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1.334 gyp-next 0.16.1

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1.338 graceful-fs 4.2.11

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1.339 ignore-walk 6.0.5

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1.340 @tufjs/canonical-json 2.0.0

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1.342 @types/connect 3.4.38

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1.347 bluebird 3.7.2

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1.348 dunder-proto 1.0.1

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1.349 @npmcli/query 3.1.0

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1.356 prom-client 12.0.0

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1.357 sensible-utils 0.0.17

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1.358 @apidevtools/openapi-schemas 2.1.0

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1.359 fs.realpath 1.0.0

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1.360 write-file-atomic 5.0.1

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1.361 side-channel-list 1.0.0

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1.362 @sigstore/sign 2.3.2

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1.363 cookie-signature 1.0.6

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1.364 tiny-relative-date 1.3.0

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1.388 chownr 2.0.0
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1.389 @tufjs/models 2.0.1
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1.390 base-passwd 3.5.52build1
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1.391 methods 1.1.2
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1.2 expat 2.4.7

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1.3 tdb 1.46.5

1.3.1 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
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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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     ** 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>.

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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Upstream Author: Theodore Ts'o <tytso@mit.edu>

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This is the Debian GNU/Linux prepackaged version of the ss command-line interface parsing library. It is currently distributed together with the EXT2 file system utilities, which are otherwise packaged as "e2fsprogs".

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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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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1.4 glibc 2.27-3ubuntu1.6

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1.6 libcap 2.44

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1.12 crc 3.8.0

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1.13 sysv-init 3.01-1ubuntu1

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1.14 kerberos 1.19.2-2ubuntu0.7

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cmd/krb5/iprop/iprop_hdr.h
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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
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lib/libgss/g_acquire_cred.c
lib/libgss/g_canon_name.c
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lib/libgss/g_dsp_status.c
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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_canon_name.c
lib/gssapi/mechglue/g_compare_name.c
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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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1.24 bunyan-format 0.2.1

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1.27 buffer 5.7.1

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1.28 @apidevtools/json-schema-ref-parser 9.0.9

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1.29 encodeurl 2.0.0

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1.30 balanced-match 1.0.2

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1.31 side-channel-weakmap 1.0.2

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1.32 cookie-parser 1.4.6

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1.33 buffer 4.9.2

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1.34 1to2 1.0.0

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1.35 ncurses 6.3-2ubuntu0.1

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-- vile: txtmode file-encoding=utf-8

1.36 glob 10.4.2

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1.37 tar 6.2.1

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1.38 supports-color 5.5.0

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1.39 events 1.1.1

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1.40 path-is-absolute 1.0.1

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1.41 rimraf 2.4.5

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1.43 commander 6.2.0

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1.44 referrer-policy 1.2.0

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1.45 bytes 3.1.2

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1.46 ncp 2.0.0

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1.47 exponential-backoff 3.1.1

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1.48 clean-stack 2.2.0

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1.49 gmp 2:6.2.1+dfsg-3ubuntu1

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Version 3, 29 June 2007

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This gmp package was built for Debian by

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1.58 side-channel-map 1.0.1

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```
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    ],
    "members": {
     "ResourceArn": {},
     "MaxResults": {
      "type": "integer"
     },
     "NextToken": {}
    }
   },
   "output": {
    "type": "structure",
    "members": {
     "LicenseSpecifications": {
      "shape": "S4d"
     },
     "NextToken":
{}
    }
   }
  },
  "ListLicenseVersions": {
   "input": {
    "type": "structure",
    "required": [
     "LicenseArn"
    ],
    "members": {
     "LicenseArn": {},
     "NextToken": {},
     "MaxResults": {
      "type": "integer"
     }
    }
   },
   "output": {
    "type": "structure",
    "members": {
     "Licenses": {
      "shape": "S4h"
     },
```

```
      "NextToken": {}
    }
   }
  },
  "ListLicenses": {
   "input": {
    "type": "structure",
    "members": {
     "LicenseArns": {
      "shape": "S1u"
     },
     "Filters": {
      "shape": "S3n"
     },
     "NextToken": {},
     "MaxResults": {
      "type": "integer"
     }
    }
   },
   "output": {
    "type": "structure",
    "members": {
     "Licenses": {
      "shape": "S4h"
     },
     "NextToken": {}

    }
   }
  },
  "ListReceivedGrants": {
   "input": {
    "type": "structure",
    "members": {
     "GrantArns": {
      "shape": "S1u"
     },
     "Filters": {
      "shape": "S3n"
     },
     "NextToken": {},
     "MaxResults": {
      "type": "integer"
     }
    }
   },
   "output": {
```

```
    "type": "structure",
    "members": {
      "Grants": {
        "shape": "S3u"
      },
      "NextToken": {}
    }
  }
},
"ListReceivedLicenses": {
  "input": {
    "type": "structure",
    "members": {
      "LicenseArns": {
        "shape": "S1u"
      },
      "Filters": {
        "shape": "S3n"
      },
      "NextToken": {},
      "MaxResults": {
        "type": "integer"
      }
    }
  },
  "output": {
    "type": "structure",
    "members": {
      "Licenses": {
        "type": "list",
        "member": {
          "type": "structure",
          "members": {
            "LicenseArn": {},
            "LicenseName": {},
            "ProductName": {},
            "ProductSKU": {},
            "Issuer": {
              "shape": "S2t"
            },
            "HomeRegion": {},
            "Status": {},
            "Validity": {
              "shape": "Sw"
            },
            "Beneficiary": {},
            "Entitlements": {
              "shape": "Sx"
```

```
            },
            "ConsumptionConfiguration": {
              "shape": "S12"
            },
            "LicenseMetadata": {
              "shape": "Sd"
            },
            "CreateTime": {},
            "Version": {},
            "ReceivedMetadata": {
              "type": "structure",
              "members": {
                "ReceivedStatus": {},
                "ReceivedStatusReason":
{},
                "AllowedOperations": {
                  "shape": "So"
                }
              }
            }
          }
        },
        "NextToken": {}
      }
    }
  },
  "ListResourceInventory": {
    "input": {
      "type": "structure",
      "members": {
        "MaxResults": {
          "type": "integer"
        },
        "NextToken": {},
        "Filters": {
          "type": "list",
          "member": {
            "type": "structure",
            "required": [
              "Name",
              "Condition"
            ],
            "members": {
              "Name": {},
              "Condition": {},
              "Value": {}
            }
```

```
        }
       }
      }
     },
     "output": {
      "type": "structure",
      "members": {
       "ResourceInventoryList": {
        "type": "list",
        "member": {

"type": "structure",
          "members": {
           "ResourceId": {},
           "ResourceType": {},
           "ResourceArn": {},
           "Platform": {},
           "PlatformVersion": {},
           "ResourceOwningAccountId": {}
          }
         }
        },
        "NextToken": {}
      }
     }
    },
    "ListTagsForResource": {
     "input": {
      "type": "structure",
      "required": [
       "ResourceArn"
      ],
      "members": {
       "ResourceArn": {}
      }
     },
     "output": {
      "type": "structure",
      "members": {
       "Tags": {
        "shape": "S1d"
       }
      }
     }
    },
    "ListTokens": {
     "input": {
      "type": "structure",
```

```
      "members": {
        "TokenIds": {
          "shape": "S1c"
        },
        "Filters": {
          "shape": "S3n"
        },
        "NextToken": {},
        "MaxResults": {
          "type":
"integer"
        }
      }
    },
    "output": {
      "type": "structure",
      "members": {
        "Tokens": {
          "type": "list",
          "member": {
            "type": "structure",
            "members": {
              "TokenId": {},
              "TokenType": {},
              "LicenseArn": {},
              "ExpirationTime": {},
              "TokenProperties": {
                "shape": "S23"
              },
              "RoleArns": {
                "shape": "S1u"
              },
              "Status": {}
            }
          }
        },
        "NextToken": {}
      }
    }
  },
  "ListUsageForLicenseConfiguration": {
    "input": {
      "type": "structure",
      "required": [
        "LicenseConfigurationArn"
      ],
      "members": {
        "LicenseConfigurationArn": {},
```

```
      "MaxResults": {
        "type": "integer"
      },
      "NextToken": {},

    "Filters": {
        "shape": "S40"
      }
    }
  },
  "output": {
    "type": "structure",
    "members": {
      "LicenseConfigurationUsageList": {
        "type": "list",
        "member": {
          "type": "structure",
          "members": {
            "ResourceArn": {},
            "ResourceType": {},
            "ResourceStatus": {},
            "ResourceOwnerId": {},
            "AssociationTime": {
              "type": "timestamp"
            },
            "ConsumedLicenses": {
              "type": "long"
            }
          }
        }
      },
      "NextToken": {}
    }
  }
},
"RejectGrant": {
  "input": {
    "type": "structure",
    "required": [
      "GrantArn"
    ],
    "members": {
      "GrantArn": {}
    }
  },
  "output": {
    "type": "structure",
    "members": {
```

```
      "GrantArn":
{},
      "Status": {},
      "Version": {}
     }
    }
   },
   "TagResource": {
    "input": {
     "type": "structure",
     "required": [
      "ResourceArn",
      "Tags"
     ],
     "members": {
      "ResourceArn": {},
      "Tags": {
       "shape": "S1d"
      }
     }
    },
    "output": {
     "type": "structure",
     "members": {}
    }
   },
   "UntagResource": {
    "input": {
     "type": "structure",
     "required": [
      "ResourceArn",
      "TagKeys"
     ],
     "members": {
      "ResourceArn": {},
      "TagKeys": {
       "type": "list",
       "member": {}
      }
     }
    },
    "output": {
     "type": "structure",
     "members": {}
    }
   },
   "UpdateLicenseConfiguration": {
    "input": {
```

```
      "type": "structure",
      "required": [
        "LicenseConfigurationArn"
      ],
      "members": {

     "LicenseConfigurationArn": {},
        "LicenseConfigurationStatus": {},
        "LicenseRules": {
          "shape": "S1c"
        },
        "LicenseCount": {
          "type": "long"
        },
        "LicenseCountHardLimit": {
          "type": "boolean"
        },
        "Name": {},
        "Description": {},
        "ProductInformationList": {
          "shape": "S1f"
        },
        "DisassociateWhenNotFound": {
          "type": "boolean"
        }
      }
    },
    "output": {
      "type": "structure",
      "members": {}
    }
  },
  "UpdateLicenseManagerReportGenerator": {
    "input": {
      "type": "structure",
      "required": [
        "LicenseManagerReportGeneratorArn",
        "ReportGeneratorName",
        "Type",
        "ReportContext",
        "ReportFrequency",
        "ClientToken"
      ],
      "members": {
        "LicenseManagerReportGeneratorArn": {},
        "ReportGeneratorName":
{},
        "Type": {
```

```
        "shape": "S1r"
       },
       "ReportContext": {
        "shape": "S1t"
       },
       "ReportFrequency": {
        "shape": "S1v"
       },
       "ClientToken": {},
       "Description": {}
      }
     },
     "output": {
      "type": "structure",
      "members": {}
     }
    },
    "UpdateLicenseSpecificationsForResource": {
     "input": {
      "type": "structure",
      "required": [
       "ResourceArn"
      ],
      "members": {
       "ResourceArn": {},
       "AddLicenseSpecifications": {
        "shape": "S4d"
       },
       "RemoveLicenseSpecifications": {
        "shape": "S4d"
       }
      }
     },
     "output": {
      "type": "structure",
      "members": {}
     }
    },
    "UpdateServiceSettings": {
     "input": {
      "type": "structure",
      "members": {
       "S3BucketArn": {},
       "SnsTopicArn": {},
        "OrganizationConfiguration": {
        "shape": "S3h"
       },
       "EnableCrossAccountsDiscovery": {
```

```
          "type": "boolean"
        }
      }
    },
    "output": {
      "type": "structure",
      "members": {}
    }
  }
},
"shapes": {
  "S9": {
    "type": "list",
    "member": {
      "type": "structure",
      "required": [
        "Name",
        "Unit"
      ],
      "members": {
        "Name": {},
        "Value": {},
        "Unit": {}
      }
    }
  },
  "Sd": {
    "type": "list",
    "member": {
      "type": "structure",
      "members": {
        "Name": {},
        "Value": {}
      }
    }
  },
  "So": {
    "type": "list",
    "member": {}
  },
  "Sv": {
    "type": "structure",
    "required": [
      "Name"
    ],
    "members": {
      "Name": {},
      "SignKey": {}
```

```
  }
},
"Sw": {
  "type": "structure",
  "required": [
    "Begin"
  ],
  "members": {
    "Begin": {},
    "End": {}
  }
},
"Sx": {
  "type": "list",
  "member": {
    "type": "structure",
    "required": [
      "Name",
      "Unit"
    ],
    "members": {
      "Name": {},
      "Value": {},
      "MaxCount": {
        "type": "long"
      },
      "Overage": {
        "type": "boolean"
      },
      "Unit": {},
      "AllowCheckIn": {
        "type": "boolean"
      }
    }
  }
},
"S12": {
  "type": "structure",
  "members": {
    "RenewType": {},
    "ProvisionalConfiguration": {
      "type": "structure",
      "required": [
        "MaxTimeToLiveInMinutes"
      ],
      "members": {
        "MaxTimeToLiveInMinutes": {
          "type": "integer"
```

```
        }
       }
      },
      "BorrowConfiguration": {
       "type": "structure",
       "required":
[
        "AllowEarlyCheckIn",
        "MaxTimeToLiveInMinutes"
       ],
       "members": {
        "AllowEarlyCheckIn": {
         "type": "boolean"
        },
        "MaxTimeToLiveInMinutes": {
         "type": "integer"
        }
       }
      }
     }
    },
    "S1c": {
     "type": "list",
     "member": {}
    },
    "S1d": {
     "type": "list",
     "member": {
      "type": "structure",
      "members": {
       "Key": {},
       "Value": {}
      }
     }
    },
    "S1f": {
     "type": "list",
     "member": {
      "type": "structure",
      "required": [
       "ResourceType",
       "ProductInformationFilterList"
      ],
      "members": {
       "ResourceType": {},
       "ProductInformationFilterList": {
        "type": "list",
        "member": {
```

```
        "type": "structure",
        "required": [
          "ProductInformationFilterName",

  "ProductInformationFilterComparator"
        ],
        "members": {
          "ProductInformationFilterName": {},
          "ProductInformationFilterValue": {
            "shape": "S1c"
          },
          "ProductInformationFilterComparator": {}
        }
      }
    }
  }
},
"S1l": {
  "type": "structure",
  "members": {
    "UsageOperation": {}
  }
},
"S1r": {
  "type": "list",
  "member": {}
},
"S1t": {
  "type": "structure",
  "required": [
    "licenseConfigurationArns"
  ],
  "members": {
    "licenseConfigurationArns": {
      "shape": "S1u"
    }
  }
},
"S1u": {
  "type": "list",
  "member": {}
},
"S1v": {
  "type": "structure",
  "members": {
    "value": {
      "type": "integer"
```

```
      },
      "period": {}
    }
  },
  "S23": {
    "type": "list",
    "member":
{}
  },
  "S2p": {
    "type": "structure",
    "required": [
      "GrantArn",
      "GrantName",
      "ParentArn",
      "LicenseArn",
      "GranteePrincipalArn",
      "HomeRegion",
      "GrantStatus",
      "Version",
      "GrantedOperations"
    ],
    "members": {
      "GrantArn": {},
      "GrantName": {},
      "ParentArn": {},
      "LicenseArn": {},
      "GranteePrincipalArn": {},
      "HomeRegion": {},
      "GrantStatus": {},
      "StatusReason": {},
      "Version": {},
      "GrantedOperations": {
        "shape": "So"
      }
    }
  },
  "S2s": {
    "type": "structure",
    "members": {
      "LicenseArn": {},
      "LicenseName": {},
      "ProductName": {},
      "ProductSKU": {},
      "Issuer": {
        "shape": "S2t"
      },
      "HomeRegion": {},
```

```
      "Status": {},
      "Validity": {
        "shape": "Sw"
      },
      "Beneficiary": {},
      "Entitlements":
{
        "shape": "Sx"
      },
      "ConsumptionConfiguration": {
        "shape": "S12"
      },
      "LicenseMetadata": {
        "shape": "Sd"
      },
      "CreateTime": {},
      "Version": {}
    }
  },
  "S2t": {
    "type": "structure",
    "members": {
      "Name": {},
      "SignKey": {},
      "KeyFingerprint": {}
    }
  },
  "S2w": {
    "type": "list",
    "member": {
      "type": "structure",
      "members": {
        "ResourceType": {},
        "ConsumedLicenses": {
          "type": "long"
        }
      }
    }
  },
  "S2z": {
    "type": "list",
    "member": {
      "type": "structure",
      "members": {
        "ResourceType": {},
        "AssociationCount": {
          "type": "long"
        }
```

```
    }
   }
  },
  "S31": {
   "type": "structure",
   "members": {
    "LastRunTime": {
     "type": "timestamp"
    }
   }
  },
  "S38": {
    "type": "structure",
   "members": {
    "ReportGeneratorName": {},
    "ReportType": {
     "shape": "S1r"
    },
    "ReportContext": {
     "shape": "S1t"
    },
    "ReportFrequency": {
     "shape": "S1v"
    },
    "LicenseManagerReportGeneratorArn": {},
    "LastRunStatus": {},
    "LastRunFailureReason": {},
    "LastReportGenerationTime": {},
    "ReportCreatorAccount": {},
    "Description": {},
    "S3Location": {
     "type": "structure",
     "members": {
      "bucket": {},
      "keyPrefix": {}
     }
    },
    "CreateTime": {},
    "Tags": {
     "shape": "S1d"
    }
   }
  },
  "S3h": {
   "type": "structure",
   "required": [
    "EnableIntegration"
   ],
```

```
    "members": {
      "EnableIntegration": {
        "type": "boolean"
      }
    }
  },
  "S3n": {
    "type": "list",
    "member": {
      "shape":
"S3o"
    }
  },
  "S3o": {
    "type": "structure",
    "members": {
      "Name": {},
      "Values": {
        "type": "list",
        "member": {}
      }
    }
  },
  "S3u": {
    "type": "list",
    "member": {
      "shape": "S2p"
    }
  },
  "S40": {
    "type": "list",
    "member": {
      "shape": "S3o"
    }
  },
  "S4d": {
    "type": "list",
    "member": {
      "type": "structure",
      "required": [
        "LicenseConfigurationArn"
      ],
      "members": {
        "LicenseConfigurationArn": {},
        "AmiAssociationScope": {}
      }
    }
  },
```

```
  "S4h": {
    "type": "list",
    "member": {
      "shape": "S2s"
    }
  }
 }
}
```

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```
{
 "pagination": {
 }
}
```

1.63 minipass 3.3.6

1.63.1 Available under license :

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1.64 camelize 1.0.0

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1.65 @types/mime 3.0.4

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1.66 side-channel 1.1.0

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1.67 @apidevtools/swagger-parser 10.0.3

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1.68 socks 2.8.3

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1.72 util-deprecate 1.0.2

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1.73 mime-db 1.52.0

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1.74 negotiator 0.6.3

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1.75 cidr-regex 4.1.1

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1.77 rxjs 6.6.7

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1.81 ws 7.5.9

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1.90 call-me-maybe 1.0.2

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1.91 socks-proxy-agent 8.0.4

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1.92 @npmcli/config 8.3.4

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1.93 ecdsa-sig-formatter 1.0.11

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1.94 depd 1.1.2

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1.95 @types/send 0.17.4

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1.96 cmd-shim 6.0.3

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1.97 is-extglob 2.1.1

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1.99 dont-sniff-mimetype 1.1.0

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1.100 buffer-more-ints 1.0.0

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1.101 ansi-regex 5.0.1

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1.102 ansicolors 0.2.1

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1.107 minipass-flush 1.0.5

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1.108 which 2.0.2

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1.109 media-types 7.0.0

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1.111 zstd 1.4.8+dfsg-3build1

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1.112 gnutls 3.7.3-4ubuntu1.7

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```
/*  Extract the last component (base name) of a file name.

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  along with this program.  If not, see <https://www.gnu.org/licenses/>.  */

#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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##
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1.118 @pkgjs/parseargs 0.11.0

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1.119 bunyan 1.8.15

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1.120 hide-powered-by 1.1.0

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1.122 es-object-atoms 1.1.1

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1.123 fastest-levenshtein 1.0.16

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1.125 libnpmhook 10.0.5

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1.126 promise-call-limit 3.0.1

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1.127 adduser 3.118ubuntu5

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1.128 pflag 1.0.5

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1.129 spdx-expression-parse 3.0.1

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1.130 @types/mime 1.3.5

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1.131 spdx-correct 3.2.0

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1.134 http-cache-semantics 4.1.1

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1.135 ip-regex 5.0.0

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1.137 lodash.get 4.4.2

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1.138 pam 1.4.0-11ubuntu2.6

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1.139 libnpmpublish 9.0.9

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1.140 promise-all-reject-late 1.0.1

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1.141 @types/node 15.14.9

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1.142 ieee754 1.2.1

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1.143 openssl 3.0.2-0ubuntu1.20

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Tests included here are based on build output generated by the six-speed benchmark suite.

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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.

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
2.1.2	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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(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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1.151 glob 7.1.6

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1.152 proc-log 4.2.0

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1.154 openssl 3.0.16

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1.155 libnsl 1.3.0-2build2

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1.159 normalize-package-data 6.0.2

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1.164 @sinclair/typebox 0.28.14

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1.165 js-base64 2.6.4

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1.166 apt 2.4.14

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Version 3, 29 June 2007

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* DNS resolver (dirmngr/dns.c)

dns.c - Recursive, Reentrant DNS Resolver.

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* Regular
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1993 Christopher Seiwald seiwald@vix.com
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1.178 object-inspect 1.13.4

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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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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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 ABC. Guido remains Python's
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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 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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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 and above	2.1.1	2001-now	PSF	yes

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Mersenne Twister

The `_random' module includes code based on a download from
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A C-program for MT19937, with initialization improved 2002/1/26.
 Coded by Takuji Nishimura and Makoto Matsumoto.

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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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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
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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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1.224 @npmcli/redact 2.0.1

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1.243 ansi-regex 6.0.1

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1.244 fs 0.0.2

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1.245 make-fetch-happen 13.0.1

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1.246 merge-descriptors 1.0.3

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1.247 memory-pager 1.5.0

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1.248 compression 1.7.4

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1.249 walk-up-path 3.0.1

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1.250 @sigstore/core 1.1.0

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1.251 send 0.19.0

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1.252 sparse-bitfield 3.0.3

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1.253 wrappy 1.0.2

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1.254 path-to-regexp 0.1.12

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1.255 zod 3.18.0

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1.256 lodash.includes 4.3.0

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1.257 zlib 1:1.2.11.dfsg-2ubuntu9.2

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/* gun.c -- simple gunzip to give an example of the use of inflateBack()
* Copyright (C) 2003, 2005, 2008, 2010, 2012 Mark Adler
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  Version 1.7 12 August 2012 Mark Adler */

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/* gzwrite.c -- zlib functions for writing gzip files
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/* inffast.h -- header to use inffast.c
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*/

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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.

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(the contents of which are also included in zip.h) for terms of use.
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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

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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

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*/

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* /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
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/* inflate.c -- zlib decompression
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* /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
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*/

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

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

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
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
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/* 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

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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

1.258 libnpmexec 8.1.3

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1.259 uuid 3.3.2

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1.260 debconf 1.5.79ubuntu1

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1.261 debounce 1.2.1

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1.262 get-intrinsic 1.3.0

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1.263 readable-stream 2.3.7

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1.264 libxcrypt 1:4.4.27-1

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1.267 setprototypeof 1.2.0

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1.269 libgpg-error 1.43-3

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1.308 libpkit 0.24.0-6build1

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1.311 math-intrinsics 1.1.0

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1.314 mawk 1.3.4.20200120-3

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```
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```
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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;
}
```

1.319 z-schema 5.0.5

1.319.1 Available under license :

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https://github.com/zaggino/z-schema/graphs/contributors

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1.320 init-package-json 6.0.3

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ISC

1.321 node-gyp 10.1.0

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1.325 npm-package-arg 11.0.2

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1.326 tslib 1.14.1

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1.327 go-toml 1.9.4

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localtime.go, localtime_test.go:

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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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1.328 amcharts3-export 1.4.73

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1.334 gyp-next 0.16.1

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1.335 lodash.isinteger 4.0.4

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1.338 graceful-fs 4.2.11

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1.339 ignore-walk 6.0.5

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1.341 lodash.once 4.1.1

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1.342 @types/connect 3.4.38

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1.345 sigstore 2.3.1

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1.346 json-stringify-nice 1.1.4

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1.348 dunder-proto 1.0.1

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1.349 @npmcli/query 3.1.0

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1.351 which 4.0.0

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1.356 prom-client 12.0.0

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1.359 fs.realpath 1.0.0

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1.366 object-keys 0.4.0

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1.367 proc-log 3.0.0

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1.369 require-at 1.0.6

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1.370 shebang-regex 3.0.0

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1.374 bowser 2.9.0

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1.375 xml2js 0.4.19

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1.376 @npmcli/metavuln-calculator 7.1.1

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1.377 npm-install-checks 6.3.0

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1.378 fast-json-stable-stringify 2.1.0

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1.379 http-proxy-agent 7.0.2

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1.380 promise-retry 2.0.1

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1.381 combined-stream 1.0.8

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1.382 sax 1.2.1

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1.383 ubuntu-keyring 2021.03.26

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1.384 gzip 1.10-4ubuntu4.1

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"SSPL-1.0",
"SWL",
"Saxpath",
"SchemeReport",
"Sendmail",
"Sendmail-8.23",
"SimPL-2.0",
"Sleepycat",
"Soundex",
"Spencer-86",
"Spencer-94",
"Spencer-99",
"SugarCRM-1.1.3",
"Sun-PPP",
"Sun-PPP-2000",
"SunPro",
"Symlinks",
"TAPR-OHL-1.0",
"TCL",
"TCP-wrappers",
"TGPPL-1.0",
"TMate",
"TORQUE-1.1",
"TOSL",
"TPDL",
"TPL-1.0",
"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"
]
spdx-license-ids

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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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1.386 libsemanage-common 3.3-1build2

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1.387 iconv-lite 0.6.3

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1.399 lodash.isstring 4.0.1

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1.400 validate-npm-package-license 3.0.4

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validate-npm-package-license
==========

Give me a string and I'll tell you if it's a valid npm package license string.

```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);
assert.deepEqual(valid('ISC'), validSPDXExpression);
```
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);
```

1.401 npm-audit-report 5.0.0

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1.402 destroy 1.2.0

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1.403 strip-ansi 7.1.0

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1.404 read-cmd-shim 4.0.0

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1.405 qrcode-terminal 0.12.0

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1.406 get-proto 1.0.1

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1.407 string-width 4.2.3

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1.410 hasown 2.0.2

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1.427 e2fsprogs 1.46.5-2ubuntu1.2

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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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This is the Debian GNU/Linux prepackaged version of the translation
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written by Theodore Ts'o <tytso@mit.edu> and Remy Card
<card@masi.ibp.fr>.

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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
+   Copyright (C) Andrew Tridgell              1999-2005
+   Copyright (C) Jeremy Allison               2000-2006
+   Copyright (C) Paul `Rusty' Russell         2000

    ** 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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<signature of Ty Coon>, 1 April 1989
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Theodore Ts'o
23-June-2007

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If the program is interactive, make it output a short notice like this
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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

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1.428 npm-packlist 8.0.2

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1.429 safe-buffer 5.1.2

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1.430 is-plain-obj 3.0.0

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1.431 @isaacs/string-locale-compare 1.1.0

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1.432 helmet-csp 2.10.0

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1.433 minipass-sized 1.0.3

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1.434 lodash.isplainobject 4.0.6

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1.435 bl 2.2.1

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1.436 read-package-json-fast 3.0.2

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1.437 uri-js 4.4.1

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1.438 unpipe 1.0.0

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1.439 libnpmaccess 8.0.6

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1.440 libseccomp 2.5.3-2ubuntu3~22.04.1

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1.442 dpkg 1.21.1ubuntu2.6

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1.456 string_decoder 1.1.1

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1.468 corepack 0.33.0

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1.471 tar 1.34+dfsg-1ubuntu0.1.22.04.2

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1.473 path-scurry 1.11.1

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1.474 cpp 12.3.0-1ubuntu1~22.04.2

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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 versions of the libraries. (At this time, not all platforms and not all libraries support biarch.) The license terms for these lib32 or lib64 packages are identical to the ones for the lib packages.

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  gcc/emults.c, gcc/gbl-ctors.h, gcc/gcov-io.h, gcc/libgcov.c,
  gcc/tsystem.h, gcc/typeclass.h).
- libatomic
- libdecnumber
- libgomp
- libitm
- libssp
- libstdc++-v3
- libobjc
- libgfortran
- The libgnat-12 Ada support library and libgnat-util12 library.
- Various config files in gcc/config/

used in runtime libraries.
- libvtv

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Version 3.1, 31 March 2009

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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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The Phobos standard runtime library:
- d/phobos/*

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1.477 debianutils 5.5-1ubuntu2

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*
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* Copyright (C) 2015 Andreas Henriksson <andreas@fatal.se>
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/* run-parts: run a bunch of scripts in a directory
*
* 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/which.1
* /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
* /debianutils-5-5-orig-tar-xz/debianutils-5.5/po4a/de/installkernel.8
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1.478 selinux 3.3-1build2

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1.479 form-data 4.0.0

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1.480 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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1.481 hosted-git-info 7.0.2

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1.482 retry 0.12.0

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1.483 yaml 2.0.0-1

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1.484 lsb 11.1.0ubuntu4

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1.485 npm-pick-manifest 9.1.0

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1.486 argparse 2.0.1

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1.487 @types/http-proxy 1.17.9

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1.488 @npmcli/run-script 8.1.0

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1.489 firstline 1.3.1

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1.490 mpdecimal 2.5.1-2build2

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1.511 parse-conflict-json 3.0.1

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1.515 minipass-pipeline 1.2.4

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1.516 aggregate-error 3.1.0

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1.518 swagger-jsdoc 6.2.8

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1.519 npm-user-validate 2.0.1

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1.520 bzip2 1.0.8-5build1

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Julian Seward, jseward@acm.org
bzip2/libbzip2 version 1.0.8 of 13 July 2019

1.521 uuid 9.0.1

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1.522 lru-cache 10.2.2

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1.523 @types/range-parser 1.2.7

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1.524 npm 10.8.2

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1.525 semver 7.6.2

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1.527 amcharts3-dataloader 1.0.19

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1.531 coreutils 8.32-4.1ubuntu1.2

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1.532 libnpmdiff 6.1.4

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1.533 express-async-handler 1.2.0

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1.534 pcre 2:8.39-13ubuntu0.22.04.1

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The basic library functions are written in C and are freestanding. Also
included in the distribution is a set of C++ wrapper functions, and a
just-in-time compiler that can be used to optimize pattern matching. These
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THE BASIC LIBRARY FUNCTIONS

Written by: Philip Hazel
Email local part: ph10
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Written by: Zoltan Herczeg
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This is Debian GNU/Linux's prepackaged version of the PCRE regular
expression library and associated pgrep utility.

This package was put together by me, Mark Baker <mbaker@iee.org> from the
original sources obtained from ftp.csx.cam.ac.uk:/pub/software/programming/pcre.

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1.535 @npmcli/name-from-folder 2.0.0

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1.536 js-yaml 3.14.1

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1.537 denque 1.5.1

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1.538 node.js 20.19.5-1nodesource1

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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/ui.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_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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JSON parsing library (nlohmann/json)

File: vendor/json/upstream/single_include/nlohmann/json.hpp (only for ICU4C)

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=== src/compat.h src/compat-inl.h ===

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*/

#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'
```

```
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* 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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#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",
 "LGPL-2.0",
 "LGPL-2.1",
 "LGPL-3.0",
 "Nunit",
 "StandardML-NJ",
 "bzip2-1.0.5",
 "eCos-2.0",
 "wxWindows"
]
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/conf.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_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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*/



/*
* 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
*
* Copyright 2016-2020 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_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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* 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(freefunc))
#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))
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#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(\
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    (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), \
```

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                        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,
```

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                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(s
k),
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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```
/*
* 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(s

k), 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_t
ype(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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 "AFL-2.1",
 "AFL-3.0",
 "AGPL-1.0-only",
 "AGPL-1.0-or-later",
 "AGPL-3.0-only",
 "AGPL-3.0-or-later",
 "AMD-newlib",
 "AMDPLPA",
 "AML",
 "AML-glslang",
 "AMPAS",
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 "ANTLR-PD-fallback",
 "APAFML",
 "APL-1.0",
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 "APSL-2.0",
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 "AdaCore-doc",
 "Adobe-2006",
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 "Adobe-Glyph",
 "Adobe-Utopia",
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 "Apache-1.1",
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"BSD-3-Clause",
"BSD-3-Clause-Attribution",
"BSD-3-Clause-Clear",
"BSD-3-Clause-HP",
"BSD-3-Clause-LBNL",
"BSD-3-Clause-Modification",
"BSD-3-Clause-No-Military-License",
"BSD-3-Clause-No-Nuclear-License",
"BSD-3-Clause-No-Nuclear-License-2014",
"BSD-3-Clause-No-Nuclear-Warranty",
"BSD-3-Clause-Open-MPI",
"BSD-3-Clause-Sun",
"BSD-3-Clause-acpica",
"BSD-3-Clause-flex",
"BSD-4-Clause",
"BSD-4-Clause-Shortened",
"BSD-4-Clause-UC",
"BSD-4.3RENO",
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"BSD-Systemics",
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"BSL-1.0",
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"Baekmuk",
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"Barr",
"Beerware",
"BitTorrent-1.0",
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"C-UDA-1.0",
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"CATOSL-1.1",
"CC-BY-1.0",
"CC-BY-2.0",
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"CC-BY-2.5-AU",
"CC-BY-3.0",
"CC-BY-3.0-AT",
"CC-BY-3.0-AU",
"CC-BY-3.0-DE",
"CC-BY-3.0-IGO",
"CC-BY-3.0-NL",
"CC-BY-3.0-US",
"CC-BY-4.0",
"CC-BY-NC-1.0",
"CC-BY-NC-2.0",
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"CC-BY-NC-SA-2.0",
"CC-BY-NC-SA-2.0-DE",
"CC-BY-NC-SA-2.0-FR",
"CC-BY-NC-SA-2.0-UK",
"CC-BY-NC-SA-2.5",
"CC-BY-NC-SA-3.0",
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"CC-BY-NC-SA-3.0-IGO",
"CC-BY-NC-SA-4.0",
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"CC-BY-ND-3.0",
"CC-BY-ND-3.0-DE",
"CC-BY-ND-4.0",
"CC-BY-SA-1.0",
"CC-BY-SA-2.0",

"CC-BY-SA-2.0-UK",
"CC-BY-SA-2.1-JP",
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]
MIT
/*-
* WARNING: do not edit!
* Generated by Makefile from include/openssl/crmf.h.in
*
* Copyright 2007-2021 The OpenSSL Project Authors. All Rights Reserved.
* Copyright Nokia 2007-2019
* Copyright Siemens AG 2015-2019
*
* 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
*
* 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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* https://www.openssl.org/source/license.html
*/

#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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*/

#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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*/

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/*
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* 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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*/



#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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*/

#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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/*
* WARNING: do not edit!
* 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),
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
*)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
# 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)
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)))
#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)
((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_RecipientEncry
ptedKey_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_RecipientEncrypted
Key_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)

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*)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(freefu
nc))
```

```
#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_GENERALSTRI
NG_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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*/

#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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```
/* WARNING: do not edit! */
/* Generated by Makefile from include/crypto/bn_conf.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 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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* Generated by Makefile from providers/common/include/prov/der_rsa.h.in
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* https://www.openssl.org/source/license.html
*/

#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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* 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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```

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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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*/



#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_sk_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_type(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),
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}

/* 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),
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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),

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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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* 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_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),
 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)
*)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)
((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_ty
pe(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)
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)))
#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())
#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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* https://www.openssl.org/source/license.html
*/

#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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Version 1.0.0

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/* WARNING: do not edit! */
/* Generated by Makefile from include/crypto/bn_conf.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 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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* 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);
```

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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,          \
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                (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
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# 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
```

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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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```
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* via Makefile.in
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* 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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* 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
*
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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_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
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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 "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!
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*
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* 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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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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```
*/
```

```
#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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```
/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/bio.h.in
*
* Copyright 1995-2022 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_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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* 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"
#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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OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE
OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE
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/*
* WARNING: do not edit!
* Generated by Makefile from include/openssl/srp.h.in
*
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* in the file LICENSE in the source distribution or at
* 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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* Copyright (c) 2002, Oracle and/or its affiliates. All rights reserved
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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_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!
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* via Makefile.in
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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_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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* 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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Tim Koschtzki (tim@debuggable.com)
Felix Geisendrfer (felix@debuggable.com)

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```
/*
* WARNING: do not edit!
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*
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* in the file LICENSE in the source distribution or at
* https://www.openssl.org/source/license.html
*/

#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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1.541 sax 1.3.0

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1.544 validate-npm-package-name 5.0.1

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1.546 ms 2.1.2

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1.548 spdx-expression-parse 4.0.0

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1.549 iconv 2.35

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To protect your rights, we need to make restrictions that forbid
distributors to deny you these rights or to ask you to surrender these
rights. These restrictions translate to certain responsibilities for
you if you distribute copies of the library
or if you modify it.

For example, if you distribute copies of the library, whether gratis
or for a fee, you must give the recipients all the rights that we gave
you. You must make sure that they, too, receive or can get the source
code. If you link other code with the library, you must provide
complete object files to the recipients, so that they can relink them
with the library after making changes to the library and recompiling

it. And you must show them these terms so they know their rights.

 We protect your rights with a two-step method: (1) we copyright the
library, and (2) we offer you this license, which gives you legal
permission to copy, distribute and/or modify the library.

 To protect each distributor, we want to make it very clear that
there is no warranty for the free library. Also, if the library is
modified by someone else and passed on, the recipients should know
that what they have is not the original version, so that the original
author's reputation
 will not be affected by problems that might be
introduced by others.

 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.

 Most GNU software, including some libraries, is covered by the
ordinary GNU General Public License. This license, the GNU Lesser
General Public License, applies to certain designated libraries, and
is quite different from the ordinary General Public License. We use
this license for certain libraries in order to permit linking those
libraries into non-free programs.

 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 @dfn{Lesser} General Public License because it
does @emph{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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licensee is addressed as ``you''.

 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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You may copy and distribute
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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:

@enumerate a
@item
The modified work must itself be a software library.

@item
You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

@item
You must
cause the whole of the work to be licensed at no
charge to all third parties under the terms of this License.

@item

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.)
@end enumerate

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.

@item
You may opt to apply the terms of the ordinary GNU General Public
License instead of this License to a given copy of the Library. To do
this, you must alter all the notices that refer to this License, so
that they refer to the ordinary GNU General Public License, version 2,
instead of to this License. (If a newer version than version 2 of the
ordinary GNU General Public License has appeared, then you can specify
that version instead if you wish.) Do not make any other change in
these notices.

Once this change is made in a given copy, it is irreversible for
that copy, so the ordinary GNU General Public License applies to all
subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of
the Library into a program that is not a library.

@item
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.

@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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@end enumerate

@subheading END OF TERMS AND CONDITIONS

@page
@subheading How to Apply These Terms to Your New Libraries

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redistribution under these terms (or, alternatively, under the terms of the
ordinary General Public License).

To apply these terms, attach the following notices to the library. It is
safest to attach them to the start of each source
file to most effectively
convey the exclusion of warranty; and each file should have at least the
``copyright'' line and a pointer to where the full notice is found.

@smallexample
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USA.
@end
smallexample

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your
school, if any, to sign a ``copyright disclaimer'' for the library, if
necessary. Here is a sample; alter the names:

@smallexample
Yoyodyne, Inc., hereby disclaims all copyright interest in the library
`Frob' (a library for tweaking knobs) written by James Random Hacker.

@var{signature of Ty Coon}, 1 April 1990
Ty Coon, President of Vice
@end smallexample

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Version 2.1, February 1999

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[This is the first released version of the Lesser GPL. It also counts
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the version number 2.1.]

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free software--to make sure the software is free for all its users.

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can use it too, but we suggest you first think carefully about whether
this license or the ordinary General Public License is the better
strategy to use in any particular case, based on the explanations below.

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it if you want it; that you can change the software and use pieces of
it in new free programs; and that you are informed that you can do
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To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

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.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

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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0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

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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You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

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.)

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1.555 feature-policy 0.3.0

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1.560 qs 6.13.0

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1.561 chalk 5.3.0

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1.563 package-json-from-dist 1.0.0

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1.564 source-map 0.6.1

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1.565 @isaacs/cliui 8.0.2

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1.567 @npmcli/arborist 7.5.4

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1.568 x-xss-protection 1.3.0

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1.570 findutils 4.8.0-1ubuntu3

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1.573 delayed-stream 1.0.0

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delayed-stream

Buffers events from a stream until you are ready to handle them.

Installation

``` bash
npm install delayed-stream
```

Usage

The following example shows how to write a http echo server that delays its
response by 1000 ms.

``` javascript
var DelayedStream = require('delayed-stream');
var http = require('http');

http.createServer(function(req, res) {
 var delayed = DelayedStream.create(req);

 setTimeout(function() {
   res.writeHead(200);
   delayed.pipe(res);
 }, 1000);
});
```

If you are not using `Stream#pipe`, you can also manually release the buffered events by calling `delayedStream.resume()`:

``` javascript
var delayed = DelayedStream.create(req);

setTimeout(function() {
 // Emit all buffered events and resume underlaying source
 delayed.resume();
}, 1000);
```

Implementation

In order to use this meta stream properly, here are a few things you should know about the implementation.

Event Buffering / Proxying

All events of the `source` stream are hijacked by overwriting the `source.emit` method. Until node implements a catch-all event listener, this is the only way.

However, delayed-stream still continues to emit all events it captures on the `source`, regardless of whether you have released the delayed stream yet or not.

Upon creation, delayed-stream captures all `source` events and stores them in an internal event buffer. Once `delayedStream.release()` is called, all buffered events are emitted on the `delayedStream`, and the event buffer is cleared. After that, delayed-stream merely acts as a proxy for the underlaying source.

Error handling

Error events on `source` are buffered / proxied just like any other events. However, `delayedStream.create` attaches a no-op `'error'` listener to the `source`. This way you only have to handle errors on the `delayedStream` object, rather than in two places.

Buffer limits

delayed-stream provides
 a `maxDataSize` property that can be used to limit
the amount of data being buffered. In order to protect you from bad `source` streams that don't react to `source.pause()`, this feature is enabled by default.

API

DelayedStream.create(source, [options])

Returns a new `delayedStream`. Available options are:

* `pauseStream`
* `maxDataSize`

The description for those properties can be found below.

delayedStream.source

The `source` stream managed by this object. This is useful if you are passing your `delayedStream` around, and you still want to access properties on the `source` object.

delayedStream.pauseStream = true

Whether to pause the underlaying `source` when calling `DelayedStream.create()`. Modifying this property afterwards has no effect.

delayedStream.maxDataSize = 1024 * 1024

The amount of data to buffer before emitting an `error`.

If the underlaying source is emitting `Buffer` objects, the `maxDataSize` refers to bytes.

If the underlaying source
 is emitting JavaScript strings, the size refers to
characters.

If you know what you are doing, you can set this property to `Infinity` to
disable this feature. You can also modify this property during runtime.

delayedStream.dataSize = 0

The amount of data buffered so far.

delayedStream.readable

An ECMA5 getter that returns the value of `source.readable`.

delayedStream.resume()

If the `delayedStream` has not been released so far, `delayedStream.release()`
is called.

In either case, `source.resume()` is called.

delayedStream.pause()

Calls `source.pause()`.

delayedStream.pipe(dest)

Calls `delayedStream.resume()` and then proxies the arguments to `source.pipe`.

delayedStream.release()

Emits and clears all events that have been buffered up so far. This does not
resume the underlaying source, use `delayedStream.resume()` instead.

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1.576 read 3.0.1

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1.580 glibc 2.35-0ubuntu3.11

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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
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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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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
2.1.3	2.1.2	2002	PSF	yes
2.2 and above	2.1.1	2001-now	PSF	yes

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Thanks to the many outside volunteers who have worked under Guido's
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1.587 playwright-core 1.45.0

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==
agent-base
==========
Turn a function into an [`http.Agent`][http.Agent] instance
[![Build Status](https://github.com/TooTallNate/node-agent-base/workflows/Node%20CI/badge.svg)](https://github.com/TooTallNate/node-agent-base/actions?workflow=Node+CI)

This
 module provides an `http.Agent` generator. That is, you pass it an async
callback function, and it returns a new `http.Agent` instance that will invoke the
given callback function when sending outbound HTTP requests.

Some subclasses:

Here's some more interesting uses of `agent-base`.
Send a pull request to list yours!

* [`http-proxy-agent`][http-proxy-agent]: An HTTP(s) proxy `http.Agent` implementation for HTTP endpoints
* [`https-proxy-agent`][https-proxy-agent]: An HTTP(s) proxy `http.Agent` implementation for HTTPS endpoints
* [`pac-proxy-agent`][pac-proxy-agent]: A PAC file proxy `http.Agent` implementation for HTTP and HTTPS
* [`socks-proxy-agent`][socks-proxy-agent]: A SOCKS proxy `http.Agent` implementation for HTTP and HTTPS

Installation

Install with `npm`:

``` bash
$ npm install agent-base
```

Example

Here's a minimal example
 that creates a new `net.Socket` connection to the server
for every HTTP request (i.e. the equivalent of `agent: false` option):

```js
var net = require('net');
var tls = require('tls');
var url = require('url');
var http = require('http');
var agent = require('agent-base');

var endpoint = 'http://nodejs.org/api/';
var parsed = url.parse(endpoint);

// This is the important part!
parsed.agent = agent(function (req, opts) {
 var socket;
 // `secureEndpoint` is true when using the https module
 if (opts.secureEndpoint) {
   socket = tls.connect(opts);
 } else {
   socket = net.connect(opts);
 }
 return socket;
});

// Everything else works just like normal...
http.get(parsed, function (res) {
 console.log('"response" event!', res.headers);
 res.pipe(process.stdout);
});
```

Returning a Promise or using an `async` function is also supported:

```js
agent(async function (req, opts) {
 await sleep(1000);
 // etc
});
```

Return another `http.Agent` instance to "pass through"
 the responsibility
for that HTTP request to that agent:

```js
agent(function (req, opts) {
 return opts.secureEndpoint ? https.globalAgent : http.globalAgent;
});
```

API

Agent(Function callback[, Object options]) [http.Agent][]

Creates a base `http.Agent` that will execute the callback function `callback`
for every HTTP request that it is used as the `agent` for. The callback function
is responsible for creating a `stream.Duplex` instance of some kind that will be
used as the underlying socket in the HTTP request.

The `options` object accepts the following properties:

 * `timeout` - Number - Timeout for the `callback()` function in milliseconds. Defaults to Infinity (optional).

The callback function should have the following signature:

callback(http.ClientRequest req, Object options, Function cb) undefined

The ClientRequest `req` can be accessed to read request headers and
and the path, etc. The `options` object contains the options passed
to the `http.request()`/`https.request()`
 function call, and is formatted
to be directly passed to `net.connect()`/`tls.connect()`, or however
else you want a Socket to be created. Pass the created socket to
the callback function `cb` once created, and the HTTP request will
continue to proceed.

If the `https` module is used to invoke the HTTP request, then the
`secureEndpoint` property on `options` _will be set to `true`_.

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[http-proxy-agent]: https://github.com/TooTallNate/node-http-proxy-agent
[https-proxy-agent]: https://github.com/TooTallNate/node-https-proxy-agent
[pac-proxy-agent]: https://github.com/TooTallNate/node-pac-proxy-agent
[socks-proxy-agent]: https://github.com/TooTallNate/node-socks-proxy-agent
[http.Agent]: https://nodejs.org/api/http.html#http_class_http_agent
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==========
https-proxy-agent
==========
An HTTP(s) proxy `http.Agent` implementation for HTTPS
[![Build Status](https://github.com/TooTallNate/node-https-proxy-

agent/workflows/Node%20CI/badge.svg)](https://github.com/TooTallNate/node-https-proxy-agent/actions?workflow=Node+CI)

This module provides an `http.Agent` implementation that connects to a specified
HTTP or HTTPS proxy server, and can be used with the built-in `https` module.

Specifically, this `Agent` implementation connects to an intermediary "proxy"
server and issues the [CONNECT HTTP method][CONNECT], which tells the proxy to
open a direct TCP connection to the destination server.

Since this agent implements the
 CONNECT HTTP method, it also works with other
protocols that use this method when connecting over proxies (i.e. WebSockets).
See the "Examples" section below for more.

Installation

Install with `npm`:

``` bash
$ npm install https-proxy-agent
```

Examples

`https` module example

``` js
var url = require('url');
var https = require('https');
var HttpsProxyAgent = require('https-proxy-agent');

// HTTP/HTTPS proxy to connect to
var proxy = process.env.http_proxy || 'http://168.63.76.32:3128';
console.log('using proxy server %j', proxy);

// HTTPS endpoint for the proxy to connect to
var endpoint = process.argv[2] || 'https://graph.facebook.com/tootallnate';
console.log('attempting to GET %j', endpoint);
var options = url.parse(endpoint);

// create an instance of the `HttpsProxyAgent` class with the proxy server information
var agent = new HttpsProxyAgent(proxy);
options.agent = agent;
```

```
https.get(options, function (res) {
 console.log('"response" event!',
 res.headers);
 res.pipe(process.stdout);
});
```

`ws` WebSocket connection example

``` js
var url = require('url');
var WebSocket = require('ws');
var HttpsProxyAgent = require('https-proxy-agent');

// HTTP/HTTPS proxy to connect to
var proxy = process.env.http_proxy || 'http://168.63.76.32:3128';
console.log('using proxy server %j', proxy);

// WebSocket endpoint for the proxy to connect to
var endpoint = process.argv[2] || 'ws://echo.websocket.org';
var parsed = url.parse(endpoint);
console.log('attempting to connect to WebSocket %j', endpoint);

// create an instance of the `HttpsProxyAgent` class with the proxy server information
var options = url.parse(proxy);

var agent = new HttpsProxyAgent(options);

// finally, initiate the WebSocket connection
var socket = new WebSocket(endpoint, { agent: agent });

socket.on('open', function () {
 console.log('"open" event!');
 socket.send('hello world');
});

socket.on('message', function (data, flags) {
 console.log('"message"
 event! %j %j', data, flags);
 socket.close();
});
```

API
---

new HttpsProxyAgent(Object options)

The `HttpsProxyAgent` class implements an `http.Agent` subclass that connects
to the specified "HTTP(s) proxy server" in order to proxy HTTPS and/or WebSocket
requests. This is achieved by using the [HTTP `CONNECT` method][CONNECT].

The `options` argument may either be a string URI of the proxy server to use, or an
"options" object with more specific properties:

 * `host` - String - Proxy host to connect to (may use `hostname` as well). Required.
 * `port` - Number - Proxy port to connect to. Required.
 * `protocol` - String - If `https:`, then use TLS to connect to the proxy.
 * `headers` - Object - Additional HTTP headers to be sent on the HTTP CONNECT method.
 * Any other options given are passed to the `net.connect()`/`tls.connect()` functions.

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[CONNECT]:
 http://en.wikipedia.org/wiki/HTTP_tunnel#HTTP_CONNECT_Tunneling
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socks-proxy-agent
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###
 A SOCKS proxy `http.Agent` implementation for HTTP and HTTPS
[![Build Status](https://github.com/TooTallNate/node-socks-proxy-agent/workflows/Node%20CI/badge.svg)](https://github.com/TooTallNate/node-socks-proxy-agent/actions?workflow=Node+CI)

This module provides an `http.Agent` implementation that connects to a
specified SOCKS proxy server, and can be used with the built-in `http`
and `https` modules.

It can also be used in conjunction with the `ws` module to establish a WebSocket
connection over a SOCKS proxy. See the "Examples" section below.

Installation

Install with `npm`:

``` bash
$ npm install socks-proxy-agent
```


Examples

TypeScript example

```ts
import https from 'https';
import { SocksProxyAgent } from 'socks-proxy-agent';

const info = {
 host: 'br41.nordvpn.com',
 userId: 'your-name@gmail.com',
 password: 'abcdef12345124'
};
const agent = new SocksProxyAgent(info);

https.get('https://jsonip.org', { agent }, (res) => {
 console.log(res.headers);
```

```
 res.pipe(process.stdout);
});
```

####
 `http` module example

```js
var url = require('url');
var http = require('http');
var SocksProxyAgent = require('socks-proxy-agent');

// SOCKS proxy to connect to
var proxy = process.env.socks_proxy || 'socks://127.0.0.1:1080';
console.log('using proxy server %j', proxy);

// HTTP endpoint for the proxy to connect to
var endpoint = process.argv[2] || 'http://nodejs.org/api/';
console.log('attempting to GET %j', endpoint);
var opts = url.parse(endpoint);

// create an instance of the `SocksProxyAgent` class with the proxy server information
var agent = new SocksProxyAgent(proxy);
opts.agent = agent;

http.get(opts, function (res) {
 console.log('"response" event!', res.headers);
 res.pipe(process.stdout);
});
```

`https` module example

```js
var url = require('url');
var https = require('https');
var SocksProxyAgent = require('socks-proxy-agent');

// SOCKS proxy to connect to
var proxy = process.env.socks_proxy || 'socks://127.0.0.1:1080';
console.log('using
 proxy server %j', proxy);

// HTTP endpoint for the proxy to connect to
var endpoint = process.argv[2] || 'https://encrypted.google.com/';
console.log('attempting to GET %j', endpoint);
var opts = url.parse(endpoint);
```

```
// create an instance of the `SocksProxyAgent` class with the proxy server information
var agent = new SocksProxyAgent(proxy);
opts.agent = agent;

https.get(opts, function (res) {
 console.log('"response" event!', res.headers);
 res.pipe(process.stdout);
});
```

`ws` WebSocket connection example

```
var WebSocket = require('ws');
var SocksProxyAgent = require('socks-proxy-agent');

// SOCKS proxy to connect to
var proxy = process.env.socks_proxy || 'socks://127.0.0.1:1080';
console.log('using proxy server %j', proxy);

// WebSocket endpoint for the proxy to connect to
var endpoint = process.argv[2] || 'ws://echo.websocket.org';
console.log('attempting to connect to WebSocket %j', endpoint);

// create an instance of the `SocksProxyAgent`
 class with the proxy server information
var agent = new SocksProxyAgent(proxy);

// initiate the WebSocket connection
var socket = new WebSocket(endpoint, { agent: agent });

socket.on('open', function () {
 console.log('"open" event!');
 socket.send('hello world');
});

socket.on('message', function (data, flags) {
 console.log('"message" event! %j %j', data, flags);
 socket.close();
});
```

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