common/annotations/GwtIncompatible.java
* /guava-33-3-1-android-sources-jar/com/google/common/cache/LocalCache.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/JdkFutureAdapters.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/ArrayBasedEscaperMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/cache/ReferenceEntry.java
* /guava-33-3-1-android-sources-jar/com/google/common/html/HtmlEscapers.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/primitives/UnsignedBytes.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingListenableFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Splitter.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AbstractService.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/TypeResolver.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/SettableFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/ArrayBasedCharEscaper.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ByteProcessor.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/MapMaker.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Service.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/ArrayBasedUnicodeEscaper.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/Platform.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingFluentFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/annotations/GwtCompatible.java
* /guava-33-3-1-android-sources-jar/com/google/common/xml/XmlEscapers.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Cut.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Callables.java
* /guava-33-3-1-android-sources-jar/com/google/common/annotations/J2ktIncompatible.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/DenseImmutableTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/net/InternetDomainName.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Platform.java
* /guava-33-3-1-android-sources-jar/com/google/common/net/HostSpecifier.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SparseImmutableTable.java
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/guava-33-3-1-android-sources-jar/com/google/common/primitives/SignedBytes.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/TimeoutFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/annotations/VisibleForTesting.java
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/guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AbstractTransformFuture.java
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* /guava-33-3-1-android-sources-jar/com/google/common/io/AppendableWriter.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/FluentFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/CollectionFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/TypeToken.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/CharEscaper.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/GwtFuturesCatchingSpecialization.java
* /guava-33-3-1-android-sources-
jar/com/google/common/util/concurrent/GwtFluentFutureCatchingSpecialization.java

* /guava-33-3-1-android-sources-jar/com/google/common/base/CaseFormat.java
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 /guava-33-3-1-android-sources-jar/com/google/common/escape/CharEscaperBuilder.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AggregateFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/FakeTimeLimiter.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/TimeLimiter.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ImmediateFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/UncheckedTimeoutException.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingSortedSetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingListMultimap.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractSequentialIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingSetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RowSortedTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/MinMaxPriorityQueue.java
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*/
/**
* Holder for web specializations of methods of {@code Shorts}. Intended to be empty for regular
* version.
*/

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* /guava-33-3-1-android-sources-jar/com/google/common/graph/IncidentEdgeSet.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ExecutionSequencer.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/ImmutableSupplier.java
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* /guava-33-3-1-android-sources-jar/com/google/common/base/PatternCompiler.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/CommonMatcher.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/CommonPattern.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/JdkPattern.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Platform.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ConsumingQueueIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AggregateFutureState.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/FarmHashFingerprint64.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/InterruptibleTask.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ReaderInputStream.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AsyncCallable.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/MacHashFunction.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/CombinedFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/LittleEndianByteArray.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/IndexedImmutableSet.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingCondition.java
* /guava-33-3-1-android-sources-jar/com/google/common/primitives/ImmutableDoubleArray.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingLock.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/primitives/ImmutableIntArray.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/AbstractHashFunction.java
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* /guava-33-3-1-android-sources-jar/com/google/common/base/MoreObjects.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/Quantiles.java

* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/SubscriberRegistry.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ListenerCallQueue.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/TrustedListenableFutureTask.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/Dispatcher.java
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/**
* Holder for web specializations of methods of {@code Doubles}. Intended to be empty for regular
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*/

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* /guava-33-3-1-android-sources-jar/com/google/common/hash/ChecksumHashFunction.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ByteSink.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/StatsAccumulator.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/reflect/TypeToInstanceMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/Stats.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/html/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredKeyMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/Invokable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableRangeSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/SipHashFunction.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/Parameter.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/ClassPath.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/Closer.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ServiceManager.java
* /guava-33-3-1-android-sources-jar/com/google/common/cache/LongAddables.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/math/PairedStats.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ListenableScheduledFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/CartesianList.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ByteSource.java
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* /guava-33-3-1-android-sources-jar/com/google/common/io/CharSource.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/AbstractInvocationHandler.java

* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/RateLimiter.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/StandardSystemProperty.java
* /guava-33-3-1-android-sources-jar/com/google/common/escape/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/FileWriteMode.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/xml/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/BaseEncoding.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/MutableTypeToInstanceMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/AbstractByteHasher.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableRangeMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/LinearTransformation.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/LongAddables.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/CharSink.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/ImmutableTypeToInstanceMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/PairedStatsAccumulator.java
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* /guava-33-3-1-android-sources-jar/com/google/common/graph/ForwardingGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/MoreCollectors.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/HashMultimapGwtSerializationDependencies.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/GraphConstants.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ImmutableValueGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/StandardNetwork.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/MapIteratorCache.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/AbstractGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/StandardValueGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/MapRetrievalCache.java

* /guava-33-3-1-android-sources-
jar/com/google/common/collect/ArrayListMultimapGwtSerializationDependencies.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/AbstractGraphBuilder.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/EndpointPairIterator.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/graph/AbstractNetwork.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ForwardingNetwork.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ValueGraphBuilder.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/GraphBuilder.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/StandardMutableNetwork.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/UndirectedMultiNetworkConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/DirectedMultiNetworkConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Comparators.java
* /guava-33-3-1-android-sources-
jar/com/google/common/collect/ImmutableMultisetGwtSerializationDependencies.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/AbstractDirectedNetworkConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/NetworkConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/EndpointPair.java
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 /guava-33-3-1-android-sources-jar/com/google/common/graph/DirectedGraphConnections.java
* /guava-33-3-1-android-sources-
jar/com/google/common/collect/LinkedHashMultimapGwtSerializationDependencies.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/GraphConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/MultiEdgesConnecting.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/UndirectedGraphConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/UndirectedNetworkConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/AbstractValueGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/MutableValueGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/StandardMutableValueGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ElementOrder.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/NetworkBuilder.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/RangeGwtSerializationDependencies.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/DirectedNetworkConnections.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/CollectCollectors.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ForwardingValueGraph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/ValueGraph.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/Tables.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableMap.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Platform.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Table.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/PeekingIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TreeBasedTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Range.java
* /guava-33-3-1-android-sources-jar/com/google/thirdparty/publicsuffix/PublicSuffixPatterns.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableSortedSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/UnmodifiableIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableListMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableMapValues.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/StandardRowSortedTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Serialization.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableCollection.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Collections2.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/StandardTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableMultiset.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/CollectPreconditions.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableMapEntrySet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableEntry.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableMapKeySet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/EmptyImmutableListMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableBiMap.java
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* /guava-33-3-1-android-sources-jar/com/google/common/io/CharStreams.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/Subscribe.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/LittleEndianDataInputStream.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Predicate.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/base/Charsets.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Interners.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Function.java
* /guava-33-3-1-android-sources-jar/com/google/common/primitives/Primitives.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/DeadEvent.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/MultiInputStream.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/Files.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/FinalizablePhantomReference.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/LineReader.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/CountingOutputStream.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/AllowConcurrentEvents.java
*

/guava-33-3-1-android-sources-jar/com/google/common/base/Preconditions.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ExecutionList.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/Resources.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/CountingInputStream.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/LineBuffer.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/AsyncEventBus.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Throwables.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Defaults.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/ByteStreams.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/DirectExecutor.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/TempFileCreator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/EnumMultiset.java
*
/guava-33-3-1-android-sources-jar/com/google/common/eventbus/EventBus.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/Closeables.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/FinalizableReference.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Objects.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/FinalizableWeakReference.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Suppliers.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/FinalizableSoftReference.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/AbstractFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/FinalizableReferenceQueue.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ListenableFuture.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Predicates.java
*
/guava-33-3-1-android-sources-jar/com/google/common/collect/HashBiMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Functions.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/AbstractIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Supplier.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/LittleEndianDataOutputStream.java
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```
*/
/**
* Holder for web specializations of methods of {@code Floats}. Intended to be empty for regular
* version.
*/
```

Found in path(s):
* /guava-33-3-1-android-sources-jar/com/google/common/primitives/FloatsMethodsForWeb.java
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*/
/*
  * This method was rewritten in Java from an intermediate step of the Murmur hash function in
  * http://code.google.com/p/smhasher/source/browse/trunk/MurmurHash3.cpp, which contained the
  * following header:
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 disclaims copyright to this source code.
  */
```

Found in path(s):
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Hashing.java
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Found in path(s):
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedMultisets.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedMultiset.java
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*/
/**
  * Returns an array containing all of the elements in the specified collection. This method
  * returns the elements in the order they are returned by the collection's iterator. The returned
  * array is "safe" in that no references to it are maintained by the collection. The caller is
  * thus free to modify the returned
 array.
  *
  * <p>This method assumes that the collection size doesn't change while the method is running.
  *
  * <p>TODO(kevinb): support concurrently modified collections?
  *
  * @param c the collection for which to return an array of elements
  */
```

Found in path(s):
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ObjectArrays.java
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*/
/*
 * This method was written by Doug Lea with assistance from members of JCP JSR-166 Expert Group
 * and released to the public domain, as explained at
 * http://creativecommons.org/licenses/publicdomain
 *
 * As of 2010/06/11, this method is identical to the (package private) hash method in OpenJDK 7's
 * java.util.HashMap
class.
 */

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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Striped.java
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*/
/*
 * This method was rewritten in Java from an intermediate step of the Murmur hash function in
 * http://code.google.com/p/smhasher/source/browse/trunk/MurmurHash3.cpp, which contained the
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Found in path(s):
* /guava-33-3-1-android-sources-jar/com/google/common/base/SmallCharMatcher.java
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express
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* the License.
*/
/**
* Holder for extra methods of {@code Objects} only in web. Intended to be empty for regular
* version.
*/
```

Found in path(s):
* /guava-33-3-1-android-sources-jar/com/google/common/base/ExtraObjectsMethodsForWeb.java
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```

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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ServiceManagerBridge.java
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express
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* the License.
*/
/**
* Outer class that exists solely to let us write {@code Partially.GwtIncompatible} instead of plain
* {@code GwtIncompatible}. This is more accurate for {@link Futures#catching}, which is available
* under GWT but with a slightly different signature.
*
* <p>We can't use {@code PartiallyGwtIncompatible} because then the GWT compiler
 wouldn't recognize
* it as a {@code GwtIncompatible} annotation. And for {@code Futures.catching}, we need the GWT
* compiler to autostrip the normal server method in order to expose the special, inherited GWT
* version.
*/
```

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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Partially.java
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```

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* /guava-33-3-1-android-sources-jar/com/google/common/math/ToDoubleRounder.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/Java8Compatibility.java

* /guava-33-3-1-android-sources-jar/com/google/common/base/Java8Compatibility.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/OverflowAvoidingLockSupport.java
*
/guava-33-3-1-android-sources-jar/com/google/common/hash/Java8Compatibility.java
* /guava-33-3-1-android-sources-jar/com/google/common/math/BigDecimalMath.java
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* /guava-33-3-1-android-sources-jar/com/google/common/base/Utf8.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Verify.java
* /guava-33-3-1-android-sources-jar/com/google/common/reflect/TypeVisitor.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/FilteredMultimapValues.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/SubscriberExceptionContext.java
*
/guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Runnables.java
* /guava-33-3-1-android-sources-jar/com/google/common/io/CharSequenceReader.java
* /guava-33-3-1-android-sources-jar/com/google/thirdparty/publicsuffix/PublicSuffixType.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/VerifyException.java
* /guava-33-3-1-android-sources-jar/com/google/common/eventbus/SubscriberExceptionHandler.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/WrappingScheduledExecutorService.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractTable.java
* /guava-33-3-1-android-sources-jar/com/google/common/hash/HashingInputStream.java
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* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ForwardingBlockingQueue.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ListeningExecutorService.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Atomics.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/Monitor.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Ascii.java
* /guava-33-3-1-android-sources-jar/com/google/common/annotations/Beta.java
* /guava-33-3-1-android-sources-jar/com/google/common/base/Strings.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ContiguousSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedLists.java
* /guava-33-3-1-android-sources-jar/com/google/common/primitives/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/ThreadFactoryBuilder.java
* /guava-33-3-1-android-sources-jar/com/google/common/util/concurrent/UncaughtExceptionHandlers.java
* /guava-33-3-1-android-sources-jar/com/google/common/net/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/annotations/package-info.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/NaturalOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Maps.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ClassToInstanceMap.java
*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/CompoundOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractMapEntry.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingSortedSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingList.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/LinkedListMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TreeMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingQueue.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/LinkedHashMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/TreeMultiset.java
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 /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingListIterator.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Synchronized.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/NullsFirstOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractBiMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/UsingToStringOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/package-info.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableList.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/HashMultimap.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingMap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingMultimap.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/ImmutableSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/LexicographicalOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/MapDifference.java

* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractListMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/NullsLastOrdering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Multimaps.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Ordering.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Multimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/Multisets.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SingletonImmutableSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/EnumBiMap.java
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* /guava-33-3-1-android-sources-jar/com/google/common/collect/Lists.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/RegularImmutableSet.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingObject.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/AbstractMapBasedMultiset.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/SetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/ForwardingSortedMap.java
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*
 /guava-33-3-1-android-sources-jar/com/google/common/collect/SortedSetMultimap.java
* /guava-33-3-1-android-sources-jar/com/google/common/collect/MutableClassToInstanceMap.java
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  * Not supported. <b>You are attempting to create a map that may contain a non-{@code Comparable}
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  * version.
  *
  * @throws UnsupportedOperationException always
  * @deprecated <b>Pass a key of type {@code Comparable}
 to use {@link
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  */
```

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 /guava-33-3-1-android-sources-jar/com/google/common/collect/TopKSelector.java
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* /guava-33-3-1-android-sources-jar/com/google/common/graph/Graph.java
* /guava-33-3-1-android-sources-jar/com/google/common/graph/Graphs.java
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* /guava-33-3-1-android-sources-jar/com/google/common/graph/AbstractBaseGraph.java
*

/guava-33-3-1-android-sources-jar/com/google/common/graph/BaseGraph.java
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Double-conversion v1.1.5

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Mesa 3-D Graphics Library v21.0.3

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GL/wglext.h Khronos
KHR/khrplatform.h Khronos

****

---
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Mesa 3-D
graphics library

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include/GL/glxext.h
include/GL/wglxext.h :

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Eric Raymond <esr[AT]snark.thyrsus.com>
current as well as long time former maintainer of giflib code

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tree/openbsd-reallocarray.c

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```

ASM Bytecode Manipulation Framework v6.0

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1.748 isexe 3.1.1

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1.749 glibc 2.35-0ubuntu3.11

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In other cases, permission to use a particular library in non-free
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its purpose remains meaningful.

(For example, a function in a library to compute square roots has
a purpose that is entirely well-defined independent of the
application. Therefore, Subsection 2d requires that any
application-supplied function or table used by this function must
be optional: if the application does not supply it, the square
root function must still compute square roots.)
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from a designated place, then offering equivalent access to copy the
source code from the same place satisfies the requirement to
distribute the source code, even though third parties are not
compelled to copy the source along with the object code.

@item
A program that contains no derivative of any portion of the
Library, but is designed to work with the Library by being compiled or
linked with it, is called a ``work that uses the Library''. Such a
work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

However, linking a ``work that uses the Library'' with the Library
creates an executable that is a derivative of the Library (because
it
contains portions of the Library), rather than a ``work that uses the
library''. The executable is therefore covered by this License.
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When a ``work that uses the Library'' uses material from a header file
that is part of the Library, the object code for the work may be a
derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be
linked without the Library, or if the work is itself a library. The
threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data
structure layouts and accessors, and small macros and small inline
functions (ten lines or less in length), then the use of the object
file is unrestricted, regardless of whether it is legally a derivative
work. (Executables containing this object code plus portions of the
Library will still fall under Section 6.)

Otherwise,
if the work is a derivative of the Library, you may
distribute the object code for the work under the terms of Section 6.
Any executables containing that work also fall under Section 6,
whether or not they are linked directly with the Library itself.

@item
As an exception to the Sections above, you may also combine or
link a ``work that uses the Library'' with the Library to produce a
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this License. Also, you must do one
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@enumerate a
@item
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Sections 1 and 2 above); and, if the work is an executable linked
with the Library, with the complete machine-readable ``work that
uses the Library'', as object code and/or source code, so that the
user can modify the Library and then relink to produce a modified
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that the user who changes the contents of definitions files in the
Library will not necessarily be able to recompile the application
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@item
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@page
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/reader/RandomAccessReader.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/reader/SequentialReader.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/reader/ClassfileReader.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/ArraySlice.java
* /classgraph-4-8-179-sources-1-
jar/nonapi/io/github/classgraph/fileslice/reader/RandomAccessFileChannelReader.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/FileSlice.java
*
/classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/Slice.java
* /classgraph-4-8-179-sources-1-
jar/nonapi/io/github/classgraph/fileslice/reader/RandomAccessByteBufferReader.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fileslice/PathSlice.java
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* This file is part of ClassGraph.
*
* Author: Michael J. Simons
*
* Hosted at: https://github.com/classgraph/classgraph
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*
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*
* Hosted at: https://github.com/classgraph/classgraph
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/utils/JarUtils.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClasspathElementModule.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/JSONReference.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClassGraph.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/types/ParseException.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/TypeVariableSignature.java
*
 /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/utils/StringUtils.java
* /classgraph-4-8-179-sources-1-
jar/nonapi/io/github/classgraph/classloaderhandler/EquinoxClassLoaderHandler.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ReferenceTypeSignature.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/utils/FileUtils.java
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jar/nonapi/io/github/classgraph/classloaderhandler/EquinoxContextFinderClassLoaderHandler.java
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/ParameterizedTypeImpl.java
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/classpath/ClasspathOrder.java
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jar/nonapi/io/github/classgraph/classloaderhandler/ClassLoaderHandlerRegistry.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClasspathElement.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fastzipfilereader/FastZipEntry.java
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jar/nonapi/io/github/classgraph/classloaderhandler/WeblogicClassLoaderHandler.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/classpath/ClassLoaderFinder.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/MethodParameterInfo.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/types/TypeUtils.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClassMemberInfo.java
* /classgraph-4-8-179-sources-1-
jar/nonapi/io/github/classgraph/classloaderhandler/ParentLastDelegationOrderTestClassLoaderHandler.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/AnnotationEnumValue.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ModuleInfoList.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/recycler/RecycleOnClose.java
* /classgraph-4-8-179-sources-1-
jar/nonapi/io/github/classgraph/classloaderhandler/PlexusClassWorldsClassRealmClassLoaderHandler.java
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/classgraph-4-8-179-sources-1-jar/io/github/classgraph/ModuleRef.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/InfoList.java
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/reflection/ReflectionUtils.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/utils/VersionFinder.java

*
/classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClassGraphException.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ModuleInfo.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/PackageInfoList.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/AnnotationClassRef.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/classpath/CallStackReader.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/recycler/Resettable.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/scanspec/AcceptReject.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClasspathElementDir.java
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* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/MappableInfoList.java
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/classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClassRefTypeSignature.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/ClassFields.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/BaseTypeSignature.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/classpath/SystemJarFinder.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/JSONObject.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/Resource.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/TypeSignature.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClassInfoList.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/FieldInfoList.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/concurrency/InterruptionChecker.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/JSONUtils.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/PotentiallyUnmodifiableList.java
*
/classgraph-4-8-179-sources-1-jar/io/github/classgraph/MethodTypeSignature.java
* /classgraph-4-8-179-sources-1-
jar/nonapi/io/github/classgraph/classloaderhandler/TomcatWebappClassLoaderBaseHandler.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ClasspathElementZip.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ModuleReaderProxy.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/FieldTypeInfo.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ObjectTypedValueWrapper.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/HasName.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/HierarchicalTypeSignature.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fastzipfilereader/NestedJarHandler.java
* /classgraph-4-8-179-sources-1-jar/io/github/classgraph/ScanResult.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/utils/LogNode.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/json/JSONParser.java
*
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/fastzipfilereader/PhysicalZipFile.java
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*
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* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/reflection/ReflectionDriver.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/reflection/JVMDriverReflectionDriver.java
* /classgraph-4-8-179-sources-1-jar/nonapi/io/github/classgraph/reflection/NarcissusReflectionDriver.java
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A. HISTORY OF THE SOFTWARE
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see http://www.cwi.nl) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see http://www.cnri.reston.va.us) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see https://www.python.org/psf/) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

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0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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*/

Found in path(s):

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* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/Log4JLogger.java
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/LogFactoryImpl.java
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/Jdk13LumberjackLogger.java
*
/commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/SimpleLog.java
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/Jdk14Logger.java
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/LogSource.java
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/NoOpLog.java
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/LogKitLogger.java
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Found in path(s):
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/package.html
* /commons-logging-1-1-sources-9-jar/org/apache/commons/logging/impl/package.html

1.757 minipass 7.1.2

1.757.1 Available under license :

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1.758 robfig-cron 3.0.1

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1.759 util-linux 1:2.37.2-4ubuntu3.4

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NR START END SECTORS SIZE NAME UUID
1 32 7679 7648 3.7M 8f8378c0-01
2 7680 16383 8704 4.3M 8f8378c0-02
5 7936 12799 4864 2.4M
6 12544 16127 3584 1.8M

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#ifndef UTIL_LINUX_PT_BSD_H
#define UTIL_LINUX_PT_BSD_H

#define BSD_MAXPARTITIONS 16
#define BSD_FS_UNUSED  0

#ifndef BSD_DISKMAGIC
# define BSD_DISKMAGIC     ((uint32_t) 0x82564557)
#endif

#define BSD_LINUX_BOOTDIR "/usr/ucb/mdec"

#if defined (__alpha__) || defined (__powerpc__) || \
   defined (__ia64__) || defined (__hppa__)
# define BSD_LABELSECTOR   0
# define BSD_LABELOFFSET   64
#else
# define BSD_LABELSECTOR   1
# define BSD_LABELOFFSET   0
#endif

#define BSD_BBSIZE        8192  /* size of boot area, with label */
#define BSD_SBSIZE        8192  /* max size of fs superblock */

struct bsd_disklabel {
 uint32_t d_magic;  /* the magic number */
 int16_t  d_type;   /* drive type */
 int16_t  d_subtype;  /* controller/d_type specific */
 char  d_typename[16];  /* type name, e.g. "eagle" */
 char  d_packname[16];  /* pack identifier */

   /* disk geometry: */
 uint32_t d_secsize;  /* # of bytes per sector */
 uint32_t d_nsectors;  /* # of data sectors per track */
 uint32_t d_ntracks;  /*
 # of tracks per cylinder */
 uint32_t d_ncylinders;  /* # of data cylinders per unit */
 uint32_t d_secpercyl;  /* # of data sectors per cylinder */
```

```
uint32_t d_secperunit;  /* # of data sectors per unit */

/*
 * Spares (bad sector replacements) below
 * are not counted in d_nsectors or d_secpercyl.
 * Spare sectors are assumed to be physical sectors
 * which occupy space at the end of each track and/or cylinder.
 */
uint16_t d_sparespertrack; /* # of spare sectors per track */
uint16_t d_sparespercyl;  /* # of spare sectors per cylinder */

/*
 * Alternate cylinders include maintenance, replacement,
 * configuration description areas, etc.
 */
uint32_t d_acylinders;  /* # of alt. cylinders per unit */

  /* hardware characteristics: */
/*
 * d_interleave, d_trackskew and d_cylskew describe perturbations
 * in the media format used to compensate for a slow controller.
 * Interleave is physical sector interleave, set up by the formatter
 * or controller
when formatting.  When interleaving is in use,
 * logically adjacent sectors are not physically contiguous,
 * but instead are separated by some number of sectors.
 * It is specified as the ratio of physical sectors traversed
 * per logical sector.  Thus an interleave of 1:1 implies contiguous
 * layout, while 2:1 implies that logical sector 0 is separated
 * by one sector from logical sector 1.
 * d_trackskew is the offset of sector 0 on track N
 * relative to sector 0 on track N-1 on the same cylinder.
 * Finally, d_cylskew is the offset of sector 0 on cylinder N
 * relative to sector 0 on cylinder N-1.
 */
uint16_t d_rpm;   /* rotational speed */
uint16_t d_interleave;  /* hardware sector interleave */
uint16_t d_trackskew;  /* sector 0 skew, per track */
uint16_t d_cylskew;  /* sector 0 skew, per cylinder */
uint32_t d_headswitch;  /* head switch time, usec */
uint32_t d_trkseek;  /* track-to-track seek, usec */
uint32_t d_flags;  /* generic flags */
uint32_t d_drivedata[5];  /*
drive-type specific information */
uint32_t d_spare[5];  /* reserved for future use */
uint32_t d_magic2;  /* the magic number (again) */
uint16_t d_checksum;  /* xor of data incl. partitions */
```

```
  /* filesystem and partition information: */
 uint16_t d_npartitions;        /* number of partitions in following */
 uint32_t d_bbsize;         /* size of boot area at sn0, bytes */
 uint32_t d_sbsize;         /* max size of fs superblock, bytes */

 struct bsd_partition  {  /* the partition table */
  uint32_t p_size;         /* number of sectors in partition */
  uint32_t p_offset;       /* starting sector */
  uint32_t p_fsize;        /* filesystem basic fragment size */
  uint8_t  p_fstype; /* filesystem type, see below */
  uint8_t  p_frag;  /* filesystem fragments per block */
  uint16_t p_cpg;         /* filesystem cylinders per group */
 } __attribute__((packed)) d_partitions[BSD_MAXPARTITIONS]; /* actually may be more */
} __attribute__((packed));



/* d_type values:
 */
#define BSD_DTYPE_SMD  1  /* SMD, XSMD; VAX hp/up */
#define BSD_DTYPE_MSCP  2  /* MSCP */
#define BSD_DTYPE_DEC  3  /* other DEC (rk, rl) */
#define BSD_DTYPE_SCSI  4  /* SCSI */
#define BSD_DTYPE_ESDI  5  /* ESDI interface */
#define BSD_DTYPE_ST506  6  /* ST506 etc. */
#define BSD_DTYPE_HPIB  7  /* CS/80 on HP-IB */
#define BSD_DTYPE_HPFL  8  /* HP Fiber-link */
#define BSD_DTYPE_FLOPPY 10  /* floppy */

/* d_subtype values: */
#define BSD_DSTYPE_INDOSPART 0x8  /* is inside dos partition */
#define BSD_DSTYPE_DOSPART(s) ((s) & 3) /* dos partition number */
#define BSD_DSTYPE_GEOMETRY 0x10  /* drive params in label */

/*
* Filesystem type and version.
* Used to interpret other filesystem-specific
* per-partition information.
*/
#define BSD_FS_UNUSED 0  /* unused */
#define BSD_FS_SWAP     1  /* swap */
#define BSD_FS_V6       2  /* Sixth Edition */
#define BSD_FS_V7       3  /* Seventh Edition */
#define BSD_FS_SYSV     4  /* System V */
#define BSD_FS_V71K     5  /* V7
 with 1K blocks (4.1, 2.9) */
#define BSD_FS_V8       6  /* Eighth Edition, 4K blocks */
#define BSD_FS_BSDFFS 7  /* 4.2BSD fast file system */
#define BSD_FS_BSDLFS 9  /* 4.4BSD log-structured file system */
```

```
#define BSD_FS_OTHER 10  /* in use, but unknown/unsupported */
#define BSD_FS_HPFS 11  /* OS/2 high-performance file system */
#define BSD_FS_ISO9660 12  /* ISO-9660 filesystem (cdrom) */
#define BSD_FS_ISOFS BSD_FS_ISO9660
#define BSD_FS_BOOT 13  /* partition contains bootstrap */
#define BSD_FS_ADOS 14  /* AmigaDOS fast file system */
#define BSD_FS_HFS 15  /* Macintosh HFS */
#define BSD_FS_ADVFS 16  /* Digital Unix AdvFS */

/* this is annoying, but it's also the way it is :-( */
#ifdef __alpha__
#define BSD_FS_EXT2 8  /* ext2 file system */
#else
#define BSD_FS_MSDOS 8  /* MS-DOS file system */
#endif

/*
* flags shared by various drives:
*/
#define BSD_D_REMOVABLE 0x01  /* removable media */
#define BSD_D_ECC       0x02  /* supports ECC */
#define BSD_D_BADSECT 0x04  /* supports
 bad sector forw. */
#define BSD_D_RAMDISK 0x08  /* disk emulator */
#define BSD_D_CHAIN     0x10  /* can do back-back transfers */
#define BSD_D_DOSPART 0x20  /* within MSDOS partition */

#endif /* UTIL_LINUX_PT_BSD_H */
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1.760 base-files 12ubuntu4.7

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<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice

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1.762 musl 1.2.5-r21

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# Contributor: Carlo Landmeter <clandmeter@alpinelinux.org>
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pkgname=spdx-licenses
pkgver=3.27.0
pkgrel=0
pkgdesc="Various data formats for the SPDX License List"
url="https://spdx.org/"
arch="noarch"
options="!check" # no test suite
license="CC-BY-3.0"
source="license-list-data-$pkgver.tar.gz::https://github.com/spdx/license-list-data/archive/v$pkgver.tar.gz"
builddir="$srcdir/license-list-data-$pkgver"
subpackages="$pkgname-list"

_types="html json rdfa rdfnt rdfturtle rdfxml template text"

for type in $_types; do
 subpackages="$subpackages $pkgname-$type:_subpkg"
done

package() {
 mkdir -p "$pkgdir"
```

```
}

_subpkg() {
 local type=${subpkgname/$pkgname-/}
 pkgdesc="$pkgdesc ($type)"
 install_if="$pkgname=$pkgver-r$pkgrel"
 mkdir -p "$subpkgdir"/usr/share/spdx
 cp -r "$builddir"/$type "$subpkgdir"/usr/share/spdx/
}

list() {
 pkgdesc="$pkgdesc (licence list)"
 mkdir -p "$subpkgdir"/usr/share/spdx
 local i; for i in "$builddir"/text/*.txt;
 do
  local license=${i##*/}
  echo ${license%.*} >> "$subpkgdir"/usr/share/spdx/license.lst
 done
}

sha512sums="
16d59c81e331b54b52639826f83408d98144cdaa70eacc3e8ce35dc3b13992e4794cf7515eb9db200efd390a0c0e35ae9
d4706fbe0ca6a8d236189e88870720c  license-list-data-3.27.0.tar.gz
"
# Automatically generated by apkbuild-cpan, template 4
# Contributor: Valery Kartel <valery.kartel@gmail.com>
# Maintainer: Celeste <cielesti@protonmail.com>
maintainer="Celeste <cielesti@protonmail.com>"
pkgname=perl-bsd-resource
pkgver=1.2911
pkgrel=11
#_pkgreal is used by apkbuild-cpan to find modules at MetaCpan
_pkgreal=BSD-Resource
pkgdesc="Perl extension implements the BSD process resource limit functions"
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arch="all"
license="Artistic-2.0 OR LGPL-2.0"
depends="perl"
makedepends="perl-dev"
subpackages="$pkgname-doc"
source="https://cpan.metacpan.org/authors/id/J/JH/JHI/BSD-Resource-$pkgver.tar.gz"
builddir="$srcdir/$_pkgreal-$pkgver"

build() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 PERL_MM_USE_DEFAULT=1 perl -I. Makefile.PL \
  INSTALLDIRS=vendor \
  NO_PACKLIST=1 \
```

```
  NO_PERLLOCAL=1
 make
}

check() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 make test
}

package() {
 make DESTDIR="$pkgdir" install
}

sha512sums="
d0032d41c7c0468ed1c6d8f57b885f6cb97a5039d754c8cb60b2067daedaf53bd15fb6561a3d0f828df16dfa5417f663b
8065ba65f4fea16dc9262728b3b6b85
  BSD-Resource-1.2911.tar.gz
"
maintainer="Achill Gilgenast <achill@achill.org>"
pkgname=cargo-license
pkgver=0.7.0
pkgrel=1
pkgdesc="Cargo subcommand to see license of dependencies"
url="https://github.com/onur/cargo-license"
arch="all"
license="MIT"
makedepends="cargo cargo-auditable"
source="$pkgname-$pkgver.tar.gz::https://crates.io/api/v1/crates/cargo-license/$pkgver/download"

prepare() {
 default_prepare

 cargo fetch --target="$CTARGET" --locked
}

build() {
 cargo auditable build --release --frozen
}

check() {
 cargo test --frozen
}

package() {
 install -Dm755 target/release/cargo-license -t "$pkgdir"/usr/bin
}

sha512sums="
```

```
9b3f0ead35515e85ef4074ebdbdbe5b9ec8bcaec244fabe414e2ed60f90366e8b1692d8bf7ffe4c07d778e60d94bab86bc
0c8be9823232e9c360a38bc65e9c5a  cargo-license-0.7.0.tar.gz
"
#!/sbin/openrc-run

command="/usr/libexec/xdg-permission-store"
supervisor=supervise-daemon
command_args="--replace $command_args"
error_logger="logger -t '${RC_SVCNAME}' -p daemon.error"

depend() {
 need dbus
}
# Contributor: Maxim Karasev <begs@disroot.org>
# Maintainer: mio <miyopan@e.email>
pkgname=bsd-games
pkgver=3.3
pkgrel=2
pkgdesc="traditional text mode games from BSD"
url="https://bsd-games.sourceforge.io/"
arch="all"
license="BSD-3-Clause"
install="$pkgname.post-install"
makedepends="ncurses-dev coreutils" # configure causes busybox expr error
subpackages="$pkgname-doc"
source="https://sourceforge.net/projects/bsd-games/files/bsd-games-$pkgver.tar.gz
 0001-bsd-games-scores-dir.patch
 "
options="!check" # no tests

build() {
 # some GNU autoconf options are ignored, but it works
 ./configure \
  --build=$CBUILD \
  --host=$CHOST \
  --prefix=/usr \
  --sysconfdir=/etc \
  --mandir=/usr/share/man \
  --scoredir=/usr/share/$pkgname
 make
}

package() {
 make DESTDIR="$pkgdir" install
 install -Dm644 LICENSE "$pkgdir"/usr/share/licenses/bsd-games/LICENSE
}

sha512sums="
```

```
aaf36d09d4fe68514a5c279063d7e77a9a9a84c447037cba974b29faa07eb80c2aab2379d0699c196b5c27ffe1b2bb2c6
8d3390143e0e62d5e3d210ccfb61294
  bsd-games-3.3.tar.gz
e1def0d4835a877242c4173fae862e278a7858738e0bacacbb045a42bcabec2aa7c72d000bbd2421ce35fe66cdc1f52c0
577b7e278029ca5ed50f7aab22319f6  0001-bsd-games-scores-dir.patch
"
```

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```
# Maintainer: Natanael Copa <ncopa@alpinelinux.org>
pkgname=libart-lgpl
pkgver=2.3.21
pkgrel=8
pkgdesc="A library for high-performance 2D graphics"
url="https://www.levien.com/libart/"
arch="all"
options="!check"  # No test suite.
license="LGPL-2.0-or-later"
subpackages="$pkgname-dev"
source="https://download.gnome.org/sources/libart_lgpl/2.3/libart_lgpl-$pkgver.tar.bz2
 "

builddir="$srcdir"/libart_lgpl-$pkgver

prepare() {
 update_config_sub
 default_prepare
}
```

```
build() {
 ./configure \
  --build=$CBUILD \
  --host=$CHOST \
  --prefix=/usr
 make
}

package() {
 make DESTDIR="$pkgdir" install
}

sha512sums="8a632a6a4da59e5e8c02ec2f5a57e36d182b325b46513765425e5f171ff9ae326af1b133725beba28f7e7
6654309e001aee9bace727b5b4c8589405256a3c020  libart_lgpl-2.3.21.tar.bz2"
mini_sendmail - accept email on behalf of real sendmail

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LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
SUCH DAMAGE.
# Contributor: Patrycja Rosa <alpine@ptrcnull.me>
# Maintainer: Patrycja Rosa <alpine@ptrcnull.me>
pkgname=bsd-compat-headers
pkgver=0.7.2
pkgrel=6
pkgdesc="BSD compatibility headers (cdefs, queue, tree)"
url="https://gitlab.alpinelinux.org/alpine/aports"
arch="noarch"
```

```
license="BSD-2-Clause AND BSD-3-Clause"
source="
 cdefs.h
 queue.h
 tree.h
"
builddir="$srcdir"
options="!check" # just headers

package() {
 mkdir -p "$pkgdir"
 install -Dm644 -t "$pkgdir"/usr/include/sys \
  cdefs.h queue.h tree.h
}
sha512sums="
37c8fc73c7aea7b490f7850927e2bb91d12137c9e59e22c084146d515696dbc7973b5de92f4c987ba080dd2502ba8312
7006442c3f019b6447a620c0cae73178  cdefs.h
2f0d5e6e4dc3350285cf17009265dddcbe12431c111868eea39bc8cb038ab7c1f2acacbb21735c4e9d4a1fd106a8fc0f86
11ea33987d4faba37dde5ce6da0750  queue.h
d9ac210d81feb8ad2655bc80fb065d3fe20ae4417b32b4a1711e6738a4870140005c13373b5d1846ef3ce5ae6da45f2da
cef2092881eded0a2e94f6a07752ef3  tree.h
"
```

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student practice (Universite Bordeaux, France). For additional information about X-splines, see:
"X-Splines: A Spline Model Designed for the End User" by C. Blanc and C. Schlick, Proceedings of SIGGRAPH'95
http://dept-info.labri.u-bordeaux.fr/~schlick/DOC/sig1.html
/* $NetBSD: queue.h,v 1.70 2015/11/02 15:21:23 christos Exp $ */

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*
* @(#)queue.h 8.5 (Berkeley) 8/20/94
*/

#ifndef _SYS_QUEUE_H_
#define _SYS_QUEUE_H_

/*
* This file defines five types of data structures: singly-linked lists,
* lists, simple queues, tail queues, and circular queues.
*
* A singly-linked list is headed by a single forward pointer. The
* elements are singly linked for minimum space and
 pointer manipulation
* overhead at the expense of O(n) removal for arbitrary elements. New

```
* elements can be added to the list after an existing element or at the
* head of the list.  Elements being removed from the head of the list
* should use the explicit macro for this purpose for optimum
* efficiency. A singly-linked list may only be traversed in the forward
* direction.  Singly-linked lists are ideal for applications with large
* datasets and few or no removals or for implementing a LIFO queue.
*
* A list is headed by a single forward pointer (or an array of forward
* pointers for a hash table header). The elements are doubly linked
* so that an arbitrary element can be removed without a need to
* traverse the list. New elements can be added to the list before
* or after an existing element or at the head of the list. A list
* may only be traversed in the forward direction.
*
* A simple queue is headed by a pair of pointers, one the head of the
* list and the
 other to the tail of the list. The elements are singly
* linked to save space, so elements can only be removed from the
* head of the list. New elements can be added to the list after
* an existing element, at the head of the list, or at the end of the
* list. A simple queue may only be traversed in the forward direction.
*
* A tail queue is headed by a pair of pointers, one to the head of the
* list and the other to the tail of the list. The elements are doubly
* linked so that an arbitrary element can be removed without a need to
* traverse the list. New elements can be added to the list before or
* after an existing element, at the head of the list, or at the end of
* the list. A tail queue may be traversed in either direction.
*
* A circle queue is headed by a pair of pointers, one to the head of the
* list and the other to the tail of the list. The elements are doubly
* linked so that an arbitrary element can be removed without a need to
* traverse the list. New elements
 can be added to the list before or after
* an existing element, at the head of the list, or at the end of the list.
* A circle queue may be traversed in either direction, but has a more
* complex end of list detection.
*
* For details on the use of these macros, see the queue(3) manual page.
*/

/*
* Include the definition of NULL only on NetBSD because sys/null.h
* is not available elsewhere.  This conditional makes the header
* portable and it can simply be dropped verbatim into any system.
* The caveat is that on other systems some other header
* must provide NULL before the macros can be used.
*/
```

```
#ifdef __NetBSD__
#include <sys/null.h>
#endif

#if defined(QUEUEDEBUG)
# if defined(_KERNEL)
#  define QUEUEDEBUG_ABORT(...) panic(__VA_ARGS__)
# else
#  include <err.h>
#  define QUEUEDEBUG_ABORT(...) err(1, __VA_ARGS__)
# endif
#endif

/*
* Singly-linked List definitions.
*/
#define SLIST_HEAD(name, type)      \
struct name {       \
 struct type *slh_first; /* first
 element */   \
}

#define SLIST_HEAD_INITIALIZER(head)     \
 { NULL }

#define SLIST_ENTRY(type)      \
struct {       \
 struct type *sle_next; /* next element */   \
}

/*
* Singly-linked List access methods.
*/
#define SLIST_FIRST(head) ((head)->slh_first)
#define SLIST_END(head)  NULL
#define SLIST_EMPTY(head) ((head)->slh_first == NULL)
#define SLIST_NEXT(elm, field) ((elm)->field.sle_next)

#define SLIST_FOREACH(var, head, field)     \
 for((var) = (head)->slh_first;     \
    (var) != SLIST_END(head);     \
    (var) = (var)->field.sle_next)

#define SLIST_FOREACH_SAFE(var, head, field, tvar)   \
 for ((var) = SLIST_FIRST((head));    \
    (var) != SLIST_END(head) &&     \
    ((tvar) = SLIST_NEXT((var), field), 1);   \
    (var) = (tvar))
```

```
/*
* Singly-linked List functions.
*/
#define SLIST_INIT(head) do {      \
 (head)->slh_first = SLIST_END(head);    \
} while (/*CONSTCOND*/0)

#define SLIST_INSERT_AFTER(slistelm, elm, field) do {   \
 (elm)->field.sle_next = (slistelm)->field.sle_next;  \
 (slistelm)->field.sle_next
 = (elm);    \
} while (/*CONSTCOND*/0)

#define SLIST_INSERT_HEAD(head, elm, field) do {   \
 (elm)->field.sle_next = (head)->slh_first;   \
 (head)->slh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define SLIST_REMOVE_AFTER(slistelm, field) do {   \
 (slistelm)->field.sle_next =     \
    SLIST_NEXT(SLIST_NEXT((slistelm), field), field);  \
} while (/*CONSTCOND*/0)

#define SLIST_REMOVE_HEAD(head, field) do {    \
 (head)->slh_first = (head)->slh_first->field.sle_next;  \
} while (/*CONSTCOND*/0)

#define SLIST_REMOVE(head, elm, type, field) do {   \
 if ((head)->slh_first == (elm)) {    \
  SLIST_REMOVE_HEAD((head), field);   \
 }       \
 else {       \
  struct type *curelm = (head)->slh_first;  \
  while(curelm->field.sle_next != (elm))   \
   curelm = curelm->field.sle_next;  \
  curelm->field.sle_next =    \
     curelm->field.sle_next->field.sle_next;  \
 }       \
} while (/*CONSTCOND*/0)


/*
* List definitions.
 */
#define LIST_HEAD(name, type)      \
struct name {       \
 struct type *lh_first; /* first element */   \
```

```
}

#define LIST_HEAD_INITIALIZER(head)     \
 { NULL }

#define LIST_ENTRY(type)      \
struct {        \
 struct type *le_next; /* next element */   \
 struct type **le_prev; /* address of previous next element */ \
}

/*
* List access methods.
*/
#define LIST_FIRST(head)  ((head)->lh_first)
#define LIST_END(head)   NULL
#define LIST_EMPTY(head)  ((head)->lh_first == LIST_END(head))
#define LIST_NEXT(elm, field)  ((elm)->field.le_next)

#define LIST_FOREACH(var, head, field)     \
 for ((var) = ((head)->lh_first);    \
     (var) != LIST_END(head);     \
     (var) = ((var)->field.le_next))

#define LIST_FOREACH_SAFE(var, head, field, tvar)   \
 for ((var) = LIST_FIRST((head));    \
     (var) != LIST_END(head) &&     \
     ((tvar) = LIST_NEXT((var), field), 1);   \
     (var) = (tvar))

#define LIST_MOVE(head1, head2) do {     \
 LIST_INIT((head2));      \
 if (!LIST_EMPTY((head1)))
 {     \
  (head2)->lh_first = (head1)->lh_first;   \
  LIST_INIT((head1));     \
 }        \
} while (/*CONSTCOND*/0)

/*
* List functions.
*/
#if defined(QUEUEDEBUG)
#define QUEUEDEBUG_LIST_INSERT_HEAD(head, elm, field)   \
 if ((head)->lh_first &&      \
     (head)->lh_first->field.le_prev != &(head)->lh_first) \
  QUEUEDEBUG_ABORT("LIST_INSERT_HEAD %p %s:%d", (head), \
      __FILE__, __LINE__);
```

```
#define QUEUEDEBUG_LIST_OP(elm, field)     \
 if ((elm)->field.le_next &&     \
     (elm)->field.le_next->field.le_prev !=   \
     &(elm)->field.le_next)     \
  QUEUEDEBUG_ABORT("LIST_* forw %p %s:%d", (elm),  \
      __FILE__, __LINE__);    \
 if (*(elm)->field.le_prev != (elm))    \
  QUEUEDEBUG_ABORT("LIST_* back %p %s:%d", (elm),  \
      __FILE__, __LINE__);
#define QUEUEDEBUG_LIST_POSTREMOVE(elm, field)    \
 (elm)->field.le_next = (void *)1L;    \
 (elm)->field.le_prev = (void *)1L;
#else
#define QUEUEDEBUG_LIST_INSERT_HEAD(head, elm, field)
#define QUEUEDEBUG_LIST_OP(elm,
 field)
#define QUEUEDEBUG_LIST_POSTREMOVE(elm, field)
#endif

#define LIST_INIT(head) do {      \
 (head)->lh_first = LIST_END(head);    \
} while (/*CONSTCOND*/0)

#define LIST_INSERT_AFTER(listelm, elm, field) do {   \
 QUEUEDEBUG_LIST_OP((listelm), field)    \
 if (((elm)->field.le_next = (listelm)->field.le_next) !=  \
     LIST_END(head))      \
  (listelm)->field.le_next->field.le_prev =  \
      &(elm)->field.le_next;    \
 (listelm)->field.le_next = (elm);    \
 (elm)->field.le_prev = &(listelm)->field.le_next;  \
} while (/*CONSTCOND*/0)

#define LIST_INSERT_BEFORE(listelm, elm, field) do {   \
 QUEUEDEBUG_LIST_OP((listelm), field)    \
 (elm)->field.le_prev = (listelm)->field.le_prev;  \
 (elm)->field.le_next = (listelm);    \
 *(listelm)->field.le_prev = (elm);    \
 (listelm)->field.le_prev = &(elm)->field.le_next;  \
} while (/*CONSTCOND*/0)

#define LIST_INSERT_HEAD(head, elm, field) do {    \
 QUEUEDEBUG_LIST_INSERT_HEAD((head), (elm), field)  \
 if (((elm)->field.le_next
 = (head)->lh_first) != LIST_END(head))\
  (head)->lh_first->field.le_prev = &(elm)->field.le_next;\
 (head)->lh_first = (elm);     \
 (elm)->field.le_prev = &(head)->lh_first;   \
```

```
} while (/*CONSTCOND*/0)

#define LIST_REMOVE(elm, field) do {     \
 QUEUEDEBUG_LIST_OP((elm), field)    \
 if ((elm)->field.le_next != NULL)    \
  (elm)->field.le_next->field.le_prev =    \
      (elm)->field.le_prev;    \
 *(elm)->field.le_prev = (elm)->field.le_next;   \
 QUEUEDEBUG_LIST_POSTREMOVE((elm), field)   \
} while (/*CONSTCOND*/0)

#define LIST_REPLACE(elm, elm2, field) do {    \
 if (((elm2)->field.le_next = (elm)->field.le_next) != NULL) \
  (elm2)->field.le_next->field.le_prev =   \
      &(elm2)->field.le_next;    \
 (elm2)->field.le_prev = (elm)->field.le_prev;   \
 *(elm2)->field.le_prev = (elm2);    \
 QUEUEDEBUG_LIST_POSTREMOVE((elm), field)   \
} while (/*CONSTCOND*/0)

/*
* Simple queue definitions.
*/
#define SIMPLEQ_HEAD(name, type)     \
struct name {        \
 struct
 type *sqh_first; /* first element */   \
 struct type **sqh_last; /* addr of last next element */  \
}

#define SIMPLEQ_HEAD_INITIALIZER(head)     \
 { NULL, &(head).sqh_first }

#define SIMPLEQ_ENTRY(type)      \
struct {        \
 struct type *sqe_next; /* next element */   \
}

/*
* Simple queue access methods.
*/
#define SIMPLEQ_FIRST(head)  ((head)->sqh_first)
#define SIMPLEQ_END(head)  NULL
#define SIMPLEQ_EMPTY(head)  ((head)->sqh_first == SIMPLEQ_END(head))
#define SIMPLEQ_NEXT(elm, field) ((elm)->field.sqe_next)

#define SIMPLEQ_FOREACH(var, head, field)    \
 for ((var) = ((head)->sqh_first);    \
```

```
    (var) != SIMPLEQ_END(head);     \
    (var) = ((var)->field.sqe_next))

#define SIMPLEQ_FOREACH_SAFE(var, head, field, next)   \
 for ((var) = ((head)->sqh_first);    \
    (var) != SIMPLEQ_END(head) &&    \
    ((next = ((var)->field.sqe_next)), 1);   \
    (var) = (next))

/*
* Simple queue functions.
*/
#define SIMPLEQ_INIT(head) do {      \
 (head)->sqh_first = NULL;     \
 (head)->sqh_last
 = &(head)->sqh_first;    \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_INSERT_HEAD(head, elm, field) do {   \
 if (((elm)->field.sqe_next = (head)->sqh_first) == NULL) \
  (head)->sqh_last = &(elm)->field.sqe_next;  \
 (head)->sqh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_INSERT_TAIL(head, elm, field) do {   \
 (elm)->field.sqe_next = NULL;     \
 *(head)->sqh_last = (elm);     \
 (head)->sqh_last = &(elm)->field.sqe_next;   \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 if (((elm)->field.sqe_next = (listelm)->field.sqe_next) == NULL)\
  (head)->sqh_last = &(elm)->field.sqe_next;  \
 (listelm)->field.sqe_next = (elm);    \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_REMOVE_HEAD(head, field) do {    \
 if (((head)->sqh_first = (head)->sqh_first->field.sqe_next) == NULL) \
  (head)->sqh_last = &(head)->sqh_first;   \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_REMOVE_AFTER(head, elm, field) do {   \
 if
 (((elm)->field.sqe_next = (elm)->field.sqe_next->field.sqe_next) \
    == NULL)       \
  (head)->sqh_last = &(elm)->field.sqe_next;  \
} while (/*CONSTCOND*/0)
```

```
#define SIMPLEQ_REMOVE(head, elm, type, field) do {   \
 if ((head)->sqh_first == (elm)) {    \
  SIMPLEQ_REMOVE_HEAD((head), field);   \
 } else {      \
  struct type *curelm = (head)->sqh_first;  \
  while (curelm->field.sqe_next != (elm))   \
   curelm = curelm->field.sqe_next;  \
  if ((curelm->field.sqe_next =    \
   curelm->field.sqe_next->field.sqe_next) == NULL) \
       (head)->sqh_last = &(curelm)->field.sqe_next; \
 }       \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_CONCAT(head1, head2) do {    \
 if (!SIMPLEQ_EMPTY((head2))) {     \
  *(head1)->sqh_last = (head2)->sqh_first;  \
  (head1)->sqh_last = (head2)->sqh_last;  \
  SIMPLEQ_INIT((head2));     \
 }       \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_LAST(head, type, field)     \
 (SIMPLEQ_EMPTY((head)) ?      \
  NULL :       \
        ((struct type
 *)(void *)    \
  ((char *)((head)->sqh_last) - offsetof(struct type, field))))

/*
* Tail queue definitions.
*/
#define _TAILQ_HEAD(name, type, qual)     \
struct name {       \
 qual type *tqh_first;  /* first element */  \
 qual type *qual *tqh_last; /* addr of last next element */ \
}
#define TAILQ_HEAD(name, type) _TAILQ_HEAD(name, struct type,)

#define TAILQ_HEAD_INITIALIZER(head)     \
 { TAILQ_END(head), &(head).tqh_first }

#define _TAILQ_ENTRY(type, qual)     \
struct {       \
 qual type *tqe_next;  /* next element */  \
 qual type *qual *tqe_prev; /* address of previous next element */\
}
#define TAILQ_ENTRY(type) _TAILQ_ENTRY(struct type,)
```

```
/*
* Tail queue access methods.
*/
#define TAILQ_FIRST(head)  ((head)->tqh_first)
#define TAILQ_END(head)   (NULL)
#define TAILQ_NEXT(elm, field)  ((elm)->field.tqe_next)
#define TAILQ_LAST(head, headname) \
 (*(((struct headname *)(void *)((head)->tqh_last))->tqh_last))
#define TAILQ_PREV(elm, headname, field) \
 (*(((struct headname
 *)(void *)((elm)->field.tqe_prev))->tqh_last))
#define TAILQ_EMPTY(head)  (TAILQ_FIRST(head) == TAILQ_END(head))


#define TAILQ_FOREACH(var, head, field)     \
 for ((var) = ((head)->tqh_first);    \
     (var) != TAILQ_END(head);     \
     (var) = ((var)->field.tqe_next))

#define TAILQ_FOREACH_SAFE(var, head, field, next)   \
 for ((var) = ((head)->tqh_first);    \
     (var) != TAILQ_END(head) &&     \
     ((next) = TAILQ_NEXT(var, field), 1); (var) = (next))

#define TAILQ_FOREACH_REVERSE(var, head, headname, field)  \
 for ((var) = TAILQ_LAST((head), headname);   \
     (var) != TAILQ_END(head);     \
     (var) = TAILQ_PREV((var), headname, field))

#define TAILQ_FOREACH_REVERSE_SAFE(var, head, headname, field, prev) \
 for ((var) = TAILQ_LAST((head), headname);   \
     (var) != TAILQ_END(head) &&     \
     ((prev) = TAILQ_PREV((var), headname, field), 1); (var) = (prev))

/*
* Tail queue functions.
*/
#if defined(QUEUEDEBUG)
#define QUEUEDEBUG_TAILQ_INSERT_HEAD(head,
 elm, field)   \
 if ((head)->tqh_first &&     \
     (head)->tqh_first->field.tqe_prev != &(head)->tqh_first) \
  QUEUEDEBUG_ABORT("TAILQ_INSERT_HEAD %p %s:%d", (head), \
      __FILE__, __LINE__);
#define QUEUEDEBUG_TAILQ_INSERT_TAIL(head, elm, field)   \
 if (*(head)->tqh_last != NULL)     \
  QUEUEDEBUG_ABORT("TAILQ_INSERT_TAIL %p %s:%d", (head), \
      __FILE__, __LINE__);
```

```
#define QUEUEDEBUG_TAILQ_OP(elm, field)     \
 if ((elm)->field.tqe_next &&     \
     (elm)->field.tqe_next->field.tqe_prev !=   \
     &(elm)->field.tqe_next)     \
  QUEUEDEBUG_ABORT("TAILQ_* forw %p %s:%d", (elm), \
      __FILE__, __LINE__);    \
 if (*(elm)->field.tqe_prev != (elm))    \
  QUEUEDEBUG_ABORT("TAILQ_* back %p %s:%d", (elm), \
      __FILE__, __LINE__);
#define QUEUEDEBUG_TAILQ_PREREMOVE(head, elm, field)   \
 if ((elm)->field.tqe_next == NULL &&    \
     (head)->tqh_last != &(elm)->field.tqe_next)   \
  QUEUEDEBUG_ABORT("TAILQ_PREREMOVE head %p elm %p %s:%d",\
      (head), (elm), __FILE__,
 __LINE__);
#define QUEUEDEBUG_TAILQ_POSTREMOVE(elm, field)    \
 (elm)->field.tqe_next = (void *)1L;    \
 (elm)->field.tqe_prev = (void *)1L;
#else
#define QUEUEDEBUG_TAILQ_INSERT_HEAD(head, elm, field)
#define QUEUEDEBUG_TAILQ_INSERT_TAIL(head, elm, field)
#define QUEUEDEBUG_TAILQ_OP(elm, field)
#define QUEUEDEBUG_TAILQ_PREREMOVE(head, elm, field)
#define QUEUEDEBUG_TAILQ_POSTREMOVE(elm, field)
#endif

#define TAILQ_INIT(head) do {      \
 (head)->tqh_first = TAILQ_END(head);    \
 (head)->tqh_last = &(head)->tqh_first;    \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_HEAD(head, elm, field) do {   \
 QUEUEDEBUG_TAILQ_INSERT_HEAD((head), (elm), field)  \
 if (((elm)->field.tqe_next = (head)->tqh_first) != TAILQ_END(head))\
  (head)->tqh_first->field.tqe_prev =   \
     &(elm)->field.tqe_next;    \
 else       \
  (head)->tqh_last = &(elm)->field.tqe_next;  \
 (head)->tqh_first = (elm);     \
 (elm)->field.tqe_prev = &(head)->tqh_first;   \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_TAIL(head,
 elm, field) do {   \
 QUEUEDEBUG_TAILQ_INSERT_TAIL((head), (elm), field)  \
 (elm)->field.tqe_next = TAILQ_END(head);   \
 (elm)->field.tqe_prev = (head)->tqh_last;   \
 *(head)->tqh_last = (elm);     \
```

```
 (head)->tqh_last = &(elm)->field.tqe_next;   \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 QUEUEDEBUG_TAILQ_OP((listelm), field)    \
 if (((elm)->field.tqe_next = (listelm)->field.tqe_next) !=  \
    TAILQ_END(head))      \
  (elm)->field.tqe_next->field.tqe_prev =   \
     &(elm)->field.tqe_next;    \
 else       \
  (head)->tqh_last = &(elm)->field.tqe_next;  \
 (listelm)->field.tqe_next = (elm);    \
 (elm)->field.tqe_prev = &(listelm)->field.tqe_next;  \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_BEFORE(listelm, elm, field) do {   \
 QUEUEDEBUG_TAILQ_OP((listelm), field)    \
 (elm)->field.tqe_prev = (listelm)->field.tqe_prev;  \
 (elm)->field.tqe_next = (listelm);    \
 *(listelm)->field.tqe_prev = (elm);    \
 (listelm)->field.tqe_prev
 = &(elm)->field.tqe_next;  \
} while (/*CONSTCOND*/0)

#define TAILQ_REMOVE(head, elm, field) do {    \
 QUEUEDEBUG_TAILQ_PREREMOVE((head), (elm), field)  \
 QUEUEDEBUG_TAILQ_OP((elm), field)    \
 if (((elm)->field.tqe_next) != TAILQ_END(head))   \
  (elm)->field.tqe_next->field.tqe_prev =   \
     (elm)->field.tqe_prev;    \
 else       \
  (head)->tqh_last = (elm)->field.tqe_prev;  \
 *(elm)->field.tqe_prev = (elm)->field.tqe_next;   \
 QUEUEDEBUG_TAILQ_POSTREMOVE((elm), field);   \
} while (/*CONSTCOND*/0)

#define TAILQ_REPLACE(head, elm, elm2, field) do {   \
      if (((elm2)->field.tqe_next = (elm)->field.tqe_next) !=  \
    TAILQ_END(head))        \
            (elm2)->field.tqe_next->field.tqe_prev =  \
               &(elm2)->field.tqe_next;    \
      else       \
            (head)->tqh_last = &(elm2)->field.tqe_next;  \
      (elm2)->field.tqe_prev = (elm)->field.tqe_prev;   \
      *(elm2)->field.tqe_prev = (elm2);    \
 QUEUEDEBUG_TAILQ_POSTREMOVE((elm),
 field);   \
} while (/*CONSTCOND*/0)
```

```
#define TAILQ_CONCAT(head1, head2, field) do {    \
 if (!TAILQ_EMPTY(head2)) {     \
  *(head1)->tqh_last = (head2)->tqh_first;  \
  (head2)->tqh_first->field.tqe_prev = (head1)->tqh_last; \
  (head1)->tqh_last = (head2)->tqh_last;   \
  TAILQ_INIT((head2));     \
 }       \
} while (/*CONSTCOND*/0)

/*
* Singly-linked Tail queue declarations.
*/
#define STAILQ_HEAD(name, type)      \
struct name {        \
 struct type *stqh_first; /* first element */  \
 struct type **stqh_last; /* addr of last next element */ \
}

#define STAILQ_HEAD_INITIALIZER(head)     \
 { NULL, &(head).stqh_first }

#define STAILQ_ENTRY(type)      \
struct {        \
 struct type *stqe_next; /* next element */   \
}

/*
* Singly-linked Tail queue access methods.
*/
#define STAILQ_FIRST(head) ((head)->stqh_first)
#define STAILQ_END(head) NULL
#define STAILQ_NEXT(elm, field) ((elm)->field.stqe_next)
#define STAILQ_EMPTY(head) (STAILQ_FIRST(head)
 == STAILQ_END(head))

/*
* Singly-linked Tail queue functions.
*/
#define STAILQ_INIT(head) do {      \
 (head)->stqh_first = NULL;     \
 (head)->stqh_last = &(head)->stqh_first;    \
} while (/*CONSTCOND*/0)

#define STAILQ_INSERT_HEAD(head, elm, field) do {   \
 if (((elm)->field.stqe_next = (head)->stqh_first) == NULL) \
  (head)->stqh_last = &(elm)->field.stqe_next;  \
 (head)->stqh_first = (elm);     \
```

```
} while (/*CONSTCOND*/0)

#define STAILQ_INSERT_TAIL(head, elm, field) do {   \
 (elm)->field.stqe_next = NULL;     \
 *(head)->stqh_last = (elm);     \
 (head)->stqh_last = &(elm)->field.stqe_next;   \
} while (/*CONSTCOND*/0)

#define STAILQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 if (((elm)->field.stqe_next = (listelm)->field.stqe_next) == NULL)\
  (head)->stqh_last = &(elm)->field.stqe_next;  \
 (listelm)->field.stqe_next = (elm);    \
} while (/*CONSTCOND*/0)

#define STAILQ_REMOVE_HEAD(head, field) do {    \
 if (((head)->stqh_first = (head)->stqh_first->field.stqe_next)
 == NULL) \
  (head)->stqh_last = &(head)->stqh_first;   \
} while (/*CONSTCOND*/0)

#define STAILQ_REMOVE(head, elm, type, field) do {   \
 if ((head)->stqh_first == (elm)) {    \
  STAILQ_REMOVE_HEAD((head), field);   \
 } else {       \
  struct type *curelm = (head)->stqh_first;  \
  while (curelm->field.stqe_next != (elm))   \
   curelm = curelm->field.stqe_next;  \
  if ((curelm->field.stqe_next =    \
   curelm->field.stqe_next->field.stqe_next) == NULL) \
      (head)->stqh_last = &(curelm)->field.stqe_next; \
 }       \
} while (/*CONSTCOND*/0)

#define STAILQ_FOREACH(var, head, field)    \
 for ((var) = ((head)->stqh_first);    \
  (var);       \
  (var) = ((var)->field.stqe_next))

#define STAILQ_FOREACH_SAFE(var, head, field, tvar)   \
 for ((var) = STAILQ_FIRST((head));    \
    (var) && ((tvar) = STAILQ_NEXT((var), field), 1);  \
    (var) = (tvar))

#define STAILQ_CONCAT(head1, head2) do {    \
 if (!STAILQ_EMPTY((head2))) {     \
  *(head1)->stqh_last
 = (head2)->stqh_first;  \
  (head1)->stqh_last = (head2)->stqh_last;  \
```

```
 STAILQ_INIT((head2));    \
 }       \
} while (/*CONSTCOND*/0)

#define STAILQ_LAST(head, type, field)    \
 (STAILQ_EMPTY((head)) ?     \
  NULL :      \
       ((struct type *)(void *)    \
  ((char *)((head)->stqh_last) - offsetof(struct type, field))))


#ifndef _KERNEL
/*
* Circular queue definitions. Do not use. We still keep the macros
* for compatibility but because of pointer aliasing issues their use
* is discouraged!
*/

/*
* __launder_type():  We use this ugly hack to work around the the compiler
* noticing that two types may not alias each other and elide tests in code.
* We hit this in the CIRCLEQ macros when comparing 'struct name *' and
* 'struct type *' (see CIRCLEQ_HEAD()).  Modern compilers (such as GCC
* 4.8) declare these comparisons as always false, causing the code to
* not run as designed.
*
* This hack is only to be used for comparisons and thus can be fully const.
 * Do not use for assignment.
*
* If we ever choose to change the ABI of the CIRCLEQ macros, we could fix
* this by changing the head/tail sentinal values, but see the note above
* this one.
*/
static __inline const void * __launder_type(const void *);
static __inline const void *
__launder_type(const void *__x)
{
 __asm __volatile("" : "+r" (__x));
 return __x;
}

#if defined(QUEUEDEBUG)
#define QUEUEDEBUG_CIRCLEQ_HEAD(head, field)    \
 if ((head)->cqh_first != CIRCLEQ_ENDC(head) &&   \
    (head)->cqh_first->field.cqe_prev != CIRCLEQ_ENDC(head)) \
  QUEUEDEBUG_ABORT("CIRCLEQ head forw %p %s:%d", (head), \
       __FILE__, __LINE__);    \
 if ((head)->cqh_last != CIRCLEQ_ENDC(head) &&   \
```

```
    (head)->cqh_last->field.cqe_next != CIRCLEQ_ENDC(head)) \
  QUEUEDEBUG_ABORT("CIRCLEQ head back %p %s:%d", (head), \
       __FILE__, __LINE__);
#define QUEUEDEBUG_CIRCLEQ_ELM(head, elm, field)   \
 if ((elm)->field.cqe_next == CIRCLEQ_ENDC(head)) {  \
  if ((head)->cqh_last != (elm))    \
   QUEUEDEBUG_ABORT("CIRCLEQ
 elm last %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 } else {       \
  if ((elm)->field.cqe_next->field.cqe_prev != (elm)) \
   QUEUEDEBUG_ABORT("CIRCLEQ elm forw %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 }       \
 if ((elm)->field.cqe_prev == CIRCLEQ_ENDC(head)) {  \
  if ((head)->cqh_first != (elm))    \
   QUEUEDEBUG_ABORT("CIRCLEQ elm first %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 } else {       \
  if ((elm)->field.cqe_prev->field.cqe_next != (elm)) \
   QUEUEDEBUG_ABORT("CIRCLEQ elm prev %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 }
#define QUEUEDEBUG_CIRCLEQ_POSTREMOVE(elm, field)   \
 (elm)->field.cqe_next = (void *)1L;    \
 (elm)->field.cqe_prev = (void *)1L;
#else
#define QUEUEDEBUG_CIRCLEQ_HEAD(head, field)
#define QUEUEDEBUG_CIRCLEQ_ELM(head, elm, field)
#define QUEUEDEBUG_CIRCLEQ_POSTREMOVE(elm, field)
#endif

#define CIRCLEQ_HEAD(name, type)     \
struct name {        \
 struct type *cqh_first;  /*
 first element */  \
 struct type *cqh_last;  /* last element */  \
}

#define CIRCLEQ_HEAD_INITIALIZER(head)     \
 { CIRCLEQ_END(&head), CIRCLEQ_END(&head) }

#define CIRCLEQ_ENTRY(type)      \
struct {        \
 struct type *cqe_next;  /* next element */  \
 struct type *cqe_prev;  /* previous element */  \
}
```

```
/*
* Circular queue functions.
*/
#define CIRCLEQ_INIT(head) do {      \
 (head)->cqh_first = CIRCLEQ_END(head);    \
 (head)->cqh_last = CIRCLEQ_END(head);    \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 QUEUEDEBUG_CIRCLEQ_ELM((head), (listelm), field)  \
 (elm)->field.cqe_next = (listelm)->field.cqe_next;  \
 (elm)->field.cqe_prev = (listelm);    \
 if ((listelm)->field.cqe_next == CIRCLEQ_ENDC(head))  \
  (head)->cqh_last = (elm);    \
 else       \
  (listelm)->field.cqe_next->field.cqe_prev = (elm); \
 (listelm)->field.cqe_next = (elm);    \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_BEFORE(head,
 listelm, elm, field) do {  \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 QUEUEDEBUG_CIRCLEQ_ELM((head), (listelm), field)  \
 (elm)->field.cqe_next = (listelm);    \
 (elm)->field.cqe_prev = (listelm)->field.cqe_prev;  \
 if ((listelm)->field.cqe_prev == CIRCLEQ_ENDC(head))  \
  (head)->cqh_first = (elm);    \
 else       \
  (listelm)->field.cqe_prev->field.cqe_next = (elm); \
 (listelm)->field.cqe_prev = (elm);    \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_HEAD(head, elm, field) do {   \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 (elm)->field.cqe_next = (head)->cqh_first;   \
 (elm)->field.cqe_prev = CIRCLEQ_END(head);   \
 if ((head)->cqh_last == CIRCLEQ_ENDC(head))   \
  (head)->cqh_last = (elm);    \
 else       \
  (head)->cqh_first->field.cqe_prev = (elm);  \
 (head)->cqh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_TAIL(head, elm, field) do {   \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 (elm)->field.cqe_next
```

```
 = CIRCLEQ_END(head);   \
 (elm)->field.cqe_prev = (head)->cqh_last;   \
 if ((head)->cqh_first == CIRCLEQ_ENDC(head))   \
  (head)->cqh_first = (elm);    \
 else       \
  (head)->cqh_last->field.cqe_next = (elm);  \
 (head)->cqh_last = (elm);     \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_REMOVE(head, elm, field) do {    \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 QUEUEDEBUG_CIRCLEQ_ELM((head), (elm), field)   \
 if ((elm)->field.cqe_next == CIRCLEQ_ENDC(head))  \
  (head)->cqh_last = (elm)->field.cqe_prev;  \
 else       \
  (elm)->field.cqe_next->field.cqe_prev =   \
     (elm)->field.cqe_prev;    \
 if ((elm)->field.cqe_prev == CIRCLEQ_ENDC(head))  \
  (head)->cqh_first = (elm)->field.cqe_next;  \
 else       \
  (elm)->field.cqe_prev->field.cqe_next =   \
     (elm)->field.cqe_next;    \
 QUEUEDEBUG_CIRCLEQ_POSTREMOVE((elm), field)   \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_FOREACH(var, head, field)    \
 for ((var) = ((head)->cqh_first);    \
  (var) != CIRCLEQ_ENDC(head);    \
  (var)
 = ((var)->field.cqe_next))

#define CIRCLEQ_FOREACH_REVERSE(var, head, field)   \
 for ((var) = ((head)->cqh_last);    \
  (var) != CIRCLEQ_ENDC(head);    \
  (var) = ((var)->field.cqe_prev))

/*
* Circular queue access methods.
*/
#define CIRCLEQ_FIRST(head)  ((head)->cqh_first)
#define CIRCLEQ_LAST(head)  ((head)->cqh_last)
/* For comparisons */
#define CIRCLEQ_ENDC(head)  (__launder_type(head))
/* For assignments */
#define CIRCLEQ_END(head)  ((void *)(head))
#define CIRCLEQ_NEXT(elm, field) ((elm)->field.cqe_next)
#define CIRCLEQ_PREV(elm, field) ((elm)->field.cqe_prev)
#define CIRCLEQ_EMPTY(head)      \
```

```
   (CIRCLEQ_FIRST(head) == CIRCLEQ_ENDC(head))

#define CIRCLEQ_LOOP_NEXT(head, elm, field)    \
 (((elm)->field.cqe_next == CIRCLEQ_ENDC(head))   \
    ? ((head)->cqh_first)     \
    : (elm->field.cqe_next))
#define CIRCLEQ_LOOP_PREV(head, elm, field)    \
 (((elm)->field.cqe_prev == CIRCLEQ_ENDC(head))   \
    ? ((head)->cqh_last)     \
    :
 (elm->field.cqe_prev))
#endif /* !_KERNEL */

#endif /* !_SYS_QUEUE_H_ */
#ifndef _SYS_CDEFS_H_
#define _SYS_CDEFS_H_

#warning usage of non-standard #include <sys/cdefs.h> is deprecated

#undef __P
#undef __PMT

#define __P(args) args
#define __PMT(args) args

#define __CONCAT(x,y) x ## y
#define __STRING(x) #x

#ifdef  __cplusplus
# define __BEGIN_DECLS extern "C" {
# define __END_DECLS }
#else
# define __BEGIN_DECLS
# define __END_DECLS
#endif

#if defined(__GNUC__) && !defined(__cplusplus)
# define __THROW __attribute__ ((__nothrow__))
# define __NTH(fct) __attribute__ ((__nothrow__)) fct
#else
# define __THROW
# define __NTH(fct)     fct
#endif

#endif /* _SYS_CDEFS_H_ */
# Contributor: Fabian Affolter <fabian@affolter-engineering.ch>
# Maintainer: Fabian Affolter <fabian@affolter-engineering.ch>
pkgname=py3-flake8-copyright
```

```
_pkgname=flake8-copyright
pkgver=0.2.4
pkgrel=3
pkgdesc="Extension for flake8 which checks for copyrights"
options="!check" # No testsuite
url="https://github.com/savoirfairelinux/flake8-copyright"
arch="noarch"
license="MIT"
depends="py3-flake8 py3-setuptools"
makedepends="py3-gpep517 py3-wheel"
subpackages="$pkgname-pyc"
source="https://files.pythonhosted.org/packages/source/${_pkgname:0:1}/$_pkgname/$_pkgname-$pkgver.tar.gz"
builddir="$srcdir"/$_pkgname-$pkgver

replaces="py-flake8-copyright"                  # Backwards compatibility
provides="py-flake8-copyright=$pkgver-r$pkgrel" # Backwards compatibility

build() {
 gpep517 build-wheel \
  --wheel-dir .dist \
  --output-fd 3 3>&1 >&2
}

package() {
 gpep517 install-wheel --destdir "$pkgdir" \
  .dist/*.whl
}

sha512sums="
a6ab47e1bb715618f075c51f398e18180404871b3b0faf1c2d30701d5203db6bc23771bf22ffb5bafcd8ee856b9b64237
b316bd503ae7dceed6ca284ccd5a74d
  flake8-copyright-0.2.4.tar.gz
"
```

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/* $NetBSD: tree.h,v 1.20 2013/09/14 13:20:45 joerg Exp $ */
/* $OpenBSD: tree.h,v 1.13 2011/07/09 00:19:45 pirofti Exp $ */
/* Modified by Void Linux. */
/*
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*/

#ifndef _SYS_TREE_H_
#define _SYS_TREE_H_

#ifdef __GNUC__
#define __GNUC_PREREQ__(x, y)      \
 ((__GNUC__ == (x) && __GNUC_MINOR__ >= (y)) ||   \
  (__GNUC__ > (x)))
#else
#define __GNUC_PREREQ__(x, y) 0
#endif
```

```
#if __GNUC_PREREQ__(2, 7) || defined(__lint__)
#define _sys_tree_h_unused __attribute__((__unused__))
#else
#define _sys_tree_h_unused /* delete */
#endif

/*
* This file defines data structures for different types of trees:
* splay trees and red-black trees.
*
* A splay tree is a self-organizing
 data structure.  Every operation
* on the tree causes a splay to happen.  The splay moves the requested
* node to the root of the tree and partly rebalances it.
*
* This has the benefit that request locality causes faster lookups as
* the requested nodes move to the top of the tree.  On the other hand,
* every lookup causes memory writes.
*
* The Balance Theorem bounds the total access time for m operations
* and n inserts on an initially empty tree as O((m + n)lg n).  The
* amortized cost for a sequence of m accesses to a splay tree is O(lg n);
*
* A red-black tree is a binary search tree with the node color as an
* extra attribute.  It fulfills a set of conditions:
* - every search path from the root to a leaf consists of the
*   same number of black nodes,
* - each red node (except for the root) has a black parent,
* - each leaf node is black.
*
* Every operation on a red-black tree is bounded as O(lg n).
* The maximum height of a red-black tree is 2lg (n+1).
 */

#define SPLAY_HEAD(name, type)      \
struct name {       \
 struct type *sph_root; /* root of the tree */   \
}

#define SPLAY_INITIALIZER(root)     \
 { NULL }

#define SPLAY_INIT(root) do {      \
 (root)->sph_root = NULL;     \
} while (/*CONSTCOND*/ 0)

#define SPLAY_ENTRY(type)      \
struct {        \
```

```
 struct type *spe_left; /* left element */   \
 struct type *spe_right; /* right element */   \
}

#define SPLAY_LEFT(elm, field)  (elm)->field.spe_left
#define SPLAY_RIGHT(elm, field)  (elm)->field.spe_right
#define SPLAY_ROOT(head)  (head)->sph_root
#define SPLAY_EMPTY(head)  (SPLAY_ROOT(head) == NULL)

/* SPLAY_ROTATE_{LEFT,RIGHT} expect that tmp hold SPLAY_{RIGHT,LEFT} */
#define SPLAY_ROTATE_RIGHT(head, tmp, field) do {   \
 SPLAY_LEFT((head)->sph_root, field) = SPLAY_RIGHT(tmp, field); \
 SPLAY_RIGHT(tmp, field) = (head)->sph_root;   \
 (head)->sph_root = tmp;      \
} while (/*CONSTCOND*/ 0)

#define SPLAY_ROTATE_LEFT(head, tmp, field) do {   \
 SPLAY_RIGHT((head)->sph_root,
 field) = SPLAY_LEFT(tmp, field); \
 SPLAY_LEFT(tmp, field) = (head)->sph_root;   \
 (head)->sph_root = tmp;      \
} while (/*CONSTCOND*/ 0)

#define SPLAY_LINKLEFT(head, tmp, field) do {    \
 SPLAY_LEFT(tmp, field) = (head)->sph_root;   \
 tmp = (head)->sph_root;      \
 (head)->sph_root = SPLAY_LEFT((head)->sph_root, field);  \
} while (/*CONSTCOND*/ 0)

#define SPLAY_LINKRIGHT(head, tmp, field) do {    \
 SPLAY_RIGHT(tmp, field) = (head)->sph_root;   \
 tmp = (head)->sph_root;      \
 (head)->sph_root = SPLAY_RIGHT((head)->sph_root, field); \
} while (/*CONSTCOND*/ 0)

#define SPLAY_ASSEMBLE(head, node, left, right, field) do {  \
 SPLAY_RIGHT(left, field) = SPLAY_LEFT((head)->sph_root, field); \
 SPLAY_LEFT(right, field) = SPLAY_RIGHT((head)->sph_root, field);\
 SPLAY_LEFT((head)->sph_root, field) = SPLAY_RIGHT(node, field); \
 SPLAY_RIGHT((head)->sph_root, field) = SPLAY_LEFT(node, field); \
} while (/*CONSTCOND*/ 0)

/* Generates prototypes and inline functions */

#define
 SPLAY_PROTOTYPE(name, type, field, cmp)    \
void name##_SPLAY(struct name *, struct type *);   \
void name##_SPLAY_MINMAX(struct name *, int);    \
```

```
struct type *name##_SPLAY_INSERT(struct name *, struct type *);  \
struct type *name##_SPLAY_REMOVE(struct name *, struct type *);  \
        \
/* Finds the node with the same key as elm */    \
static __inline struct type *      \
name##_SPLAY_FIND(struct name *head, struct type *elm)   \
{        \
 if (SPLAY_EMPTY(head))      \
  return(NULL);      \
 name##_SPLAY(head, elm);     \
 if ((cmp)(elm, (head)->sph_root) == 0)    \
  return (head->sph_root);    \
 return (NULL);       \
}        \
        \
static __inline _sys_tree_h_unused struct type *   \
name##_SPLAY_NEXT(struct name *head, struct type *elm)   \
{        \
 name##_SPLAY(head, elm);     \
 if (SPLAY_RIGHT(elm, field) != NULL) {    \
  elm = SPLAY_RIGHT(elm, field);    \
  while (SPLAY_LEFT(elm, field) != NULL) {  \
   elm = SPLAY_LEFT(elm, field);   \
  }       \
 }
 else       \
  elm = NULL;      \
 return (elm);       \
}        \
        \
static _sys_tree_h_unused __inline struct type *   \
name##_SPLAY_MIN_MAX(struct name *head, int val)   \
{        \
 name##_SPLAY_MINMAX(head, val);     \
       return (SPLAY_ROOT(head));     \
}

/* Main splay operation.
* Moves node close to the key of elm to top
*/
#define SPLAY_GENERATE(name, type, field, cmp)    \
struct type *       \
name##_SPLAY_INSERT(struct name *head, struct type *elm)  \
{        \
   if (SPLAY_EMPTY(head)) {      \
     SPLAY_LEFT(elm, field) = SPLAY_RIGHT(elm, field) = NULL; \
   } else {       \
     int __comp;       \
```

```
    name##_SPLAY(head, elm);    \
    __comp = (cmp)(elm, (head)->sph_root);  \
    if(__comp < 0) {    \
     SPLAY_LEFT(elm, field) = SPLAY_LEFT((head)->sph_root, field);\
     SPLAY_RIGHT(elm, field) = (head)->sph_root;  \
     SPLAY_LEFT((head)->sph_root, field) = NULL;  \
    } else if (__comp > 0) {    \
     SPLAY_RIGHT(elm,
 field) = SPLAY_RIGHT((head)->sph_root, field);\
     SPLAY_LEFT(elm, field) = (head)->sph_root;  \
     SPLAY_RIGHT((head)->sph_root, field) = NULL; \
    } else      \
     return ((head)->sph_root);    \
  }       \
  (head)->sph_root = (elm);     \
  return (NULL);      \
}       \
       \
struct type *       \
name##_SPLAY_REMOVE(struct name *head, struct type *elm)  \
{       \
 struct type *__tmp;     \
 if (SPLAY_EMPTY(head))     \
  return (NULL);     \
 name##_SPLAY(head, elm);    \
 if ((cmp)(elm, (head)->sph_root) == 0) {   \
  if (SPLAY_LEFT((head)->sph_root, field) == NULL) { \
   (head)->sph_root = SPLAY_RIGHT((head)->sph_root, field);\
  } else {     \
   __tmp = SPLAY_RIGHT((head)->sph_root, field); \
   (head)->sph_root = SPLAY_LEFT((head)->sph_root, field);\
   name##_SPLAY(head, elm);   \
   SPLAY_RIGHT((head)->sph_root, field) = __tmp; \
  }      \
  return (elm);     \
 }       \
 return (NULL);      \
}       \
       \
void        \
name##_SPLAY(struct
 name *head, struct type *elm)   \
{       \
 struct type __node, *__left, *__right, *__tmp;   \
 int __comp;      \
\
 SPLAY_LEFT(&__node, field) = SPLAY_RIGHT(&__node, field) = NULL;\
 __left = __right = &__node;    \
```

```
\
 while ((__comp = (cmp)(elm, (head)->sph_root)) != 0) {  \
  if (__comp < 0) {     \
   __tmp = SPLAY_LEFT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if ((cmp)(elm, __tmp) < 0){   \
    SPLAY_ROTATE_RIGHT(head, __tmp, field); \
    if (SPLAY_LEFT((head)->sph_root, field) == NULL)\
     break;    \
   }      \
   SPLAY_LINKLEFT(head, __right, field);  \
  } else if (__comp > 0) {    \
   __tmp = SPLAY_RIGHT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if ((cmp)(elm, __tmp) > 0){   \
    SPLAY_ROTATE_LEFT(head, __tmp, field); \
    if (SPLAY_RIGHT((head)->sph_root, field) == NULL)\
     break;    \
   }      \
   SPLAY_LINKRIGHT(head, __left, field);  \
  }       \
 }        \
 SPLAY_ASSEMBLE(head,
 &__node, __left, __right, field);  \
}         \
        \
/* Splay with either the minimum or the maximum element   \
* Used to find minimum or maximum element in tree.   \
*/         \
void name##_SPLAY_MINMAX(struct name *head, int __comp) \
{         \
 struct type __node, *__left, *__right, *__tmp;   \
\
 SPLAY_LEFT(&__node, field) = SPLAY_RIGHT(&__node, field) = NULL;\
 __left = __right = &__node;     \
\
 while (1) {       \
  if (__comp < 0) {     \
   __tmp = SPLAY_LEFT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if (__comp < 0){    \
    SPLAY_ROTATE_RIGHT(head, __tmp, field); \
    if (SPLAY_LEFT((head)->sph_root, field) == NULL)\
     break;    \
   }      \
```

```
  SPLAY_LINKLEFT(head, __right, field);  \
 } else if (__comp > 0) {    \
  __tmp = SPLAY_RIGHT((head)->sph_root, field); \
  if (__tmp == NULL)    \
   break;     \
  if (__comp > 0) {    \
   SPLAY_ROTATE_LEFT(head, __tmp, field); \
   if (SPLAY_RIGHT((head)->sph_root,
field) == NULL)\
    break;    \
  }      \
  SPLAY_LINKRIGHT(head, __left, field);  \
 }       \
}       \
 SPLAY_ASSEMBLE(head, &__node, __left, __right, field);  \
}

#define SPLAY_NEGINF -1
#define SPLAY_INF 1

#define SPLAY_INSERT(name, x, y) name##_SPLAY_INSERT(x, y)
#define SPLAY_REMOVE(name, x, y) name##_SPLAY_REMOVE(x, y)
#define SPLAY_FIND(name, x, y)  name##_SPLAY_FIND(x, y)
#define SPLAY_NEXT(name, x, y)  name##_SPLAY_NEXT(x, y)
#define SPLAY_MIN(name, x)  (SPLAY_EMPTY(x) ? NULL \
    : name##_SPLAY_MIN_MAX(x, SPLAY_NEGINF))
#define SPLAY_MAX(name, x)  (SPLAY_EMPTY(x) ? NULL \
    : name##_SPLAY_MIN_MAX(x, SPLAY_INF))

#define SPLAY_FOREACH(x, name, head)     \
 for ((x) = SPLAY_MIN(name, head);    \
     (x) != NULL;      \
     (x) = SPLAY_NEXT(name, head, x))

/* Macros that define a red-black tree */
#define RB_HEAD(name, type)      \
struct name {        \
 struct type *rbh_root; /* root of the tree */   \
}

#define RB_INITIALIZER(root)      \
 {
 NULL }

#define RB_INIT(root) do {      \
 (root)->rbh_root = NULL;     \
} while (/*CONSTCOND*/ 0)
```

```
#define RB_BLACK 0
#define RB_RED  1
#define RB_ENTRY(type)       \
struct {        \
 struct type *rbe_left;  /* left element */  \
 struct type *rbe_right;  /* right element */  \
 struct type *rbe_parent; /* parent element */  \
 int rbe_color;   /* node color */  \
}

#define RB_LEFT(elm, field)  (elm)->field.rbe_left
#define RB_RIGHT(elm, field)  (elm)->field.rbe_right
#define RB_PARENT(elm, field)  (elm)->field.rbe_parent
#define RB_COLOR(elm, field)  (elm)->field.rbe_color
#define RB_ROOT(head)   (head)->rbh_root
#define RB_EMPTY(head)   (RB_ROOT(head) == NULL)

#define RB_SET(elm, parent, field) do {     \
 RB_PARENT(elm, field) = parent;     \
 RB_LEFT(elm, field) = RB_RIGHT(elm, field) = NULL;  \
 RB_COLOR(elm, field) = RB_RED;     \
} while (/*CONSTCOND*/ 0)

#define RB_SET_BLACKRED(black, red, field) do {    \
 RB_COLOR(black, field) = RB_BLACK;    \
 RB_COLOR(red, field)
 = RB_RED;     \
} while (/*CONSTCOND*/ 0)

#ifndef RB_AUGMENT
#define RB_AUGMENT(x) do {} while (/*CONSTCOND*/ 0)
#endif

#define RB_ROTATE_LEFT(head, elm, tmp, field) do {   \
 (tmp) = RB_RIGHT(elm, field);     \
 if ((RB_RIGHT(elm, field) = RB_LEFT(tmp, field)) != NULL) { \
  RB_PARENT(RB_LEFT(tmp, field), field) = (elm);  \
 }       \
 RB_AUGMENT(elm);      \
 if ((RB_PARENT(tmp, field) = RB_PARENT(elm, field)) != NULL) { \
  if ((elm) == RB_LEFT(RB_PARENT(elm, field), field)) \
   RB_LEFT(RB_PARENT(elm, field), field) = (tmp); \
  else      \
   RB_RIGHT(RB_PARENT(elm, field), field) = (tmp); \
 } else       \
  (head)->rbh_root = (tmp);    \
 RB_LEFT(tmp, field) = (elm);     \
 RB_PARENT(elm, field) = (tmp);     \
```

```
 RB_AUGMENT(tmp);      \
 if ((RB_PARENT(tmp, field)))     \
  RB_AUGMENT(RB_PARENT(tmp, field));   \
} while (/*CONSTCOND*/ 0)

#define RB_ROTATE_RIGHT(head, elm, tmp, field) do {   \
 (tmp) = RB_LEFT(elm, field);     \
 if ((RB_LEFT(elm, field) = RB_RIGHT(tmp, field))
 != NULL) { \
  RB_PARENT(RB_RIGHT(tmp, field), field) = (elm);  \
 }       \
 RB_AUGMENT(elm);      \
 if ((RB_PARENT(tmp, field) = RB_PARENT(elm, field)) != NULL) { \
  if ((elm) == RB_LEFT(RB_PARENT(elm, field), field)) \
   RB_LEFT(RB_PARENT(elm, field), field) = (tmp); \
  else       \
   RB_RIGHT(RB_PARENT(elm, field), field) = (tmp); \
 } else       \
  (head)->rbh_root = (tmp);    \
 RB_RIGHT(tmp, field) = (elm);     \
 RB_PARENT(elm, field) = (tmp);     \
 RB_AUGMENT(tmp);      \
 if ((RB_PARENT(tmp, field)))     \
  RB_AUGMENT(RB_PARENT(tmp, field));   \
} while (/*CONSTCOND*/ 0)

/* Generates prototypes and inline functions */
#define RB_PROTOTYPE(name, type, field, cmp)    \
 RB_PROTOTYPE_INTERNAL(name, type, field, cmp,)
#define RB_PROTOTYPE_STATIC(name, type, field, cmp)   \
 RB_PROTOTYPE_INTERNAL(name, type, field, cmp, _sys_tree_h_unused static)
#define RB_PROTOTYPE_INTERNAL(name, type, field, cmp, attr)  \
attr void name##_RB_INSERT_COLOR(struct name *, struct
 type *);  \
attr void name##_RB_REMOVE_COLOR(struct name *, struct type *, struct type *);\
attr struct type *name##_RB_REMOVE(struct name *, struct type *); \
attr struct type *name##_RB_INSERT(struct name *, struct type *); \
attr struct type *name##_RB_FIND(struct name *, struct type *);  \
attr struct type *name##_RB_NFIND(struct name *, struct type *); \
attr struct type *name##_RB_NEXT(struct type *);   \
attr struct type *name##_RB_PREV(struct type *);   \
attr struct type *name##_RB_MINMAX(struct name *, int);   \
        \

/* Main rb operation.
* Moves node close to the key of elm to top
*/
#define RB_GENERATE(name, type, field, cmp)    \
```

```
 RB_GENERATE_INTERNAL(name, type, field, cmp,)
#define RB_GENERATE_STATIC(name, type, field, cmp)   \
 RB_GENERATE_INTERNAL(name, type, field, cmp, _sys_tree_h_unused static)
#define RB_GENERATE_INTERNAL(name, type, field, cmp, attr)  \
attr void       \
name##_RB_INSERT_COLOR(struct name *head, struct type *elm)  \
{       \
 struct type
 *parent, *gparent, *tmp;    \
 while ((parent = RB_PARENT(elm, field)) != NULL &&  \
     RB_COLOR(parent, field) == RB_RED) {    \
  gparent = RB_PARENT(parent, field);   \
  if (parent == RB_LEFT(gparent, field)) {  \
   tmp = RB_RIGHT(gparent, field);   \
   if (tmp && RB_COLOR(tmp, field) == RB_RED) { \
    RB_COLOR(tmp, field) = RB_BLACK; \
    RB_SET_BLACKRED(parent, gparent, field);\
    elm = gparent;    \
    continue;    \
   }      \
   if (RB_RIGHT(parent, field) == elm) {  \
    RB_ROTATE_LEFT(head, parent, tmp, field);\
    tmp = parent;    \
    parent = elm;    \
    elm = tmp;    \
   }      \
   RB_SET_BLACKRED(parent, gparent, field); \
   RB_ROTATE_RIGHT(head, gparent, tmp, field); \
  } else {      \
   tmp = RB_LEFT(gparent, field);   \
   if (tmp && RB_COLOR(tmp, field) == RB_RED) { \
    RB_COLOR(tmp, field) = RB_BLACK; \
    RB_SET_BLACKRED(parent, gparent, field);\
    elm = gparent;    \
    continue;    \
   }      \
   if (RB_LEFT(parent, field) == elm)
  {  \
    RB_ROTATE_RIGHT(head, parent, tmp, field);\
    tmp = parent;    \
    parent = elm;    \
    elm = tmp;    \
   }      \
   RB_SET_BLACKRED(parent, gparent, field); \
   RB_ROTATE_LEFT(head, gparent, tmp, field); \
  }       \
 }       \
 RB_COLOR(head->rbh_root, field) = RB_BLACK;   \
```

```
}       \
       \
attr void       \
name##_RB_REMOVE_COLOR(struct name *head, struct type *parent, struct type *elm) \
{       \
 struct type *tmp;     \
 while ((elm == NULL || RB_COLOR(elm, field) == RB_BLACK) && \
     elm != RB_ROOT(head)) {     \
  if (RB_LEFT(parent, field) == elm) {   \
   tmp = RB_RIGHT(parent, field);   \
   if (RB_COLOR(tmp, field) == RB_RED) {  \
    RB_SET_BLACKRED(tmp, parent, field); \
    RB_ROTATE_LEFT(head, parent, tmp, field);\
    tmp = RB_RIGHT(parent, field);  \
   }     \
   if ((RB_LEFT(tmp, field) == NULL ||  \
       RB_COLOR(RB_LEFT(tmp, field), field) == RB_BLACK) &&\
       (RB_RIGHT(tmp, field) == NULL ||  \
       RB_COLOR(RB_RIGHT(tmp,
 field), field) == RB_BLACK)) {\
    RB_COLOR(tmp, field) = RB_RED;  \
    elm = parent;    \
    parent = RB_PARENT(elm, field);  \
   } else {     \
    if (RB_RIGHT(tmp, field) == NULL || \
        RB_COLOR(RB_RIGHT(tmp, field), field) == RB_BLACK) {\
     struct type *oleft;  \
     if ((oleft = RB_LEFT(tmp, field)) \
         != NULL)   \
      RB_COLOR(oleft, field) = RB_BLACK;\
     RB_COLOR(tmp, field) = RB_RED; \
     RB_ROTATE_RIGHT(head, tmp, oleft, field);\
     tmp = RB_RIGHT(parent, field); \
    }     \
    RB_COLOR(tmp, field) = RB_COLOR(parent, field);\
    RB_COLOR(parent, field) = RB_BLACK; \
    if (RB_RIGHT(tmp, field))  \
     RB_COLOR(RB_RIGHT(tmp, field), field) = RB_BLACK;\
    RB_ROTATE_LEFT(head, parent, tmp, field);\
    elm = RB_ROOT(head);   \
    break;     \
   }     \
  } else {      \
   tmp = RB_LEFT(parent, field);   \
   if (RB_COLOR(tmp, field) == RB_RED) {  \
    RB_SET_BLACKRED(tmp, parent, field); \
    RB_ROTATE_RIGHT(head, parent, tmp, field);\
    tmp
```

```
 = RB_LEFT(parent, field);  \
  }      \
  if ((RB_LEFT(tmp, field) == NULL ||  \
      RB_COLOR(RB_LEFT(tmp, field), field) == RB_BLACK) &&\
      (RB_RIGHT(tmp, field) == NULL ||  \
      RB_COLOR(RB_RIGHT(tmp, field), field) == RB_BLACK)) {\
   RB_COLOR(tmp, field) = RB_RED;  \
   elm = parent;    \
   parent = RB_PARENT(elm, field);  \
  } else {     \
   if (RB_LEFT(tmp, field) == NULL || \
       RB_COLOR(RB_LEFT(tmp, field), field) == RB_BLACK) {\
    struct type *oright;  \
    if ((oright = RB_RIGHT(tmp, field)) \
        != NULL)   \
     RB_COLOR(oright, field) = RB_BLACK;\
    RB_COLOR(tmp, field) = RB_RED; \
    RB_ROTATE_LEFT(head, tmp, oright, field);\
    tmp = RB_LEFT(parent, field); \
   }     \
   RB_COLOR(tmp, field) = RB_COLOR(parent, field);\
   RB_COLOR(parent, field) = RB_BLACK; \
   if (RB_LEFT(tmp, field))  \
    RB_COLOR(RB_LEFT(tmp, field), field) = RB_BLACK;\
   RB_ROTATE_RIGHT(head, parent, tmp, field);\
   elm = RB_ROOT(head);   \
   break;     \
  }      \
 }       \
}        \
if
(elm)       \
 RB_COLOR(elm, field) = RB_BLACK;   \
}        \
        \
attr struct type *       \
name##_RB_REMOVE(struct name *head, struct type *elm)   \
{        \
 struct type *child, *parent, *old = elm;   \
 int color;       \
 if (RB_LEFT(elm, field) == NULL)    \
  child = RB_RIGHT(elm, field);    \
 else if (RB_RIGHT(elm, field) == NULL)    \
  child = RB_LEFT(elm, field);    \
 else {        \
  struct type *left;     \
  elm = RB_RIGHT(elm, field);    \
  while ((left = RB_LEFT(elm, field)) != NULL)  \
```

```
 elm = left;     \
 child = RB_RIGHT(elm, field);    \
 parent = RB_PARENT(elm, field);    \
 color = RB_COLOR(elm, field);    \
 if (child)      \
  RB_PARENT(child, field) = parent;  \
 if (parent) {      \
  if (RB_LEFT(parent, field) == elm)  \
   RB_LEFT(parent, field) = child;  \
  else      \
   RB_RIGHT(parent, field) = child; \
  RB_AUGMENT(parent);    \
 } else       \
  RB_ROOT(head)
= child;    \
 if (RB_PARENT(elm, field) == old)   \
  parent = elm;     \
 (elm)->field = (old)->field;    \
 if (RB_PARENT(old, field)) {    \
  if (RB_LEFT(RB_PARENT(old, field), field) == old)\
   RB_LEFT(RB_PARENT(old, field), field) = elm;\
  else      \
   RB_RIGHT(RB_PARENT(old, field), field) = elm;\
  RB_AUGMENT(RB_PARENT(old, field));  \
 } else       \
  RB_ROOT(head) = elm;    \
 RB_PARENT(RB_LEFT(old, field), field) = elm;  \
 if (RB_RIGHT(old, field))    \
  RB_PARENT(RB_RIGHT(old, field), field) = elm; \
 if (parent) {      \
  left = parent;     \
  do {      \
   RB_AUGMENT(left);   \
  } while ((left = RB_PARENT(left, field)) != NULL); \
 }       \
 goto color;      \
}       \
parent = RB_PARENT(elm, field);     \
color = RB_COLOR(elm, field);     \
if (child)       \
 RB_PARENT(child, field) = parent;   \
if (parent) {       \
 if (RB_LEFT(parent, field) == elm)   \
  RB_LEFT(parent, field) = child;   \
 else       \
  RB_RIGHT(parent,
field) = child;  \
 RB_AUGMENT(parent);     \
```

```
 } else       \
  RB_ROOT(head) = child;    \
color:       \
 if (color == RB_BLACK)     \
  name##_RB_REMOVE_COLOR(head, parent, child);  \
 return (old);      \
}       \
       \
/* Inserts a node into the RB tree */    \
attr struct type *      \
name##_RB_INSERT(struct name *head, struct type *elm)   \
{       \
 struct type *tmp;     \
 struct type *parent = NULL;    \
 int comp = 0;      \
 tmp = RB_ROOT(head);     \
 while (tmp) {      \
  parent = tmp;     \
  comp = (cmp)(elm, parent);   \
  if (comp < 0)     \
   tmp = RB_LEFT(tmp, field);   \
  else if (comp > 0)    \
   tmp = RB_RIGHT(tmp, field);   \
  else      \
   return (tmp);    \
 }       \
 RB_SET(elm, parent, field);    \
 if (parent != NULL) {     \
  if (comp < 0)     \
   RB_LEFT(parent, field) = elm;   \
  else      \
   RB_RIGHT(parent, field) = elm;   \
  RB_AUGMENT(parent);    \
 } else       \
  RB_ROOT(head) = elm;    \
 name##_RB_INSERT_COLOR(head,
 elm);   \
 return (NULL);      \
}       \
       \
/* Finds the node with the same key as elm */   \
attr struct type *      \
name##_RB_FIND(struct name *head, struct type *elm)   \
{       \
 struct type *tmp = RB_ROOT(head);   \
 int comp;      \
 while (tmp) {      \
  comp = cmp(elm, tmp);    \
```

```
  if (comp < 0)     \
   tmp = RB_LEFT(tmp, field);   \
  else if (comp > 0)     \
   tmp = RB_RIGHT(tmp, field);   \
  else      \
   return (tmp);     \
 }       \
 return (NULL);      \
}       \
       \
/* Finds the first node greater than or equal to the search key */ \
attr struct type *      \
name##_RB_NFIND(struct name *head, struct type *elm)   \
{       \
 struct type *tmp = RB_ROOT(head);    \
 struct type *res = NULL;     \
 int comp;      \
 while (tmp) {      \
  comp = cmp(elm, tmp);     \
  if (comp < 0) {      \
   res = tmp;     \
   tmp = RB_LEFT(tmp, field);   \
  }      \
  else if (comp > 0)     \
   tmp =
 RB_RIGHT(tmp, field);   \
  else      \
   return (tmp);     \
 }       \
 return (res);      \
}       \
       \
/* ARGSUSED */       \
attr struct type *      \
name##_RB_NEXT(struct type *elm)     \
{       \
 if (RB_RIGHT(elm, field)) {     \
  elm = RB_RIGHT(elm, field);    \
  while (RB_LEFT(elm, field))    \
   elm = RB_LEFT(elm, field);   \
 } else {      \
  if (RB_PARENT(elm, field) &&    \
     (elm == RB_LEFT(RB_PARENT(elm, field), field))) \
   elm = RB_PARENT(elm, field);   \
  else {      \
   while (RB_PARENT(elm, field) &&   \
      (elm == RB_RIGHT(RB_PARENT(elm, field), field)))\
    elm = RB_PARENT(elm, field);  \
```

```
   elm = RB_PARENT(elm, field);   \
  }       \
 }       \
 return (elm);       \
}        \
        \
/* ARGSUSED */       \
attr struct type *       \
name##_RB_PREV(struct type *elm)     \
{        \
 if (RB_LEFT(elm, field)) {     \
  elm = RB_LEFT(elm, field);    \
  while (RB_RIGHT(elm, field))    \
   elm = RB_RIGHT(elm, field);   \
 }
 else {       \
  if (RB_PARENT(elm, field) &&    \
      (elm == RB_RIGHT(RB_PARENT(elm, field), field))) \
   elm = RB_PARENT(elm, field);   \
  else {       \
   while (RB_PARENT(elm, field) &&   \
       (elm == RB_LEFT(RB_PARENT(elm, field), field)))\
    elm = RB_PARENT(elm, field);  \
   elm = RB_PARENT(elm, field);   \
  }       \
 }       \
 return (elm);       \
}        \
        \
attr struct type *       \
name##_RB_MINMAX(struct name *head, int val)    \
{        \
 struct type *tmp = RB_ROOT(head);    \
 struct type *parent = NULL;     \
 while (tmp) {       \
  parent = tmp;      \
  if (val < 0)      \
   tmp = RB_LEFT(tmp, field);   \
  else       \
   tmp = RB_RIGHT(tmp, field);   \
 }       \
 return (parent);      \
}

#define RB_NEGINF -1
#define RB_INF 1

#define RB_INSERT(name, x, y) name##_RB_INSERT(x, y)
```

```
#define RB_REMOVE(name, x, y) name##_RB_REMOVE(x, y)
#define RB_FIND(name, x, y) name##_RB_FIND(x, y)
#define RB_NFIND(name, x, y) name##_RB_NFIND(x,
 y)
#define RB_NEXT(name, x, y) name##_RB_NEXT(y)
#define RB_PREV(name, x, y) name##_RB_PREV(y)
#define RB_MIN(name, x)  name##_RB_MINMAX(x, RB_NEGINF)
#define RB_MAX(name, x)  name##_RB_MINMAX(x, RB_INF)

#define RB_FOREACH(x, name, head)     \
 for ((x) = RB_MIN(name, head);     \
      (x) != NULL;      \
      (x) = name##_RB_NEXT(x))

#define RB_FOREACH_FROM(x, name, y)     \
 for ((x) = (y);       \
     ((x) != NULL) && ((y) = name##_RB_NEXT(x), (x) != NULL); \
      (x) = (y))

#define RB_FOREACH_SAFE(x, name, head, y)    \
 for ((x) = RB_MIN(name, head);     \
     ((x) != NULL) && ((y) = name##_RB_NEXT(x), (x) != NULL); \
      (x) = (y))

#define RB_FOREACH_REVERSE(x, name, head)    \
 for ((x) = RB_MAX(name, head);     \
      (x) != NULL;      \
      (x) = name##_RB_PREV(x))

#define RB_FOREACH_REVERSE_FROM(x, name, y)    \
 for ((x) = (y);       \
     ((x) != NULL) && ((y) = name##_RB_PREV(x), (x) != NULL); \
      (x) = (y))

#define RB_FOREACH_REVERSE_SAFE(x, name,
 head, y)   \
 for ((x) = RB_MAX(name, head);     \
     ((x) != NULL) && ((y) = name##_RB_PREV(x), (x) != NULL); \
      (x) = (y))

#endif /* _SYS_TREE_H_ */
# Contributor: Wen Heping <wenhepingalpine@sohu.com>
# Maintainer: Wen Heping <wenhepingalpine@sohu.com>
pkgname=perl-software-license
pkgver=0.104007
pkgrel=0
# _pkgreal is used by apkbuild-cpan to find modules at MetaCpan
_pkgreal=Software-License
```

```
pkgdesc="packages that provide templated software licenses"
url="https://metacpan.org/release/Software-License/"
arch="noarch"
license="GPL-1.0-or-later OR Artistic-1.0-Perl"
depends="perl perl-data-section perl-text-template"
checkdepends="perl-try-tiny"
subpackages="$pkgname-doc"
source="https://cpan.metacpan.org/authors/id/L/LE/LEONT/Software-License-$pkgver.tar.gz"
builddir="$srcdir/$_pkgreal-$pkgver"

build() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 PERL_MM_USE_DEFAULT=1 perl -I. Makefile.PL \
  INSTALLDIRS=vendor \
  NO_PACKLIST=1 \
  NO_PERLLOCAL=1
 make
}

check() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 make test
}

package() {
 make DESTDIR="$pkgdir" install
}

sha512sums="
12d75e9583b3013d9b4a282467f1ac80ab6b7f3251926d66591d01404489b528f22adc396dfd4528a0f0ca650f0eed6d
9c959e69eace2169c6ed1cfffe5277e4
  Software-License-0.104007.tar.gz
"
```

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SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.
# Contributor: Dhruvin Gandhi <contact@dhru.vin>
# Maintainer: Patrycja Rosa <alpine@ptrcnull.me>
pkgname=py3-license-expression
_pkgname=license_expression
pkgver=30.4.4
pkgrel=0
pkgdesc="Library to parse, compare, simplify and normalize license expressions"
url="https://github.com/nexB/license-expression"
arch="noarch"
license="Apache-2.0"
depends="python3 py3-boolean.py"
makedepends="py3-setuptools py3-setuptools_scm py3-gpep517 py3-wheel"
checkdepends="py3-pytest py3-pytest-xdist"
subpackages="$pkgname-pyc"
source="https://files.pythonhosted.org/packages/source/l/$_pkgname/$_pkgname-$pkgver.tar.gz"
builddir="$srcdir/$_pkgname-$pkgver"

build() {
 gpep517 build-wheel \
  --wheel-dir .dist \
  --output-fd 3 3>&1 >&2
}

check() {
 python3 -m venv --clear --without-pip --system-site-packages .testenv
 .testenv/bin/python3 -m installer .dist/*.whl
 .testenv/bin/python3 -m pytest
}

package() {
 python3 -m installer -d "$pkgdir" \
  .dist/*.whl
}

sha512sums="
f46dd4cf524b3962115fe26f5545bfdd6767275b482724af51e7ca07da79244969a3bfc5d2fd5b95bc0f19d1b95a26a8f3
ab36c676e56ec302178d7166588066
  license_expression-30.4.4.tar.gz
"
```

1.763 tre 1.2.5-r21

1.763.1 Available under license :

```
# Contributor: Carlo Landmeter <clandmeter@alpinelinux.org>
# Maintainer: Kevin Daudt <kdaudt@alpinelinux.org>
pkgname=spdx-licenses
pkgver=3.27.0
pkgrel=0
pkgdesc="Various data formats for the SPDX License List"
url="https://spdx.org/"
arch="noarch"
options="!check" # no test suite
license="CC-BY-3.0"
source="license-list-data-$pkgver.tar.gz::https://github.com/spdx/license-list-data/archive/v$pkgver.tar.gz"
builddir="$srcdir/license-list-data-$pkgver"
subpackages="$pkgname-list"

_types="html json rdfa rdfnt rdfturtle rdfxml template text"

for type in $_types; do
 subpackages="$subpackages $pkgname-$type:_subpkg"
done

package() {
 mkdir -p "$pkgdir"
}

_subpkg() {
 local type=${subpkgname/$pkgname-/}
 pkgdesc="$pkgdesc ($type)"
 install_if="$pkgname=$pkgver-r$pkgrel"
 mkdir -p "$subpkgdir"/usr/share/spdx
 cp -r "$builddir"/$type "$subpkgdir"/usr/share/spdx/
}

list() {
 pkgdesc="$pkgdesc (licence list)"
 mkdir -p "$subpkgdir"/usr/share/spdx
 local i; for i in "$builddir"/text/*.txt;
 do
  local license=${i##*/}
  echo ${license%.*} >> "$subpkgdir"/usr/share/spdx/license.lst
 done
}

sha512sums="
```

```
16d59c81e331b54b52639826f83408d98144cdaa70eacc3e8ce35dc3b13992e4794cf7515eb9db200efd390a0c0e35ae9
d4706fbe0ca6a8d236189e88870720c  license-list-data-3.27.0.tar.gz
"
# Automatically generated by apkbuild-cpan, template 4
# Contributor: Valery Kartel <valery.kartel@gmail.com>
# Maintainer: Celeste <cielesti@protonmail.com>
maintainer="Celeste <cielesti@protonmail.com>"
pkgname=perl-bsd-resource
pkgver=1.2911
pkgrel=11
#_pkgreal is used by apkbuild-cpan to find modules at MetaCpan
_pkgreal=BSD-Resource
pkgdesc="Perl extension implements the BSD process resource limit functions"
url="https://metacpan.org/release/BSD-Resource/"
arch="all"
license="Artistic-2.0 OR LGPL-2.0"
depends="perl"
makedepends="perl-dev"
subpackages="$pkgname-doc"
source="https://cpan.metacpan.org/authors/id/J/JH/JHI/BSD-Resource-$pkgver.tar.gz"
builddir="$srcdir/$_pkgreal-$pkgver"

build() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 PERL_MM_USE_DEFAULT=1 perl -I. Makefile.PL \
  INSTALLDIRS=vendor \
  NO_PACKLIST=1 \
  NO_PERLLOCAL=1
 make
}

check() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 make test
}

package() {
 make DESTDIR="$pkgdir" install
}

sha512sums="
d0032d41c7c0468ed1c6d8f57b885f6cb97a5039d754c8cb60b2067daedaf53bd15fb6561a3d0f828df16dfa5417f663b
8065ba65f4fea16dc9262728b3b6b85
  BSD-Resource-1.2911.tar.gz
"
maintainer="Achill Gilgenast <achill@achill.org>"
pkgname=cargo-license
pkgver=0.7.0
```

```
pkgrel=1
pkgdesc="Cargo subcommand to see license of dependencies"
url="https://github.com/onur/cargo-license"
arch="all"
license="MIT"
makedepends="cargo cargo-auditable"
source="$pkgname-$pkgver.tar.gz::https://crates.io/api/v1/crates/cargo-license/$pkgver/download"

prepare() {
 default_prepare

 cargo fetch --target="$CTARGET" --locked
}

build() {
 cargo auditable build --release --frozen
}

check() {
 cargo test --frozen
}

package() {
 install -Dm755 target/release/cargo-license -t "$pkgdir"/usr/bin
}

sha512sums="
9b3f0ead35515e85ef4074ebdbdbe5b9ec8bcaec244fabe414e2ed60f90366e8b1692d8bf7ffe4c07d778e60d94bab86bc
0c8be9823232e9c360a38bc65e9c5a  cargo-license-0.7.0.tar.gz
"
#!/sbin/openrc-run

command="/usr/libexec/xdg-permission-store"
supervisor=supervise-daemon
command_args="--replace $command_args"
error_logger="logger -t '${RC_SVCNAME}' -p daemon.error"

depend() {
 need dbus
}
# Contributor: Maxim Karasev <begs@disroot.org>
# Maintainer: mio <miyopan@e.email>
pkgname=bsd-games
pkgver=3.3
pkgrel=2
pkgdesc="traditional text mode games from BSD"
url="https://bsd-games.sourceforge.io/"
arch="all"
```

```
license="BSD-3-Clause"
install="$pkgname.post-install"
makedepends="ncurses-dev coreutils" # configure causes busybox expr error
subpackages="$pkgname-doc"
source="https://sourceforge.net/projects/bsd-games/files/bsd-games-$pkgver.tar.gz
 0001-bsd-games-scores-dir.patch
 "
options="!check" # no tests

build() {
 # some GNU autoconf options are ignored, but it works
 ./configure \
  --build=$CBUILD \
  --host=$CHOST \
  --prefix=/usr \
  --sysconfdir=/etc \
  --mandir=/usr/share/man \
  --scoredir=/usr/share/$pkgname
 make
}

package() {
 make DESTDIR="$pkgdir" install
 install -Dm644 LICENSE "$pkgdir"/usr/share/licenses/bsd-games/LICENSE
}

sha512sums="
aaf36d09d4fe68514a5c279063d7e77a9a9a84c447037cba974b29faa07eb80c2aab2379d0699c196b5c27ffe1b2bb2c6
8d3390143e0e62d5e3d210ccfb61294
  bsd-games-3.3.tar.gz
e1def0d4835a877242c4173fae862e278a7858738e0bacacbb045a42bcabec2aa7c72d000bbd2421ce35fe66cdc1f52c0
577b7e278029ca5ed50f7aab22319f6  0001-bsd-games-scores-dir.patch
"
```

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SOFTWARE.
# Maintainer: Natanael Copa <ncopa@alpinelinux.org>
pkgname=libart-lgpl
pkgver=2.3.21
pkgrel=8
pkgdesc="A library for high-performance 2D graphics"
url="https://www.levien.com/libart/"
arch="all"
options="!check"  # No test suite.
license="LGPL-2.0-or-later"
subpackages="$pkgname-dev"
source="https://download.gnome.org/sources/libart_lgpl/2.3/libart_lgpl-$pkgver.tar.bz2
 "

builddir="$srcdir"/libart_lgpl-$pkgver

prepare() {
 update_config_sub
 default_prepare
}

build() {
 ./configure \
  --build=$CBUILD \
  --host=$CHOST \
  --prefix=/usr
 make
}

package() {
 make DESTDIR="$pkgdir" install
}

sha512sums="8a632a6a4da59e5e8c02ec2f5a57e36d182b325b46513765425e5f171ff9ae326af1b133725beba28f7e7
6654309e001aee9bace727b5b4c8589405256a3c020  libart_lgpl-2.3.21.tar.bz2"
mini_sendmail - accept email on behalf of real sendmail

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SUCH DAMAGE.
# Contributor: Patrycja Rosa <alpine@ptrcnull.me>
# Maintainer: Patrycja Rosa <alpine@ptrcnull.me>
pkgname=bsd-compat-headers
pkgver=0.7.2
pkgrel=6
pkgdesc="BSD compatibility headers (cdefs, queue, tree)"
url="https://gitlab.alpinelinux.org/alpine/aports"
arch="noarch"
license="BSD-2-Clause AND BSD-3-Clause"
source="
 cdefs.h
 queue.h
 tree.h
"
builddir="$srcdir"
options="!check" # just headers

package() {
 mkdir -p "$pkgdir"
 install -Dm644 -t "$pkgdir"/usr/include/sys \
  cdefs.h queue.h tree.h
}
sha512sums="
37c8fc73c7aea7b490f7850927e2bb91d12137c9e59e22c084146d515696dbc7973b5de92f4c987ba080dd2502ba8312
7006442c3f019b6447a620c0cae73178  cdefs.h
2f0d5e6e4dc3350285cf17009265dddcbe12431c111868eea39bc8cb038ab7c1f2acacbb21735c4e9d4a1fd106a8fc0f86
11ea33987d4faba37dde5ce6da0750  queue.h
d9ac210d81feb8ad2655bc80fb065d3fe20ae4417b32b4a1711e6738a4870140005c13373b5d1846ef3ce5ae6da45f2da
cef2092881eded0a2e94f6a07752ef3  tree.h
```

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The Kohonen neural network code for color optimization was written by Anthony Dekker.

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The X-Spline code was written Carole Blanc (blanc@labri.u-bordeaux.fr) and Christophe Schlick (schlick@labri.u-bordeaux.fr) starting from an initial implementation done by C. Feuille, S. Grosbois, L. Maziere and L. Minihot as a student practice (Universite Bordeaux, France). For additional information about X-splines, see:
"X-Splines: A Spline Model Designed for the End User" by C. Blanc and C. Schlick, Proceedings of SIGGRAPH'95
http://dept-info.labri.u-bordeaux.fr/~schlick/DOC/sig1.html
/* $NetBSD: queue.h,v 1.70 2015/11/02 15:21:23 christos Exp $ */

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*
* @(#)queue.h 8.5 (Berkeley) 8/20/94
*/

#ifndef _SYS_QUEUE_H_
#define _SYS_QUEUE_H_

/*
* This file defines five types of data structures: singly-linked lists,
* lists, simple queues, tail queues, and circular queues.
*
* A singly-linked list is headed by a single forward pointer. The
* elements are singly linked for minimum space and
 pointer manipulation
* overhead at the expense of O(n) removal for arbitrary elements. New
* elements can be added to the list after an existing element or at the
* head of the list.  Elements being removed from the head of the list
* should use the explicit macro for this purpose for optimum
* efficiency. A singly-linked list may only be traversed in the forward
* direction.  Singly-linked lists are ideal for applications with large
* datasets and few or no removals or for implementing a LIFO queue.
*
* A list is headed by a single forward pointer (or an array of forward
* pointers for a hash table header). The elements are doubly linked
* so that an arbitrary element can be removed without a need to
* traverse the list. New elements can be added to the list before
* or after an existing element or at the head of the list. A list
* may only be traversed in the forward direction.
*
* A simple queue is headed by a pair of pointers, one the head of the
* list and the
 other to the tail of the list. The elements are singly
* linked to save space, so elements can only be removed from the
* head of the list. New elements can be added to the list after
* an existing element, at the head of the list, or at the end of the
* list. A simple queue may only be traversed in the forward direction.
```

```
*
* A tail queue is headed by a pair of pointers, one to the head of the
* list and the other to the tail of the list. The elements are doubly
* linked so that an arbitrary element can be removed without a need to
* traverse the list. New elements can be added to the list before or
* after an existing element, at the head of the list, or at the end of
* the list. A tail queue may be traversed in either direction.
*
* A circle queue is headed by a pair of pointers, one to the head of the
* list and the other to the tail of the list. The elements are doubly
* linked so that an arbitrary element can be removed without a need to
* traverse the list. New elements
 can be added to the list before or after
* an existing element, at the head of the list, or at the end of the list.
* A circle queue may be traversed in either direction, but has a more
* complex end of list detection.
*
* For details on the use of these macros, see the queue(3) manual page.
*/

/*
* Include the definition of NULL only on NetBSD because sys/null.h
* is not available elsewhere.  This conditional makes the header
* portable and it can simply be dropped verbatim into any system.
* The caveat is that on other systems some other header
* must provide NULL before the macros can be used.
*/
#ifdef __NetBSD__
#include <sys/null.h>
#endif

#if defined(QUEUEDEBUG)
# if defined(_KERNEL)
#  define QUEUEDEBUG_ABORT(...) panic(__VA_ARGS__)
# else
#  include <err.h>
#  define QUEUEDEBUG_ABORT(...) err(1, __VA_ARGS__)
# endif
#endif

/*
* Singly-linked List definitions.
*/
#define SLIST_HEAD(name, type)      \
struct name {       \
 struct type *slh_first; /* first
 element */   \
}
```

```
#define SLIST_HEAD_INITIALIZER(head)    \
 { NULL }

#define SLIST_ENTRY(type)      \
struct {        \
 struct type *sle_next; /* next element */   \
}

/*
* Singly-linked List access methods.
*/
#define SLIST_FIRST(head) ((head)->slh_first)
#define SLIST_END(head)  NULL
#define SLIST_EMPTY(head) ((head)->slh_first == NULL)
#define SLIST_NEXT(elm, field) ((elm)->field.sle_next)

#define SLIST_FOREACH(var, head, field)     \
 for((var) = (head)->slh_first;     \
    (var) != SLIST_END(head);     \
    (var) = (var)->field.sle_next)

#define SLIST_FOREACH_SAFE(var, head, field, tvar)   \
 for ((var) = SLIST_FIRST((head));    \
    (var) != SLIST_END(head) &&     \
    ((tvar) = SLIST_NEXT((var), field), 1);   \
    (var) = (tvar))

/*
* Singly-linked List functions.
*/
#define SLIST_INIT(head) do {      \
 (head)->slh_first = SLIST_END(head);    \
} while (/*CONSTCOND*/0)

#define SLIST_INSERT_AFTER(slistelm, elm, field) do {   \
 (elm)->field.sle_next = (slistelm)->field.sle_next;  \
 (slistelm)->field.sle_next
 = (elm);    \
} while (/*CONSTCOND*/0)

#define SLIST_INSERT_HEAD(head, elm, field) do {   \
 (elm)->field.sle_next = (head)->slh_first;   \
 (head)->slh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define SLIST_REMOVE_AFTER(slistelm, field) do {   \
 (slistelm)->field.sle_next =     \
```

```
    SLIST_NEXT(SLIST_NEXT((slistelm), field), field);  \
} while (/*CONSTCOND*/0)

#define SLIST_REMOVE_HEAD(head, field) do {    \
 (head)->slh_first = (head)->slh_first->field.sle_next;  \
} while (/*CONSTCOND*/0)

#define SLIST_REMOVE(head, elm, type, field) do {   \
 if ((head)->slh_first == (elm)) {    \
  SLIST_REMOVE_HEAD((head), field);   \
 }       \
 else {       \
  struct type *curelm = (head)->slh_first;  \
  while(curelm->field.sle_next != (elm))   \
   curelm = curelm->field.sle_next;  \
  curelm->field.sle_next =    \
      curelm->field.sle_next->field.sle_next;  \
 }       \
} while (/*CONSTCOND*/0)


/*
* List definitions.
 */
#define LIST_HEAD(name, type)      \
struct name {       \
 struct type *lh_first; /* first element */   \
}

#define LIST_HEAD_INITIALIZER(head)     \
 { NULL }

#define LIST_ENTRY(type)      \
struct {       \
 struct type *le_next; /* next element */   \
 struct type **le_prev; /* address of previous next element */ \
}

/*
* List access methods.
*/
#define LIST_FIRST(head)  ((head)->lh_first)
#define LIST_END(head)   NULL
#define LIST_EMPTY(head)  ((head)->lh_first == LIST_END(head))
#define LIST_NEXT(elm, field)  ((elm)->field.le_next)

#define LIST_FOREACH(var, head, field)     \
 for ((var) = ((head)->lh_first);    \
```

```
    (var) != LIST_END(head);    \
    (var) = ((var)->field.le_next))

#define LIST_FOREACH_SAFE(var, head, field, tvar)   \
 for ((var) = LIST_FIRST((head));    \
    (var) != LIST_END(head) &&    \
    ((tvar) = LIST_NEXT((var), field), 1);   \
    (var) = (tvar))

#define LIST_MOVE(head1, head2) do {    \
 LIST_INIT((head2));     \
 if (!LIST_EMPTY((head1)))
 {    \
  (head2)->lh_first = (head1)->lh_first;   \
  LIST_INIT((head1));    \
 }       \
} while (/*CONSTCOND*/0)

/*
* List functions.
*/
#if defined(QUEUEDEBUG)
#define QUEUEDEBUG_LIST_INSERT_HEAD(head, elm, field)   \
 if ((head)->lh_first &&     \
    (head)->lh_first->field.le_prev != &(head)->lh_first) \
  QUEUEDEBUG_ABORT("LIST_INSERT_HEAD %p %s:%d", (head), \
     __FILE__, __LINE__);
#define QUEUEDEBUG_LIST_OP(elm, field)    \
 if ((elm)->field.le_next &&    \
    (elm)->field.le_next->field.le_prev !=   \
    &(elm)->field.le_next)    \
  QUEUEDEBUG_ABORT("LIST_* forw %p %s:%d", (elm),  \
     __FILE__, __LINE__);    \
 if (*(elm)->field.le_prev != (elm))    \
  QUEUEDEBUG_ABORT("LIST_* back %p %s:%d", (elm),  \
     __FILE__, __LINE__);
#define QUEUEDEBUG_LIST_POSTREMOVE(elm, field)    \
 (elm)->field.le_next = (void *)1L;    \
 (elm)->field.le_prev = (void *)1L;
#else
#define QUEUEDEBUG_LIST_INSERT_HEAD(head, elm, field)
#define QUEUEDEBUG_LIST_OP(elm,
 field)
#define QUEUEDEBUG_LIST_POSTREMOVE(elm, field)
#endif

#define LIST_INIT(head) do {     \
 (head)->lh_first = LIST_END(head);    \
```

```
} while (/*CONSTCOND*/0)

#define LIST_INSERT_AFTER(listelm, elm, field) do {   \
 QUEUEDEBUG_LIST_OP((listelm), field)    \
 if (((elm)->field.le_next = (listelm)->field.le_next) !=  \
    LIST_END(head))      \
  (listelm)->field.le_next->field.le_prev =  \
     &(elm)->field.le_next;    \
 (listelm)->field.le_next = (elm);    \
 (elm)->field.le_prev = &(listelm)->field.le_next;  \
} while (/*CONSTCOND*/0)

#define LIST_INSERT_BEFORE(listelm, elm, field) do {   \
 QUEUEDEBUG_LIST_OP((listelm), field)    \
 (elm)->field.le_prev = (listelm)->field.le_prev;  \
 (elm)->field.le_next = (listelm);    \
 *(listelm)->field.le_prev = (elm);    \
 (listelm)->field.le_prev = &(elm)->field.le_next;  \
} while (/*CONSTCOND*/0)

#define LIST_INSERT_HEAD(head, elm, field) do {    \
 QUEUEDEBUG_LIST_INSERT_HEAD((head), (elm), field)  \
 if (((elm)->field.le_next
 = (head)->lh_first) != LIST_END(head))\
  (head)->lh_first->field.le_prev = &(elm)->field.le_next;\
 (head)->lh_first = (elm);     \
 (elm)->field.le_prev = &(head)->lh_first;   \
} while (/*CONSTCOND*/0)

#define LIST_REMOVE(elm, field) do {     \
 QUEUEDEBUG_LIST_OP((elm), field)    \
 if ((elm)->field.le_next != NULL)    \
  (elm)->field.le_next->field.le_prev =    \
     (elm)->field.le_prev;    \
 *(elm)->field.le_prev = (elm)->field.le_next;   \
 QUEUEDEBUG_LIST_POSTREMOVE((elm), field)   \
} while (/*CONSTCOND*/0)

#define LIST_REPLACE(elm, elm2, field) do {    \
 if (((elm2)->field.le_next = (elm)->field.le_next) != NULL) \
  (elm2)->field.le_next->field.le_prev =   \
     &(elm2)->field.le_next;    \
 (elm2)->field.le_prev = (elm)->field.le_prev;   \
 *(elm2)->field.le_prev = (elm2);    \
 QUEUEDEBUG_LIST_POSTREMOVE((elm), field)   \
} while (/*CONSTCOND*/0)

/*
```

```
* Simple queue definitions.
*/
#define SIMPLEQ_HEAD(name, type)     \
struct name {        \
 struct
 type *sqh_first; /* first element */   \
 struct type **sqh_last; /* addr of last next element */  \
}

#define SIMPLEQ_HEAD_INITIALIZER(head)     \
 { NULL, &(head).sqh_first }

#define SIMPLEQ_ENTRY(type)      \
struct {        \
 struct type *sqe_next; /* next element */   \
}

/*
* Simple queue access methods.
*/
#define SIMPLEQ_FIRST(head)  ((head)->sqh_first)
#define SIMPLEQ_END(head)  NULL
#define SIMPLEQ_EMPTY(head)  ((head)->sqh_first == SIMPLEQ_END(head))
#define SIMPLEQ_NEXT(elm, field) ((elm)->field.sqe_next)

#define SIMPLEQ_FOREACH(var, head, field)    \
 for ((var) = ((head)->sqh_first);    \
     (var) != SIMPLEQ_END(head);     \
     (var) = ((var)->field.sqe_next))

#define SIMPLEQ_FOREACH_SAFE(var, head, field, next)   \
 for ((var) = ((head)->sqh_first);    \
     (var) != SIMPLEQ_END(head) &&    \
     ((next = ((var)->field.sqe_next)), 1);   \
     (var) = (next))

/*
* Simple queue functions.
*/
#define SIMPLEQ_INIT(head) do {      \
 (head)->sqh_first = NULL;     \
 (head)->sqh_last
 = &(head)->sqh_first;    \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_INSERT_HEAD(head, elm, field) do {   \
 if (((elm)->field.sqe_next = (head)->sqh_first) == NULL) \
  (head)->sqh_last = &(elm)->field.sqe_next;  \
```

```
 (head)->sqh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_INSERT_TAIL(head, elm, field) do {   \
 (elm)->field.sqe_next = NULL;     \
 *(head)->sqh_last = (elm);     \
 (head)->sqh_last = &(elm)->field.sqe_next;   \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 if (((elm)->field.sqe_next = (listelm)->field.sqe_next) == NULL)\
  (head)->sqh_last = &(elm)->field.sqe_next;  \
 (listelm)->field.sqe_next = (elm);    \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_REMOVE_HEAD(head, field) do {    \
 if (((head)->sqh_first = (head)->sqh_first->field.sqe_next) == NULL) \
  (head)->sqh_last = &(head)->sqh_first;   \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_REMOVE_AFTER(head, elm, field) do {   \
 if
 (((elm)->field.sqe_next = (elm)->field.sqe_next->field.sqe_next) \
    == NULL)       \
  (head)->sqh_last = &(elm)->field.sqe_next;  \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_REMOVE(head, elm, type, field) do {   \
 if ((head)->sqh_first == (elm)) {    \
  SIMPLEQ_REMOVE_HEAD((head), field);   \
 } else {       \
  struct type *curelm = (head)->sqh_first;  \
  while (curelm->field.sqe_next != (elm))   \
   curelm = curelm->field.sqe_next;  \
  if ((curelm->field.sqe_next =    \
   curelm->field.sqe_next->field.sqe_next) == NULL) \
      (head)->sqh_last = &(curelm)->field.sqe_next; \
 }       \
} while (/*CONSTCOND*/0)

#define SIMPLEQ_CONCAT(head1, head2) do {    \
 if (!SIMPLEQ_EMPTY((head2))) {     \
  *(head1)->sqh_last = (head2)->sqh_first;  \
  (head1)->sqh_last = (head2)->sqh_last;  \
  SIMPLEQ_INIT((head2));     \
 }       \
} while (/*CONSTCOND*/0)
```

```
#define SIMPLEQ_LAST(head, type, field)     \
 (SIMPLEQ_EMPTY((head)) ?      \
  NULL :       \
        ((struct type
 *)(void *)    \
  ((char *)((head)->sqh_last) - offsetof(struct type, field))))

/*
* Tail queue definitions.
*/
#define _TAILQ_HEAD(name, type, qual)     \
struct name {        \
 qual type *tqh_first;  /* first element */  \
 qual type *qual *tqh_last; /* addr of last next element */ \
}
#define TAILQ_HEAD(name, type) _TAILQ_HEAD(name, struct type,)

#define TAILQ_HEAD_INITIALIZER(head)     \
 { TAILQ_END(head), &(head).tqh_first }

#define _TAILQ_ENTRY(type, qual)     \
struct {        \
 qual type *tqe_next;  /* next element */  \
 qual type *qual *tqe_prev; /* address of previous next element */\
}
#define TAILQ_ENTRY(type) _TAILQ_ENTRY(struct type,)

/*
* Tail queue access methods.
*/
#define TAILQ_FIRST(head)  ((head)->tqh_first)
#define TAILQ_END(head)   (NULL)
#define TAILQ_NEXT(elm, field)  ((elm)->field.tqe_next)
#define TAILQ_LAST(head, headname) \
 (*(((struct headname *)(void *)((head)->tqh_last))->tqh_last))
#define TAILQ_PREV(elm, headname, field) \
 (*(((struct headname
 *)(void *)((elm)->field.tqe_prev))->tqh_last))
#define TAILQ_EMPTY(head)  (TAILQ_FIRST(head) == TAILQ_END(head))


#define TAILQ_FOREACH(var, head, field)     \
 for ((var) = ((head)->tqh_first);    \
     (var) != TAILQ_END(head);     \
     (var) = ((var)->field.tqe_next))

#define TAILQ_FOREACH_SAFE(var, head, field, next)   \
 for ((var) = ((head)->tqh_first);    \
```

```
    (var) != TAILQ_END(head) &&     \
    ((next) = TAILQ_NEXT(var, field), 1); (var) = (next))

#define TAILQ_FOREACH_REVERSE(var, head, headname, field)  \
 for ((var) = TAILQ_LAST((head), headname);   \
    (var) != TAILQ_END(head);     \
    (var) = TAILQ_PREV((var), headname, field))

#define TAILQ_FOREACH_REVERSE_SAFE(var, head, headname, field, prev) \
 for ((var) = TAILQ_LAST((head), headname);   \
    (var) != TAILQ_END(head) &&     \
    ((prev) = TAILQ_PREV((var), headname, field), 1); (var) = (prev))

/*
* Tail queue functions.
*/
#if defined(QUEUEDEBUG)
#define QUEUEDEBUG_TAILQ_INSERT_HEAD(head,
 elm, field)   \
 if ((head)->tqh_first &&     \
    (head)->tqh_first->field.tqe_prev != &(head)->tqh_first) \
  QUEUEDEBUG_ABORT("TAILQ_INSERT_HEAD %p %s:%d", (head), \
     __FILE__, __LINE__);
#define QUEUEDEBUG_TAILQ_INSERT_TAIL(head, elm, field)   \
 if (*(head)->tqh_last != NULL)     \
  QUEUEDEBUG_ABORT("TAILQ_INSERT_TAIL %p %s:%d", (head), \
     __FILE__, __LINE__);
#define QUEUEDEBUG_TAILQ_OP(elm, field)     \
 if ((elm)->field.tqe_next &&     \
    (elm)->field.tqe_next->field.tqe_prev !=   \
    &(elm)->field.tqe_next)     \
  QUEUEDEBUG_ABORT("TAILQ_* forw %p %s:%d", (elm), \
     __FILE__, __LINE__);    \
 if (*(elm)->field.tqe_prev != (elm))    \
  QUEUEDEBUG_ABORT("TAILQ_* back %p %s:%d", (elm), \
     __FILE__, __LINE__);
#define QUEUEDEBUG_TAILQ_PREREMOVE(head, elm, field)   \
 if ((elm)->field.tqe_next == NULL &&    \
    (head)->tqh_last != &(elm)->field.tqe_next)   \
  QUEUEDEBUG_ABORT("TAILQ_PREREMOVE head %p elm %p %s:%d",\
     (head), (elm), __FILE__,
 __LINE__);
#define QUEUEDEBUG_TAILQ_POSTREMOVE(elm, field)    \
 (elm)->field.tqe_next = (void *)1L;    \
 (elm)->field.tqe_prev = (void *)1L;
#else
#define QUEUEDEBUG_TAILQ_INSERT_HEAD(head, elm, field)
#define QUEUEDEBUG_TAILQ_INSERT_TAIL(head, elm, field)
```

```
#define QUEUEDEBUG_TAILQ_OP(elm, field)
#define QUEUEDEBUG_TAILQ_PREREMOVE(head, elm, field)
#define QUEUEDEBUG_TAILQ_POSTREMOVE(elm, field)
#endif

#define TAILQ_INIT(head) do {      \
 (head)->tqh_first = TAILQ_END(head);    \
 (head)->tqh_last = &(head)->tqh_first;    \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_HEAD(head, elm, field) do {   \
 QUEUEDEBUG_TAILQ_INSERT_HEAD((head), (elm), field)  \
 if (((elm)->field.tqe_next = (head)->tqh_first) != TAILQ_END(head))\
  (head)->tqh_first->field.tqe_prev =   \
     &(elm)->field.tqe_next;    \
 else       \
  (head)->tqh_last = &(elm)->field.tqe_next;  \
 (head)->tqh_first = (elm);     \
 (elm)->field.tqe_prev = &(head)->tqh_first;   \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_TAIL(head,
 elm, field) do {   \
 QUEUEDEBUG_TAILQ_INSERT_TAIL((head), (elm), field)  \
 (elm)->field.tqe_next = TAILQ_END(head);   \
 (elm)->field.tqe_prev = (head)->tqh_last;   \
 *(head)->tqh_last = (elm);     \
 (head)->tqh_last = &(elm)->field.tqe_next;   \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 QUEUEDEBUG_TAILQ_OP((listelm), field)    \
 if (((elm)->field.tqe_next = (listelm)->field.tqe_next) !=  \
    TAILQ_END(head))      \
  (elm)->field.tqe_next->field.tqe_prev =   \
     &(elm)->field.tqe_next;    \
 else       \
  (head)->tqh_last = &(elm)->field.tqe_next;  \
 (listelm)->field.tqe_next = (elm);    \
 (elm)->field.tqe_prev = &(listelm)->field.tqe_next;  \
} while (/*CONSTCOND*/0)

#define TAILQ_INSERT_BEFORE(listelm, elm, field) do {   \
 QUEUEDEBUG_TAILQ_OP((listelm), field)    \
 (elm)->field.tqe_prev = (listelm)->field.tqe_prev;  \
 (elm)->field.tqe_next = (listelm);    \
 *(listelm)->field.tqe_prev = (elm);    \
 (listelm)->field.tqe_prev
```

```
 = &(elm)->field.tqe_next;  \
} while (/*CONSTCOND*/0)

#define TAILQ_REMOVE(head, elm, field) do {    \
 QUEUEDEBUG_TAILQ_PREREMOVE((head), (elm), field)  \
 QUEUEDEBUG_TAILQ_OP((elm), field)    \
 if (((elm)->field.tqe_next) != TAILQ_END(head))   \
  (elm)->field.tqe_next->field.tqe_prev =   \
     (elm)->field.tqe_prev;    \
 else       \
  (head)->tqh_last = (elm)->field.tqe_prev;  \
 *(elm)->field.tqe_prev = (elm)->field.tqe_next;   \
 QUEUEDEBUG_TAILQ_POSTREMOVE((elm), field);   \
} while (/*CONSTCOND*/0)

#define TAILQ_REPLACE(head, elm, elm2, field) do {   \
      if (((elm2)->field.tqe_next = (elm)->field.tqe_next) !=  \
    TAILQ_END(head))        \
            (elm2)->field.tqe_next->field.tqe_prev =  \
               &(elm2)->field.tqe_next;    \
      else       \
            (head)->tqh_last = &(elm2)->field.tqe_next;  \
      (elm2)->field.tqe_prev = (elm)->field.tqe_prev;   \
      *(elm2)->field.tqe_prev = (elm2);    \
 QUEUEDEBUG_TAILQ_POSTREMOVE((elm),
 field);   \
} while (/*CONSTCOND*/0)

#define TAILQ_CONCAT(head1, head2, field) do {    \
 if (!TAILQ_EMPTY(head2)) {     \
  *(head1)->tqh_last = (head2)->tqh_first;  \
  (head2)->tqh_first->field.tqe_prev = (head1)->tqh_last; \
  (head1)->tqh_last = (head2)->tqh_last;   \
  TAILQ_INIT((head2));     \
 }       \
} while (/*CONSTCOND*/0)

/*
* Singly-linked Tail queue declarations.
*/
#define STAILQ_HEAD(name, type)      \
struct name {       \
 struct type *stqh_first; /* first element */  \
 struct type **stqh_last; /* addr of last next element */ \
}

#define STAILQ_HEAD_INITIALIZER(head)     \
 { NULL, &(head).stqh_first }
```

```
#define STAILQ_ENTRY(type)      \
struct {        \
 struct type *stqe_next; /* next element */   \
}

/*
* Singly-linked Tail queue access methods.
*/
#define STAILQ_FIRST(head) ((head)->stqh_first)
#define STAILQ_END(head) NULL
#define STAILQ_NEXT(elm, field) ((elm)->field.stqe_next)
#define STAILQ_EMPTY(head) (STAILQ_FIRST(head)
 == STAILQ_END(head))

/*
* Singly-linked Tail queue functions.
*/
#define STAILQ_INIT(head) do {      \
 (head)->stqh_first = NULL;     \
 (head)->stqh_last = &(head)->stqh_first;    \
} while (/*CONSTCOND*/0)

#define STAILQ_INSERT_HEAD(head, elm, field) do {   \
 if (((elm)->field.stqe_next = (head)->stqh_first) == NULL) \
  (head)->stqh_last = &(elm)->field.stqe_next;  \
 (head)->stqh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define STAILQ_INSERT_TAIL(head, elm, field) do {   \
 (elm)->field.stqe_next = NULL;     \
 *(head)->stqh_last = (elm);     \
 (head)->stqh_last = &(elm)->field.stqe_next;   \
} while (/*CONSTCOND*/0)

#define STAILQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 if (((elm)->field.stqe_next = (listelm)->field.stqe_next) == NULL)\
  (head)->stqh_last = &(elm)->field.stqe_next;  \
 (listelm)->field.stqe_next = (elm);    \
} while (/*CONSTCOND*/0)

#define STAILQ_REMOVE_HEAD(head, field) do {    \
 if (((head)->stqh_first = (head)->stqh_first->field.stqe_next)
 == NULL) \
  (head)->stqh_last = &(head)->stqh_first;   \
} while (/*CONSTCOND*/0)

#define STAILQ_REMOVE(head, elm, type, field) do {   \
```

```
 if ((head)->stqh_first == (elm)) {    \
  STAILQ_REMOVE_HEAD((head), field);   \
 } else {       \
  struct type *curelm = (head)->stqh_first;  \
  while (curelm->field.stqe_next != (elm))   \
   curelm = curelm->field.stqe_next;  \
  if ((curelm->field.stqe_next =    \
   curelm->field.stqe_next->field.stqe_next) == NULL) \
       (head)->stqh_last = &(curelm)->field.stqe_next; \
 }       \
} while (/*CONSTCOND*/0)

#define STAILQ_FOREACH(var, head, field)    \
 for ((var) = ((head)->stqh_first);    \
  (var);       \
  (var) = ((var)->field.stqe_next))

#define STAILQ_FOREACH_SAFE(var, head, field, tvar)   \
 for ((var) = STAILQ_FIRST((head));    \
     (var) && ((tvar) = STAILQ_NEXT((var), field), 1);  \
     (var) = (tvar))

#define STAILQ_CONCAT(head1, head2) do {    \
 if (!STAILQ_EMPTY((head2))) {     \
  *(head1)->stqh_last
 = (head2)->stqh_first;  \
  (head1)->stqh_last = (head2)->stqh_last;  \
  STAILQ_INIT((head2));     \
 }       \
} while (/*CONSTCOND*/0)

#define STAILQ_LAST(head, type, field)     \
 (STAILQ_EMPTY((head)) ?      \
  NULL :       \
        ((struct type *)(void *)    \
  ((char *)((head)->stqh_last) - offsetof(struct type, field))))



#ifndef _KERNEL
/*
* Circular queue definitions. Do not use. We still keep the macros
* for compatibility but because of pointer aliasing issues their use
* is discouraged!
*/

/*
* __launder_type():  We use this ugly hack to work around the the compiler
* noticing that two types may not alias each other and elide tests in code.
```

```
* We hit this in the CIRCLEQ macros when comparing 'struct name *' and
* 'struct type *' (see CIRCLEQ_HEAD()).  Modern compilers (such as GCC
* 4.8) declare these comparisons as always false, causing the code to
* not run as designed.
*
* This hack is only to be used for comparisons and thus can be fully const.
 * Do not use for assignment.
*
* If we ever choose to change the ABI of the CIRCLEQ macros, we could fix
* this by changing the head/tail sentinal values, but see the note above
* this one.
*/
static __inline const void * __launder_type(const void *);
static __inline const void *
__launder_type(const void *__x)
{
 __asm __volatile("" : "+r" (__x));
 return __x;
}

#if defined(QUEUEDEBUG)
#define QUEUEDEBUG_CIRCLEQ_HEAD(head, field)    \
 if ((head)->cqh_first != CIRCLEQ_ENDC(head) &&   \
    (head)->cqh_first->field.cqe_prev != CIRCLEQ_ENDC(head)) \
  QUEUEDEBUG_ABORT("CIRCLEQ head forw %p %s:%d", (head), \
       __FILE__, __LINE__);    \
 if ((head)->cqh_last != CIRCLEQ_ENDC(head) &&   \
    (head)->cqh_last->field.cqe_next != CIRCLEQ_ENDC(head)) \
  QUEUEDEBUG_ABORT("CIRCLEQ head back %p %s:%d", (head), \
       __FILE__, __LINE__);
#define QUEUEDEBUG_CIRCLEQ_ELM(head, elm, field)   \
 if ((elm)->field.cqe_next == CIRCLEQ_ENDC(head)) {  \
  if ((head)->cqh_last != (elm))    \
   QUEUEDEBUG_ABORT("CIRCLEQ
 elm last %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 } else {      \
  if ((elm)->field.cqe_next->field.cqe_prev != (elm)) \
   QUEUEDEBUG_ABORT("CIRCLEQ elm forw %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 }       \
 if ((elm)->field.cqe_prev == CIRCLEQ_ENDC(head)) {  \
  if ((head)->cqh_first != (elm))    \
   QUEUEDEBUG_ABORT("CIRCLEQ elm first %p %s:%d", \
      (elm), __FILE__, __LINE__);   \
 } else {      \
  if ((elm)->field.cqe_prev->field.cqe_next != (elm)) \
   QUEUEDEBUG_ABORT("CIRCLEQ elm prev %p %s:%d", \
```

```
      (elm), __FILE__, __LINE__);   \
 }
#define QUEUEDEBUG_CIRCLEQ_POSTREMOVE(elm, field)   \
 (elm)->field.cqe_next = (void *)1L;    \
 (elm)->field.cqe_prev = (void *)1L;
#else
#define QUEUEDEBUG_CIRCLEQ_HEAD(head, field)
#define QUEUEDEBUG_CIRCLEQ_ELM(head, elm, field)
#define QUEUEDEBUG_CIRCLEQ_POSTREMOVE(elm, field)
#endif

#define CIRCLEQ_HEAD(name, type)     \
struct name {       \
 struct type *cqh_first;  /*
 first element */  \
 struct type *cqh_last;  /* last element */  \
}

#define CIRCLEQ_HEAD_INITIALIZER(head)     \
 { CIRCLEQ_END(&head), CIRCLEQ_END(&head) }

#define CIRCLEQ_ENTRY(type)      \
struct {       \
 struct type *cqe_next;  /* next element */  \
 struct type *cqe_prev;  /* previous element */  \
}

/*
* Circular queue functions.
*/
#define CIRCLEQ_INIT(head) do {      \
 (head)->cqh_first = CIRCLEQ_END(head);    \
 (head)->cqh_last = CIRCLEQ_END(head);    \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_AFTER(head, listelm, elm, field) do {  \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 QUEUEDEBUG_CIRCLEQ_ELM((head), (listelm), field)  \
 (elm)->field.cqe_next = (listelm)->field.cqe_next;  \
 (elm)->field.cqe_prev = (listelm);    \
 if ((listelm)->field.cqe_next == CIRCLEQ_ENDC(head))  \
  (head)->cqh_last = (elm);    \
 else       \
  (listelm)->field.cqe_next->field.cqe_prev = (elm); \
 (listelm)->field.cqe_next = (elm);    \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_BEFORE(head,
```

```
 listelm, elm, field) do {  \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 QUEUEDEBUG_CIRCLEQ_ELM((head), (listelm), field)  \
 (elm)->field.cqe_next = (listelm);    \
 (elm)->field.cqe_prev = (listelm)->field.cqe_prev;  \
 if ((listelm)->field.cqe_prev == CIRCLEQ_ENDC(head))  \
  (head)->cqh_first = (elm);    \
 else       \
  (listelm)->field.cqe_prev->field.cqe_next = (elm); \
 (listelm)->field.cqe_prev = (elm);    \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_HEAD(head, elm, field) do {   \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 (elm)->field.cqe_next = (head)->cqh_first;   \
 (elm)->field.cqe_prev = CIRCLEQ_END(head);   \
 if ((head)->cqh_last == CIRCLEQ_ENDC(head))   \
  (head)->cqh_last = (elm);    \
 else       \
  (head)->cqh_first->field.cqe_prev = (elm);  \
 (head)->cqh_first = (elm);     \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_INSERT_TAIL(head, elm, field) do {   \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 (elm)->field.cqe_next
 = CIRCLEQ_END(head);   \
 (elm)->field.cqe_prev = (head)->cqh_last;   \
 if ((head)->cqh_first == CIRCLEQ_ENDC(head))   \
  (head)->cqh_first = (elm);    \
 else       \
  (head)->cqh_last->field.cqe_next = (elm);  \
 (head)->cqh_last = (elm);     \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_REMOVE(head, elm, field) do {    \
 QUEUEDEBUG_CIRCLEQ_HEAD((head), field)    \
 QUEUEDEBUG_CIRCLEQ_ELM((head), (elm), field)   \
 if ((elm)->field.cqe_next == CIRCLEQ_ENDC(head))  \
  (head)->cqh_last = (elm)->field.cqe_prev;  \
 else       \
  (elm)->field.cqe_next->field.cqe_prev =   \
     (elm)->field.cqe_prev;    \
 if ((elm)->field.cqe_prev == CIRCLEQ_ENDC(head))  \
  (head)->cqh_first = (elm)->field.cqe_next;  \
 else       \
  (elm)->field.cqe_prev->field.cqe_next =   \
     (elm)->field.cqe_next;    \
```

```
 QUEUEDEBUG_CIRCLEQ_POSTREMOVE((elm), field)   \
} while (/*CONSTCOND*/0)

#define CIRCLEQ_FOREACH(var, head, field)    \
 for ((var) = ((head)->cqh_first);    \
  (var) != CIRCLEQ_ENDC(head);    \
  (var)
 = ((var)->field.cqe_next))

#define CIRCLEQ_FOREACH_REVERSE(var, head, field)   \
 for ((var) = ((head)->cqh_last);    \
  (var) != CIRCLEQ_ENDC(head);    \
  (var) = ((var)->field.cqe_prev))

/*
* Circular queue access methods.
*/
#define CIRCLEQ_FIRST(head)  ((head)->cqh_first)
#define CIRCLEQ_LAST(head)  ((head)->cqh_last)
/* For comparisons */
#define CIRCLEQ_ENDC(head)  (__launder_type(head))
/* For assignments */
#define CIRCLEQ_END(head)  ((void *)(head))
#define CIRCLEQ_NEXT(elm, field) ((elm)->field.cqe_next)
#define CIRCLEQ_PREV(elm, field) ((elm)->field.cqe_prev)
#define CIRCLEQ_EMPTY(head)      \
   (CIRCLEQ_FIRST(head) == CIRCLEQ_ENDC(head))

#define CIRCLEQ_LOOP_NEXT(head, elm, field)    \
 (((elm)->field.cqe_next == CIRCLEQ_ENDC(head))   \
     ? ((head)->cqh_first)     \
     : (elm->field.cqe_next))
#define CIRCLEQ_LOOP_PREV(head, elm, field)    \
 (((elm)->field.cqe_prev == CIRCLEQ_ENDC(head))   \
     ? ((head)->cqh_last)     \
     :
 (elm->field.cqe_prev))
#endif /* !_KERNEL */

#endif /* !_SYS_QUEUE_H_ */
#ifndef _SYS_CDEFS_H_
#define _SYS_CDEFS_H_

#warning usage of non-standard #include <sys/cdefs.h> is deprecated

#undef __P
#undef __PMT
```

```
#define __P(args) args
#define __PMT(args) args

#define __CONCAT(x,y) x ## y
#define __STRING(x) #x

#ifdef  __cplusplus
# define __BEGIN_DECLS extern "C" {
# define __END_DECLS }
#else
# define __BEGIN_DECLS
# define __END_DECLS
#endif

#if defined(__GNUC__) && !defined(__cplusplus)
# define __THROW __attribute__ ((__nothrow__))
# define __NTH(fct) __attribute__ ((__nothrow__)) fct
#else
# define __THROW
# define __NTH(fct)     fct
#endif

#endif /* _SYS_CDEFS_H_ */
# Contributor: Fabian Affolter <fabian@affolter-engineering.ch>
# Maintainer: Fabian Affolter <fabian@affolter-engineering.ch>
pkgname=py3-flake8-copyright
_pkgname=flake8-copyright
pkgver=0.2.4
pkgrel=3
pkgdesc="Extension for flake8 which checks for copyrights"
options="!check" # No testsuite
url="https://github.com/savoirfairelinux/flake8-copyright"
arch="noarch"
license="MIT"
depends="py3-flake8 py3-setuptools"
makedepends="py3-gpep517 py3-wheel"
subpackages="$pkgname-pyc"
source="https://files.pythonhosted.org/packages/source/${_pkgname:0:1}/$_pkgname/$_pkgname-$pkgver.tar.gz"
builddir="$srcdir"/$_pkgname-$pkgver

replaces="py-flake8-copyright"                  # Backwards compatibility
provides="py-flake8-copyright=$pkgver-r$pkgrel" # Backwards compatibility

build() {
 gpep517 build-wheel \
  --wheel-dir .dist \
  --output-fd 3 3>&1 >&2
}
```

```
package() {
 gpep517 install-wheel --destdir "$pkgdir" \
  .dist/*.whl
}

sha512sums="
a6ab47e1bb715618f075c51f398e18180404871b3b0faf1c2d30701d5203db6bc23771bf22ffb5bafcd8ee856b9b64237
b316bd503ae7dceed6ca284ccd5a74d
  flake8-copyright-0.2.4.tar.gz
"
```

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```
/* $NetBSD: tree.h,v 1.20 2013/09/14 13:20:45 joerg Exp $ */
/* $OpenBSD: tree.h,v 1.13 2011/07/09 00:19:45 pirofti Exp $ */
/* Modified by Void Linux. */
/*
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```

```
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*/

#ifndef _SYS_TREE_H_
#define _SYS_TREE_H_

#ifdef __GNUC__
#define __GNUC_PREREQ__(x, y)      \
 ((__GNUC__ == (x) && __GNUC_MINOR__ >= (y)) ||   \
  (__GNUC__ > (x)))
#else
#define __GNUC_PREREQ__(x, y) 0
#endif

#if __GNUC_PREREQ__(2, 7) || defined(__lint__)
#define _sys_tree_h_unused __attribute__((__unused__))
#else
#define _sys_tree_h_unused /* delete */
#endif

/*
* This file defines data structures for different types of trees:
* splay trees and red-black trees.
*
* A splay tree is a self-organizing
 data structure.  Every operation
* on the tree causes a splay to happen.  The splay moves the requested
* node to the root of the tree and partly rebalances it.
*
* This has the benefit that request locality causes faster lookups as
* the requested nodes move to the top of the tree.  On the other hand,
* every lookup causes memory writes.
*
* The Balance Theorem bounds the total access time for m operations
* and n inserts on an initially empty tree as O((m + n)lg n).  The
* amortized cost for a sequence of m accesses to a splay tree is O(lg n);
```

```
*
* A red-black tree is a binary search tree with the node color as an
* extra attribute.  It fulfills a set of conditions:
* - every search path from the root to a leaf consists of the
*   same number of black nodes,
* - each red node (except for the root) has a black parent,
* - each leaf node is black.
*
* Every operation on a red-black tree is bounded as O(lg n).
* The maximum height of a red-black tree is 2lg (n+1).
 */

#define SPLAY_HEAD(name, type)      \
struct name {       \
 struct type *sph_root; /* root of the tree */   \
}

#define SPLAY_INITIALIZER(root)     \
 { NULL }

#define SPLAY_INIT(root) do {      \
 (root)->sph_root = NULL;     \
} while (/*CONSTCOND*/ 0)

#define SPLAY_ENTRY(type)      \
struct {       \
 struct type *spe_left; /* left element */   \
 struct type *spe_right; /* right element */   \
}

#define SPLAY_LEFT(elm, field)  (elm)->field.spe_left
#define SPLAY_RIGHT(elm, field)  (elm)->field.spe_right
#define SPLAY_ROOT(head)  (head)->sph_root
#define SPLAY_EMPTY(head)  (SPLAY_ROOT(head) == NULL)

/* SPLAY_ROTATE_{LEFT,RIGHT} expect that tmp hold SPLAY_{RIGHT,LEFT} */
#define SPLAY_ROTATE_RIGHT(head, tmp, field) do {   \
 SPLAY_LEFT((head)->sph_root, field) = SPLAY_RIGHT(tmp, field); \
 SPLAY_RIGHT(tmp, field) = (head)->sph_root;   \
 (head)->sph_root = tmp;      \
} while (/*CONSTCOND*/ 0)

#define SPLAY_ROTATE_LEFT(head, tmp, field) do {   \
 SPLAY_RIGHT((head)->sph_root,
 field) = SPLAY_LEFT(tmp, field); \
 SPLAY_LEFT(tmp, field) = (head)->sph_root;   \
 (head)->sph_root = tmp;      \
} while (/*CONSTCOND*/ 0)
```

```
#define SPLAY_LINKLEFT(head, tmp, field) do {    \
 SPLAY_LEFT(tmp, field) = (head)->sph_root;   \
 tmp = (head)->sph_root;      \
 (head)->sph_root = SPLAY_LEFT((head)->sph_root, field);  \
} while (/*CONSTCOND*/ 0)

#define SPLAY_LINKRIGHT(head, tmp, field) do {    \
 SPLAY_RIGHT(tmp, field) = (head)->sph_root;   \
 tmp = (head)->sph_root;      \
 (head)->sph_root = SPLAY_RIGHT((head)->sph_root, field); \
} while (/*CONSTCOND*/ 0)

#define SPLAY_ASSEMBLE(head, node, left, right, field) do {  \
 SPLAY_RIGHT(left, field) = SPLAY_LEFT((head)->sph_root, field); \
 SPLAY_LEFT(right, field) = SPLAY_RIGHT((head)->sph_root, field);\
 SPLAY_LEFT((head)->sph_root, field) = SPLAY_RIGHT(node, field); \
 SPLAY_RIGHT((head)->sph_root, field) = SPLAY_LEFT(node, field); \
} while (/*CONSTCOND*/ 0)

/* Generates prototypes and inline functions */

#define
 SPLAY_PROTOTYPE(name, type, field, cmp)    \
void name##_SPLAY(struct name *, struct type *);   \
void name##_SPLAY_MINMAX(struct name *, int);    \
struct type *name##_SPLAY_INSERT(struct name *, struct type *);  \
struct type *name##_SPLAY_REMOVE(struct name *, struct type *);  \
        \
/* Finds the node with the same key as elm */    \
static __inline struct type *      \
name##_SPLAY_FIND(struct name *head, struct type *elm)   \
{        \
 if (SPLAY_EMPTY(head))      \
  return(NULL);      \
 name##_SPLAY(head, elm);     \
 if ((cmp)(elm, (head)->sph_root) == 0)    \
  return (head->sph_root);    \
 return (NULL);       \
}        \
        \
static __inline _sys_tree_h_unused struct type *   \
name##_SPLAY_NEXT(struct name *head, struct type *elm)   \
{        \
 name##_SPLAY(head, elm);     \
 if (SPLAY_RIGHT(elm, field) != NULL) {    \
  elm = SPLAY_RIGHT(elm, field);    \
  while (SPLAY_LEFT(elm, field) != NULL) {  \
```

```
   elm = SPLAY_LEFT(elm, field);   \
  }       \
 }
 else       \
  elm = NULL;      \
 return (elm);       \
}         \
         \
static _sys_tree_h_unused __inline struct type *   \
name##_SPLAY_MIN_MAX(struct name *head, int val)   \
{         \
 name##_SPLAY_MINMAX(head, val);     \
       return (SPLAY_ROOT(head));     \
}

/* Main splay operation.
* Moves node close to the key of elm to top
*/
#define SPLAY_GENERATE(name, type, field, cmp)    \
struct type *        \
name##_SPLAY_INSERT(struct name *head, struct type *elm)  \
{         \
   if (SPLAY_EMPTY(head)) {      \
     SPLAY_LEFT(elm, field) = SPLAY_RIGHT(elm, field) = NULL; \
   } else {        \
     int __comp;       \
     name##_SPLAY(head, elm);     \
     __comp = (cmp)(elm, (head)->sph_root);   \
     if(__comp < 0) {      \
      SPLAY_LEFT(elm, field) = SPLAY_LEFT((head)->sph_root, field);\
      SPLAY_RIGHT(elm, field) = (head)->sph_root;  \
      SPLAY_LEFT((head)->sph_root, field) = NULL;  \
     } else if (__comp > 0) {     \
      SPLAY_RIGHT(elm,
 field) = SPLAY_RIGHT((head)->sph_root, field);\
      SPLAY_LEFT(elm, field) = (head)->sph_root;  \
      SPLAY_RIGHT((head)->sph_root, field) = NULL; \
     } else       \
      return ((head)->sph_root);    \
   }         \
   (head)->sph_root = (elm);      \
   return (NULL);       \
}         \
         \
struct type *        \
name##_SPLAY_REMOVE(struct name *head, struct type *elm)  \
{         \
 struct type *__tmp;      \
```

```
 if (SPLAY_EMPTY(head))      \
  return (NULL);      \
 name##_SPLAY(head, elm);     \
 if ((cmp)(elm, (head)->sph_root) == 0) {   \
  if (SPLAY_LEFT((head)->sph_root, field) == NULL) { \
   (head)->sph_root = SPLAY_RIGHT((head)->sph_root, field);\
  } else {      \
   __tmp = SPLAY_RIGHT((head)->sph_root, field); \
   (head)->sph_root = SPLAY_LEFT((head)->sph_root, field);\
   name##_SPLAY(head, elm);   \
   SPLAY_RIGHT((head)->sph_root, field) = __tmp; \
  }       \
  return (elm);      \
 }        \
 return (NULL);       \
}         \
        \
void         \
name##_SPLAY(struct
 name *head, struct type *elm)   \
{         \
 struct type __node, *__left, *__right, *__tmp;   \
 int __comp;       \
\
 SPLAY_LEFT(&__node, field) = SPLAY_RIGHT(&__node, field) = NULL;\
 __left = __right = &__node;     \
\
 while ((__comp = (cmp)(elm, (head)->sph_root)) != 0) {  \
  if (__comp < 0) {     \
   __tmp = SPLAY_LEFT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if ((cmp)(elm, __tmp) < 0){   \
    SPLAY_ROTATE_RIGHT(head, __tmp, field); \
    if (SPLAY_LEFT((head)->sph_root, field) == NULL)\
     break;    \
   }      \
   SPLAY_LINKLEFT(head, __right, field);  \
  } else if (__comp > 0) {    \
   __tmp = SPLAY_RIGHT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if ((cmp)(elm, __tmp) > 0){   \
    SPLAY_ROTATE_LEFT(head, __tmp, field); \
    if (SPLAY_RIGHT((head)->sph_root, field) == NULL)\
     break;    \
   }      \
   SPLAY_LINKRIGHT(head, __left, field);  \
```

```
 }       \
 }       \
 SPLAY_ASSEMBLE(head,
 &__node, __left, __right, field);  \
}        \
        \
/* Splay with either the minimum or the maximum element   \
* Used to find minimum or maximum element in tree.   \
*/        \
void name##_SPLAY_MINMAX(struct name *head, int __comp) \
{        \
 struct type __node, *__left, *__right, *__tmp;   \
\
 SPLAY_LEFT(&__node, field) = SPLAY_RIGHT(&__node, field) = NULL;\
 __left = __right = &__node;     \
\
 while (1) {       \
  if (__comp < 0) {     \
   __tmp = SPLAY_LEFT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if (__comp < 0){    \
    SPLAY_ROTATE_RIGHT(head, __tmp, field); \
    if (SPLAY_LEFT((head)->sph_root, field) == NULL)\
     break;    \
   }      \
   SPLAY_LINKLEFT(head, __right, field);  \
  } else if (__comp > 0) {    \
   __tmp = SPLAY_RIGHT((head)->sph_root, field); \
   if (__tmp == NULL)    \
    break;     \
   if (__comp > 0) {    \
    SPLAY_ROTATE_LEFT(head, __tmp, field); \
    if (SPLAY_RIGHT((head)->sph_root,
 field) == NULL)\
     break;    \
   }      \
   SPLAY_LINKRIGHT(head, __left, field);  \
  }       \
 }       \
 SPLAY_ASSEMBLE(head, &__node, __left, __right, field);  \
}

#define SPLAY_NEGINF -1
#define SPLAY_INF 1

#define SPLAY_INSERT(name, x, y) name##_SPLAY_INSERT(x, y)
#define SPLAY_REMOVE(name, x, y) name##_SPLAY_REMOVE(x, y)
```

```
#define SPLAY_FIND(name, x, y)  name##_SPLAY_FIND(x, y)
#define SPLAY_NEXT(name, x, y)  name##_SPLAY_NEXT(x, y)
#define SPLAY_MIN(name, x)  (SPLAY_EMPTY(x) ? NULL \
    : name##_SPLAY_MIN_MAX(x, SPLAY_NEGINF))
#define SPLAY_MAX(name, x)  (SPLAY_EMPTY(x) ? NULL \
    : name##_SPLAY_MIN_MAX(x, SPLAY_INF))

#define SPLAY_FOREACH(x, name, head)    \
 for ((x) = SPLAY_MIN(name, head);   \
     (x) != NULL;     \
     (x) = SPLAY_NEXT(name, head, x))

/* Macros that define a red-black tree */
#define RB_HEAD(name, type)     \
struct name {       \
 struct type *rbh_root; /* root of the tree */   \
}

#define RB_INITIALIZER(root)     \
 {
 NULL }

#define RB_INIT(root) do {      \
 (root)->rbh_root = NULL;    \
} while (/*CONSTCOND*/ 0)

#define RB_BLACK 0
#define RB_RED  1
#define RB_ENTRY(type)      \
struct {       \
 struct type *rbe_left;  /* left element */  \
 struct type *rbe_right;  /* right element */  \
 struct type *rbe_parent; /* parent element */  \
 int rbe_color;   /* node color */  \
}

#define RB_LEFT(elm, field)  (elm)->field.rbe_left
#define RB_RIGHT(elm, field)  (elm)->field.rbe_right
#define RB_PARENT(elm, field)  (elm)->field.rbe_parent
#define RB_COLOR(elm, field)  (elm)->field.rbe_color
#define RB_ROOT(head)   (head)->rbh_root
#define RB_EMPTY(head)   (RB_ROOT(head) == NULL)

#define RB_SET(elm, parent, field) do {     \
 RB_PARENT(elm, field) = parent;     \
 RB_LEFT(elm, field) = RB_RIGHT(elm, field) = NULL;  \
 RB_COLOR(elm, field) = RB_RED;     \
} while (/*CONSTCOND*/ 0)
```

```
#define RB_SET_BLACKRED(black, red, field) do {    \
 RB_COLOR(black, field) = RB_BLACK;    \
 RB_COLOR(red, field)
 = RB_RED;     \
} while (/*CONSTCOND*/ 0)

#ifndef RB_AUGMENT
#define RB_AUGMENT(x) do {} while (/*CONSTCOND*/ 0)
#endif

#define RB_ROTATE_LEFT(head, elm, tmp, field) do {   \
 (tmp) = RB_RIGHT(elm, field);     \
 if ((RB_RIGHT(elm, field) = RB_LEFT(tmp, field)) != NULL) { \
  RB_PARENT(RB_LEFT(tmp, field), field) = (elm);  \
 }       \
 RB_AUGMENT(elm);      \
 if ((RB_PARENT(tmp, field) = RB_PARENT(elm, field)) != NULL) { \
  if ((elm) == RB_LEFT(RB_PARENT(elm, field), field)) \
   RB_LEFT(RB_PARENT(elm, field), field) = (tmp); \
  else      \
   RB_RIGHT(RB_PARENT(elm, field), field) = (tmp); \
 } else       \
  (head)->rbh_root = (tmp);    \
 RB_LEFT(tmp, field) = (elm);     \
 RB_PARENT(elm, field) = (tmp);     \
 RB_AUGMENT(tmp);      \
 if ((RB_PARENT(tmp, field)))     \
  RB_AUGMENT(RB_PARENT(tmp, field));   \
} while (/*CONSTCOND*/ 0)

#define RB_ROTATE_RIGHT(head, elm, tmp, field) do {   \
 (tmp) = RB_LEFT(elm, field);     \
 if ((RB_LEFT(elm, field) = RB_RIGHT(tmp, field))
 != NULL) { \
  RB_PARENT(RB_RIGHT(tmp, field), field) = (elm);  \
 }       \
 RB_AUGMENT(elm);      \
 if ((RB_PARENT(tmp, field) = RB_PARENT(elm, field)) != NULL) { \
  if ((elm) == RB_LEFT(RB_PARENT(elm, field), field)) \
   RB_LEFT(RB_PARENT(elm, field), field) = (tmp); \
  else      \
   RB_RIGHT(RB_PARENT(elm, field), field) = (tmp); \
 } else       \
  (head)->rbh_root = (tmp);    \
 RB_RIGHT(tmp, field) = (elm);     \
 RB_PARENT(elm, field) = (tmp);     \
 RB_AUGMENT(tmp);      \
```

```
 if ((RB_PARENT(tmp, field)))     \
  RB_AUGMENT(RB_PARENT(tmp, field));   \
} while (/*CONSTCOND*/ 0)

/* Generates prototypes and inline functions */
#define RB_PROTOTYPE(name, type, field, cmp)    \
 RB_PROTOTYPE_INTERNAL(name, type, field, cmp,)
#define RB_PROTOTYPE_STATIC(name, type, field, cmp)   \
 RB_PROTOTYPE_INTERNAL(name, type, field, cmp, _sys_tree_h_unused static)
#define RB_PROTOTYPE_INTERNAL(name, type, field, cmp, attr)  \
attr void name##_RB_INSERT_COLOR(struct name *, struct
 type *);  \
attr void name##_RB_REMOVE_COLOR(struct name *, struct type *, struct type *);\
attr struct type *name##_RB_REMOVE(struct name *, struct type *); \
attr struct type *name##_RB_INSERT(struct name *, struct type *); \
attr struct type *name##_RB_FIND(struct name *, struct type *);  \
attr struct type *name##_RB_NFIND(struct name *, struct type *); \
attr struct type *name##_RB_NEXT(struct type *);   \
attr struct type *name##_RB_PREV(struct type *);   \
attr struct type *name##_RB_MINMAX(struct name *, int);   \
        \

/* Main rb operation.
* Moves node close to the key of elm to top
*/
#define RB_GENERATE(name, type, field, cmp)    \
 RB_GENERATE_INTERNAL(name, type, field, cmp,)
#define RB_GENERATE_STATIC(name, type, field, cmp)   \
 RB_GENERATE_INTERNAL(name, type, field, cmp, _sys_tree_h_unused static)
#define RB_GENERATE_INTERNAL(name, type, field, cmp, attr)  \
attr void       \
name##_RB_INSERT_COLOR(struct name *head, struct type *elm)  \
{       \
 struct type
 *parent, *gparent, *tmp;    \
 while ((parent = RB_PARENT(elm, field)) != NULL &&  \
     RB_COLOR(parent, field) == RB_RED) {   \
  gparent = RB_PARENT(parent, field);   \
  if (parent == RB_LEFT(gparent, field)) {  \
   tmp = RB_RIGHT(gparent, field);   \
   if (tmp && RB_COLOR(tmp, field) == RB_RED) { \
    RB_COLOR(tmp, field) = RB_BLACK; \
    RB_SET_BLACKRED(parent, gparent, field);\
    elm = gparent;    \
    continue;    \
   }      \
   if (RB_RIGHT(parent, field) == elm) {  \
    RB_ROTATE_LEFT(head, parent, tmp, field);\
```

```
    tmp = parent;    \
    parent = elm;    \
    elm = tmp;    \
   }      \
   RB_SET_BLACKRED(parent, gparent, field); \
   RB_ROTATE_RIGHT(head, gparent, tmp, field); \
  } else {      \
   tmp = RB_LEFT(gparent, field);   \
   if (tmp && RB_COLOR(tmp, field) == RB_RED) { \
    RB_COLOR(tmp, field) = RB_BLACK; \
    RB_SET_BLACKRED(parent, gparent, field);\
    elm = gparent;    \
    continue;    \
   }      \
   if (RB_LEFT(parent, field) == elm)
  {  \
    RB_ROTATE_RIGHT(head, parent, tmp, field);\
    tmp = parent;    \
    parent = elm;    \
    elm = tmp;    \
   }      \
   RB_SET_BLACKRED(parent, gparent, field); \
   RB_ROTATE_LEFT(head, gparent, tmp, field); \
  }       \
 }       \
 RB_COLOR(head->rbh_root, field) = RB_BLACK;   \
}        \
        \
attr void        \
name##_RB_REMOVE_COLOR(struct name *head, struct type *parent, struct type *elm) \
{        \
 struct type *tmp;      \
 while ((elm == NULL || RB_COLOR(elm, field) == RB_BLACK) && \
     elm != RB_ROOT(head)) {     \
  if (RB_LEFT(parent, field) == elm) {    \
   tmp = RB_RIGHT(parent, field);   \
   if (RB_COLOR(tmp, field) == RB_RED) {  \
    RB_SET_BLACKRED(tmp, parent, field); \
    RB_ROTATE_LEFT(head, parent, tmp, field);\
    tmp = RB_RIGHT(parent, field);  \
   }      \
   if ((RB_LEFT(tmp, field) == NULL ||  \
       RB_COLOR(RB_LEFT(tmp, field), field) == RB_BLACK) &&\
       (RB_RIGHT(tmp, field) == NULL ||  \
       RB_COLOR(RB_RIGHT(tmp,
 field), field) == RB_BLACK)) {\
    RB_COLOR(tmp, field) = RB_RED;  \
    elm = parent;    \
```

```
 parent = RB_PARENT(elm, field);  \
 } else {     \
 if (RB_RIGHT(tmp, field) == NULL || \
     RB_COLOR(RB_RIGHT(tmp, field), field) == RB_BLACK) {\
  struct type *oleft;  \
  if ((oleft = RB_LEFT(tmp, field)) \
      != NULL)   \
   RB_COLOR(oleft, field) = RB_BLACK;\
  RB_COLOR(tmp, field) = RB_RED; \
  RB_ROTATE_RIGHT(head, tmp, oleft, field);\
  tmp = RB_RIGHT(parent, field); \
  }     \
 RB_COLOR(tmp, field) = RB_COLOR(parent, field);\
 RB_COLOR(parent, field) = RB_BLACK; \
 if (RB_RIGHT(tmp, field))  \
  RB_COLOR(RB_RIGHT(tmp, field), field) = RB_BLACK;\
 RB_ROTATE_LEFT(head, parent, tmp, field);\
 elm = RB_ROOT(head);   \
 break;     \
 }      \
} else {      \
 tmp = RB_LEFT(parent, field);   \
 if (RB_COLOR(tmp, field) == RB_RED) {  \
  RB_SET_BLACKRED(tmp, parent, field); \
  RB_ROTATE_RIGHT(head, parent, tmp, field);\
  tmp
= RB_LEFT(parent, field);  \
 }      \
 if ((RB_LEFT(tmp, field) == NULL ||  \
     RB_COLOR(RB_LEFT(tmp, field), field) == RB_BLACK) &&\
     (RB_RIGHT(tmp, field) == NULL ||  \
     RB_COLOR(RB_RIGHT(tmp, field), field) == RB_BLACK)) {\
  RB_COLOR(tmp, field) = RB_RED;  \
  elm = parent;    \
  parent = RB_PARENT(elm, field);  \
 } else {     \
 if (RB_LEFT(tmp, field) == NULL || \
     RB_COLOR(RB_LEFT(tmp, field), field) == RB_BLACK) {\
  struct type *oright;  \
  if ((oright = RB_RIGHT(tmp, field)) \
      != NULL)   \
   RB_COLOR(oright, field) = RB_BLACK;\
  RB_COLOR(tmp, field) = RB_RED; \
  RB_ROTATE_LEFT(head, tmp, oright, field);\
  tmp = RB_LEFT(parent, field); \
  }     \
 RB_COLOR(tmp, field) = RB_COLOR(parent, field);\
 RB_COLOR(parent, field) = RB_BLACK; \
```

```
    if (RB_LEFT(tmp, field))  \
     RB_COLOR(RB_LEFT(tmp, field), field) = RB_BLACK;\
    RB_ROTATE_RIGHT(head, parent, tmp, field);\
    elm = RB_ROOT(head);   \
    break;     \
   }      \
  }       \
 }       \
 if
 (elm)       \
  RB_COLOR(elm, field) = RB_BLACK;   \
}        \
        \
attr struct type *       \
name##_RB_REMOVE(struct name *head, struct type *elm)   \
{        \
 struct type *child, *parent, *old = elm;   \
 int color;       \
 if (RB_LEFT(elm, field) == NULL)    \
  child = RB_RIGHT(elm, field);    \
 else if (RB_RIGHT(elm, field) == NULL)    \
  child = RB_LEFT(elm, field);    \
 else {        \
  struct type *left;     \
  elm = RB_RIGHT(elm, field);    \
  while ((left = RB_LEFT(elm, field)) != NULL)  \
   elm = left;     \
  child = RB_RIGHT(elm, field);    \
  parent = RB_PARENT(elm, field);    \
  color = RB_COLOR(elm, field);    \
  if (child)      \
   RB_PARENT(child, field) = parent;  \
  if (parent) {      \
   if (RB_LEFT(parent, field) == elm)  \
    RB_LEFT(parent, field) = child;  \
   else      \
    RB_RIGHT(parent, field) = child; \
   RB_AUGMENT(parent);    \
  } else       \
   RB_ROOT(head)
 = child;    \
  if (RB_PARENT(elm, field) == old)   \
   parent = elm;     \
  (elm)->field = (old)->field;    \
  if (RB_PARENT(old, field)) {    \
   if (RB_LEFT(RB_PARENT(old, field), field) == old)\
    RB_LEFT(RB_PARENT(old, field), field) = elm;\
   else      \
```

```
    RB_RIGHT(RB_PARENT(old, field), field) = elm;\
   RB_AUGMENT(RB_PARENT(old, field));  \
  } else       \
   RB_ROOT(head) = elm;    \
  RB_PARENT(RB_LEFT(old, field), field) = elm;  \
  if (RB_RIGHT(old, field))    \
   RB_PARENT(RB_RIGHT(old, field), field) = elm; \
  if (parent) {      \
   left = parent;     \
   do {      \
    RB_AUGMENT(left);   \
   } while ((left = RB_PARENT(left, field)) != NULL); \
  }       \
  goto color;      \
 }        \
 parent = RB_PARENT(elm, field);     \
 color = RB_COLOR(elm, field);     \
 if (child)       \
  RB_PARENT(child, field) = parent;   \
 if (parent) {       \
  if (RB_LEFT(parent, field) == elm)   \
   RB_LEFT(parent, field) = child;   \
  else       \
   RB_RIGHT(parent,
 field) = child;  \
  RB_AUGMENT(parent);     \
 } else       \
  RB_ROOT(head) = child;     \
color:         \
 if (color == RB_BLACK)      \
  name##_RB_REMOVE_COLOR(head, parent, child);  \
 return (old);       \
}         \
        \
/* Inserts a node into the RB tree */     \
attr struct type *       \
name##_RB_INSERT(struct name *head, struct type *elm)   \
{         \
 struct type *tmp;      \
 struct type *parent = NULL;     \
 int comp = 0;       \
 tmp = RB_ROOT(head);      \
 while (tmp) {       \
  parent = tmp;      \
  comp = (cmp)(elm, parent);    \
  if (comp < 0)      \
   tmp = RB_LEFT(tmp, field);   \
  else if (comp > 0)     \
```

```
  tmp = RB_RIGHT(tmp, field);   \
 else       \
  return (tmp);     \
 }        \
 RB_SET(elm, parent, field);     \
 if (parent != NULL) {       \
  if (comp < 0)       \
   RB_LEFT(parent, field) = elm;   \
  else       \
   RB_RIGHT(parent, field) = elm;   \
  RB_AUGMENT(parent);     \
 } else       \
  RB_ROOT(head) = elm;     \
 name##_RB_INSERT_COLOR(head,
 elm);    \
 return (NULL);       \
}        \
        \
/* Finds the node with the same key as elm */    \
attr struct type *       \
name##_RB_FIND(struct name *head, struct type *elm)   \
{        \
 struct type *tmp = RB_ROOT(head);    \
 int comp;       \
 while (tmp) {       \
  comp = cmp(elm, tmp);     \
  if (comp < 0)       \
   tmp = RB_LEFT(tmp, field);   \
  else if (comp > 0)     \
   tmp = RB_RIGHT(tmp, field);   \
  else       \
   return (tmp);     \
 }        \
 return (NULL);       \
}        \
        \
/* Finds the first node greater than or equal to the search key */ \
attr struct type *       \
name##_RB_NFIND(struct name *head, struct type *elm)   \
{        \
 struct type *tmp = RB_ROOT(head);    \
 struct type *res = NULL;     \
 int comp;       \
 while (tmp) {       \
  comp = cmp(elm, tmp);     \
  if (comp < 0) {       \
   res = tmp;     \
   tmp = RB_LEFT(tmp, field);   \
```

```
 }      \
 else if (comp > 0)    \
  tmp =
 RB_RIGHT(tmp, field);   \
 else      \
  return (tmp);    \
 }       \
 return (res);      \
}        \
       \
/* ARGSUSED */       \
attr struct type *      \
name##_RB_NEXT(struct type *elm)    \
{        \
 if (RB_RIGHT(elm, field)) {    \
  elm = RB_RIGHT(elm, field);   \
  while (RB_LEFT(elm, field))   \
   elm = RB_LEFT(elm, field);   \
 } else {      \
  if (RB_PARENT(elm, field) &&   \
     (elm == RB_LEFT(RB_PARENT(elm, field), field))) \
   elm = RB_PARENT(elm, field);   \
  else {      \
   while (RB_PARENT(elm, field) &&   \
      (elm == RB_RIGHT(RB_PARENT(elm, field), field)))\
    elm = RB_PARENT(elm, field);  \
   elm = RB_PARENT(elm, field);   \
  }      \
 }       \
 return (elm);      \
}        \
       \
/* ARGSUSED */       \
attr struct type *      \
name##_RB_PREV(struct type *elm)    \
{        \
 if (RB_LEFT(elm, field)) {    \
  elm = RB_LEFT(elm, field);   \
  while (RB_RIGHT(elm, field))   \
   elm = RB_RIGHT(elm, field);   \
 }
 else {      \
  if (RB_PARENT(elm, field) &&   \
     (elm == RB_RIGHT(RB_PARENT(elm, field), field))) \
   elm = RB_PARENT(elm, field);   \
  else {      \
   while (RB_PARENT(elm, field) &&   \
      (elm == RB_LEFT(RB_PARENT(elm, field), field)))\
```

```
    elm = RB_PARENT(elm, field);  \
   elm = RB_PARENT(elm, field);   \
  }       \
 }       \
 return (elm);       \
}        \
        \
attr struct type *       \
name##_RB_MINMAX(struct name *head, int val)    \
{        \
 struct type *tmp = RB_ROOT(head);    \
 struct type *parent = NULL;     \
 while (tmp) {       \
  parent = tmp;      \
  if (val < 0)      \
   tmp = RB_LEFT(tmp, field);   \
  else       \
   tmp = RB_RIGHT(tmp, field);   \
 }       \
 return (parent);      \
}

#define RB_NEGINF -1
#define RB_INF 1

#define RB_INSERT(name, x, y) name##_RB_INSERT(x, y)
#define RB_REMOVE(name, x, y) name##_RB_REMOVE(x, y)
#define RB_FIND(name, x, y) name##_RB_FIND(x, y)
#define RB_NFIND(name, x, y) name##_RB_NFIND(x,
 y)
#define RB_NEXT(name, x, y) name##_RB_NEXT(y)
#define RB_PREV(name, x, y) name##_RB_PREV(y)
#define RB_MIN(name, x)  name##_RB_MINMAX(x, RB_NEGINF)
#define RB_MAX(name, x)  name##_RB_MINMAX(x, RB_INF)

#define RB_FOREACH(x, name, head)     \
 for ((x) = RB_MIN(name, head);     \
      (x) != NULL;      \
      (x) = name##_RB_NEXT(x))

#define RB_FOREACH_FROM(x, name, y)     \
 for ((x) = (y);       \
     ((x) != NULL) && ((y) = name##_RB_NEXT(x), (x) != NULL); \
      (x) = (y))

#define RB_FOREACH_SAFE(x, name, head, y)    \
 for ((x) = RB_MIN(name, head);     \
     ((x) != NULL) && ((y) = name##_RB_NEXT(x), (x) != NULL); \
```

```
     (x) = (y))

#define RB_FOREACH_REVERSE(x, name, head)    \
 for ((x) = RB_MAX(name, head);     \
     (x) != NULL;      \
     (x) = name##_RB_PREV(x))

#define RB_FOREACH_REVERSE_FROM(x, name, y)    \
 for ((x) = (y);       \
    ((x) != NULL) && ((y) = name##_RB_PREV(x), (x) != NULL); \
     (x) = (y))

#define RB_FOREACH_REVERSE_SAFE(x, name,
 head, y)   \
 for ((x) = RB_MAX(name, head);     \
    ((x) != NULL) && ((y) = name##_RB_PREV(x), (x) != NULL); \
     (x) = (y))

#endif /* _SYS_TREE_H_ */
# Contributor: Wen Heping <wenhepingalpine@sohu.com>
# Maintainer: Wen Heping <wenhepingalpine@sohu.com>
pkgname=perl-software-license
pkgver=0.104007
pkgrel=0
# _pkgreal is used by apkbuild-cpan to find modules at MetaCpan
_pkgreal=Software-License
pkgdesc="packages that provide templated software licenses"
url="https://metacpan.org/release/Software-License/"
arch="noarch"
license="GPL-1.0-or-later OR Artistic-1.0-Perl"
depends="perl perl-data-section perl-text-template"
checkdepends="perl-try-tiny"
subpackages="$pkgname-doc"
source="https://cpan.metacpan.org/authors/id/L/LE/LEONT/Software-License-$pkgver.tar.gz"
builddir="$srcdir/$_pkgreal-$pkgver"

build() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 PERL_MM_USE_DEFAULT=1 perl -I. Makefile.PL \
  INSTALLDIRS=vendor \
  NO_PACKLIST=1 \
  NO_PERLLOCAL=1
 make
}

check() {
 export CFLAGS=$(perl -MConfig -E 'say $Config{ccflags}')
 make test
```

```
}

package() {
 make DESTDIR="$pkgdir" install
}

sha512sums="
12d75e9583b3013d9b4a282467f1ac80ab6b7f3251926d66591d01404489b528f22adc396dfd4528a0f0ca650f0eed6d
9c959e69eace2169c6ed1cfffe5277e4
  Software-License-0.104007.tar.gz
"
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# Contributor: Dhruvin Gandhi <contact@dhru.vin>
# Maintainer: Patrycja Rosa <alpine@ptrcnull.me>
pkgname=py3-license-expression
_pkgname=license_expression
pkgver=30.4.4
pkgrel=0
pkgdesc="Library to parse, compare, simplify and normalize license expressions"
url="https://github.com/nexB/license-expression"
arch="noarch"
license="Apache-2.0"
depends="python3 py3-boolean.py"
makedepends="py3-setuptools py3-setuptools_scm py3-gpep517 py3-wheel"
checkdepends="py3-pytest py3-pytest-xdist"
subpackages="$pkgname-pyc"
```

```
source="https://files.pythonhosted.org/packages/source/l/$_pkgname/$_pkgname-$pkgver.tar.gz"
builddir="$srcdir/$_pkgname-$pkgver"

build() {
 gpep517 build-wheel \
  --wheel-dir .dist \
  --output-fd 3 3>&1 >&2
}

check() {
 python3 -m venv --clear --without-pip --system-site-packages .testenv
 .testenv/bin/python3 -m installer .dist/*.whl
 .testenv/bin/python3 -m pytest
}

package() {
 python3 -m installer -d "$pkgdir" \
  .dist/*.whl
}

sha512sums="
f46dd4cf524b3962115fe26f5545bfdd6767275b482724af51e7ca07da79244969a3bfc5d2fd5b95bc0f19d1b95a26a8f3
ab36c676e56ec302178d7166588066
  license_expression-30.4.4.tar.gz
"
```

1.764 gnupg 2.2.27-3ubuntu2.5

1.764.1 Available under license :

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#+STARTUP: showall

* DNS resolver (dirmngr/dns.c)

dns.c - Recursive, Reentrant DNS Resolver.

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* Regular
expression support

regexp/jimregexp.[ch]:

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Subsequently modified by:

1986 John Gilmore hoptoad!gnu
1987 James A. Woods ames!jaw
1993 Christopher Seiwald seiwald@vix.com
2000, 2002 Christopher Seiwald <seiwald@perforce.com>
2010 Steve Bennett <steveb@workware.net.au>
2020 NIIBE Yutaka <gniibe@fsij.org>

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regexp/utf8.[ch] (see regexp/LICENSE):

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1.765 libtasn 4.18.0-4ubuntu0.2

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That's all there is to it!
/* Extract the last component (base name) of a file name.

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#ifndef _BASENAME_LGPL_H
#define _BASENAME_LGPL_H

#include <stddef.h>

#ifndef DOUBLE_SLASH_IS_DISTINCT_ROOT
define DOUBLE_SLASH_IS_DISTINCT_ROOT 0
#endif

#ifdef __cplusplus
extern "C" {
#endif

/*
 Return the address of the last file name component of FILENAME.
  If FILENAME has some trailing slash(es), they are considered to be

```
  part of the last component.
  If FILENAME has no relative file name components because it is a file
  system root, return the empty string.
  Examples:
          FILENAME      RESULT
          "foo.c"       "foo.c"
          "foo/bar.c"   "bar.c"
          "/foo/bar.c"  "bar.c"
          "foo/bar/"    "bar/"
          "foo/bar//"   "bar//"
          "/"           ""
          "//"          ""
          ""            ""
  The return value is a tail of the given FILENAME; do NOT free() it!  */

/* This function was traditionally called 'basename', but we avoid this
  function name because
    * Various platforms have different functions in their libc.
      In particular, the glibc basename(), defined in <string.h>, does
      not consider trailing slashes to be part of the component:
          FILENAME
      RESULT
          "foo/bar/"    ""
          "foo/bar//"   ""
    * The 'basename' command eliminates trailing slashes and for a root
      produces a non-empty result:
          FILENAME      RESULT
          "foo/bar/"    "bar"
          "foo/bar//"   "bar"
          "/"           "/"
          "//"          "/"
*/
extern char *last_component (char const *filename) _GL_ATTRIBUTE_PURE;

/* Return the length of the basename FILENAME.
  Typically FILENAME is the value returned by base_name or last_component.
  Act like strlen (FILENAME), except omit all trailing slashes.  */
extern size_t base_len (char const *filename) _GL_ATTRIBUTE_PURE;



#ifdef __cplusplus
} /* extern "C" */
#endif

#endif /* _BASENAME_LGPL_H */
```

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version 0.1
##
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