

**NAME**

DECLARE\_ASN1\_FUNCTIONS, IMPLEMENT\_ASN1\_FUNCTIONS, ASN1\_ITEM,  
 ACCESS\_DESCRIPTION\_free, ACCESS\_DESCRIPTION\_new, ADMISSIONS\_free,  
 ADMISSIONS\_new, ADMISSION\_SYNTAX\_free, ADMISSION\_SYNTAX\_new,  
 ASIdOrRange\_free, ASIdOrRange\_new, ASIdentifierChoice\_free, ASIdentifierChoice\_new,  
 ASIdentifiers\_free, ASIdentifiers\_new, ASRange\_free, ASRange\_new,  
 AUTHORITY\_INFO\_ACCESS\_free, AUTHORITY\_INFO\_ACCESS\_new,  
 AUTHORITY\_KEYID\_free, AUTHORITY\_KEYID\_new, BASIC\_CONSTRAINTS\_free,  
 BASIC\_CONSTRAINTS\_new, CERTIFICATEPOLICIES\_free, CERTIFICATEPOLICIES\_new,  
 CMS\_ContentInfo\_free, CMS\_ContentInfo\_new, CMS\_ContentInfo\_new\_ex,  
 CMS\_ContentInfo\_print\_ctx, CMS\_ReceiptRequest\_free, CMS\_ReceiptRequest\_new,  
 CRL\_DIST\_POINTS\_free, CRL\_DIST\_POINTS\_new, DIRECTORYSTRING\_free,  
 DIRECTORYSTRING\_new, DISPLAYTEXT\_free, DISPLAYTEXT\_new,  
 DIST\_POINT\_NAME\_free, DIST\_POINT\_NAME\_new, DIST\_POINT\_free, DIST\_POINT\_new,  
 DSAParams\_dup, ECPARAMETERS\_free, ECPARAMETERS\_new, ECPKPARAMETERS\_free,  
 ECPKPARAMETERS\_new, EDIPARTYNAME\_free, EDIPARTYNAME\_new, ESS\_CERT\_ID\_dup,  
 ESS\_CERT\_ID\_free, ESS\_CERT\_ID\_new, ESS\_CERT\_ID\_V2\_dup, ESS\_CERT\_ID\_V2\_free,  
 ESS\_CERT\_ID\_V2\_new, ESS\_ISSUER\_SERIAL\_dup, ESS\_ISSUER\_SERIAL\_free,  
 ESS\_ISSUER\_SERIAL\_new, ESS\_SIGNING\_CERT\_dup, ESS\_SIGNING\_CERT\_free,  
 ESS\_SIGNING\_CERT\_it, ESS\_SIGNING\_CERT\_new, ESS\_SIGNING\_CERT\_V2\_dup,  
 ESS\_SIGNING\_CERT\_V2\_free, ESS\_SIGNING\_CERT\_V2\_it, ESS\_SIGNING\_CERT\_V2\_new,  
 EXTENDED\_KEY\_USAGE\_free, EXTENDED\_KEY\_USAGE\_new, GENERAL\_NAMES\_free,  
 GENERAL\_NAMES\_new, GENERAL\_NAME\_dup, GENERAL\_NAME\_free,  
 GENERAL\_NAME\_new, GENERAL\_SUBTREE\_free, GENERAL\_SUBTREE\_new,  
 IPAddressChoice\_free, IPAddressChoice\_new, IPAddressFamily\_free, IPAddressFamily\_new,  
 IPAddressOrRange\_free, IPAddressOrRange\_new, IPAddressRange\_free, IPAddressRange\_new,  
 ISSUER\_SIGN\_TOOL\_free, ISSUER\_SIGN\_TOOL\_it, ISSUER\_SIGN\_TOOL\_new,  
 ISSUING\_DIST\_POINT\_free, ISSUING\_DIST\_POINT\_it, ISSUING\_DIST\_POINT\_new,  
 NAME\_CONSTRAINTS\_free, NAME\_CONSTRAINTS\_new, NAMING\_AUTHORITY\_free,  
 NAMING\_AUTHORITY\_new, NETSCAPE\_CERT\_SEQUENCE\_free,  
 NETSCAPE\_CERT\_SEQUENCE\_new, NETSCAPE\_SPKAC\_free, NETSCAPE\_SPKAC\_new,  
 NETSCAPE\_SPKI\_free, NETSCAPE\_SPKI\_new, NOTICEREF\_free, NOTICEREF\_new,  
 OCSP\_BASICRESP\_free, OCSP\_BASICRESP\_new, OCSP\_CERTID\_dup, OCSP\_CERTID\_new,  
 OCSP\_CERTSTATUS\_free, OCSP\_CERTSTATUS\_new, OCSP\_CRLID\_free, OCSP\_CRLID\_new,  
 OCSP\_ONEREQ\_free, OCSP\_ONEREQ\_new, OCSP\_REQINFO\_free, OCSP\_REQINFO\_new,  
 OCSP\_RESPBYTES\_free, OCSP\_RESPBYTES\_new, OCSP\_RESPDATA\_free,  
 OCSP\_RESPDATA\_new, OCSP\_RESPID\_free, OCSP\_RESPID\_new, OCSP\_RESPONSE\_new,  
 OCSP\_REVOKEDINFO\_free, OCSP\_REVOKEDINFO\_new, OCSP\_SERVICELOC\_free,  
 OCSP\_SERVICELOC\_new, OCSP\_SIGNATURE\_free, OCSP\_SIGNATURE\_new,  
 OCSP\_SINGLERESP\_free, OCSP\_SINGLERESP\_new, OSSL\_CMP\_ITAV\_dup,

OSSL\_CMP\_ITAV\_free, OSSL\_CMP\_MSG\_dup, OSSL\_CMP\_MSG\_it, OSSL\_CMP\_MSG\_free,  
OSSL\_CMP\_PKIHEADER\_free, OSSL\_CMP\_PKIHEADER\_it, OSSL\_CMP\_PKIHEADER\_new,  
OSSL\_CMP\_PKISI\_dup, OSSL\_CMP\_PKISI\_free, OSSL\_CMP\_PKISI\_it, OSSL\_CMP\_PKISI\_new,  
OSSL\_CMP\_PKISTATUS\_it, OSSL\_CRMF\_CERTID\_dup, OSSL\_CRMF\_CERTID\_free,  
OSSL\_CRMF\_CERTID\_it, OSSL\_CRMF\_CERTID\_new, OSSL\_CRMF\_CERTTEMPLATE\_free,  
OSSL\_CRMF\_CERTTEMPLATE\_it, OSSL\_CRMF\_CERTTEMPLATE\_new,  
OSSL\_CRMF\_ENCRYPTEDVALUE\_free, OSSL\_CRMF\_ENCRYPTEDVALUE\_it,  
OSSL\_CRMF\_ENCRYPTEDVALUE\_new, OSSL\_CRMF\_MSGS\_free, OSSL\_CRMF\_MSGS\_it,  
OSSL\_CRMF\_MSGS\_new, OSSL\_CRMF\_MSG\_dup, OSSL\_CRMF\_MSG\_free,  
OSSL\_CRMF\_MSG\_it, OSSL\_CRMF\_MSG\_new, OSSL\_CRMF\_PBMPARAMETER\_free,  
OSSL\_CRMF\_PBMPARAMETER\_it, OSSL\_CRMF\_PBMPARAMETER\_new,  
OSSL\_CRMF\_PKIPUBLICATIONINFO\_free, OSSL\_CRMF\_PKIPUBLICATIONINFO\_it,  
OSSL\_CRMF\_PKIPUBLICATIONINFO\_new, OSSL\_CRMF\_SINGLEPUBINFO\_free,  
OSSL\_CRMF\_SINGLEPUBINFO\_it, OSSL\_CRMF\_SINGLEPUBINFO\_new, OTHERNAME\_free,  
OTHERNAME\_new, PBE2PARAM\_free, PBE2PARAM\_new, PBEPARAM\_free,  
PBEPARAM\_new, PBKDF2PARAM\_free, PBKDF2PARAM\_new, PKCS12\_BAGS\_free,  
PKCS12\_BAGS\_new, PKCS12\_MAC\_DATA\_free, PKCS12\_MAC\_DATA\_new,  
PKCS12\_SAFEBAG\_free, PKCS12\_SAFEBAG\_new, PKCS12\_free, PKCS12\_new,  
PKCS7\_DIGEST\_free, PKCS7\_DIGEST\_new, PKCS7\_ENCRYPT\_free, PKCS7\_ENCRYPT\_new,  
PKCS7\_ENC\_CONTENT\_free, PKCS7\_ENC\_CONTENT\_new, PKCS7\_ENVELOPE\_free,  
PKCS7\_ENVELOPE\_new, PKCS7\_ISSUER\_AND\_SERIAL\_free,  
PKCS7\_ISSUER\_AND\_SERIAL\_new, PKCS7\_RECIP\_INFO\_free, PKCS7\_RECIP\_INFO\_new,  
PKCS7\_SIGNED\_free, PKCS7\_SIGNED\_new, PKCS7\_SIGNER\_INFO\_free,  
PKCS7\_SIGNER\_INFO\_new, PKCS7\_SIGN\_ENVELOPE\_free, PKCS7\_SIGN\_ENVELOPE\_new,  
PKCS7\_dup, PKCS7\_free, PKCS7\_new\_ex, PKCS7\_new, PKCS7\_print\_ctx,  
PKCS8\_PRIV\_KEY\_INFO\_free, PKCS8\_PRIV\_KEY\_INFO\_new, PKEY\_USAGE\_PERIOD\_free,  
PKEY\_USAGE\_PERIOD\_new, POLICYINFO\_free, POLICYINFO\_new, POLICYQUALINFO\_free,  
POLICYQUALINFO\_new, POLICY\_CONSTRAINTS\_free, POLICY\_CONSTRAINTS\_new,  
POLICY\_MAPPING\_free, POLICY\_MAPPING\_new, PROFESSION\_INFOS\_free,  
PROFESSION\_INFOS\_new, PROFESSION\_INFO\_free, PROFESSION\_INFO\_new,  
PROXY\_CERT\_INFO\_EXTENSION\_free, PROXY\_CERT\_INFO\_EXTENSION\_new,  
PROXY\_POLICY\_free, PROXY\_POLICY\_new, RSAPrivateKey\_dup, RSAPublicKey\_dup,  
RSA\_OAEP\_PARAMS\_free, RSA\_OAEP\_PARAMS\_new, RSA\_PSS\_PARAMS\_free,  
RSA\_PSS\_PARAMS\_new, RSA\_PSS\_PARAMS\_dup, SCRYPT\_PARAMS\_free,  
SCRYPT\_PARAMS\_new, SXNETID\_free, SXNETID\_new, SXNET\_free, SXNET\_new,  
TLS\_FEATURE\_free, TLS\_FEATURE\_new, TS\_ACCURACY\_dup, TS\_ACCURACY\_free,  
TS\_ACCURACY\_new, TS\_MSG\_IMPRINT\_dup, TS\_MSG\_IMPRINT\_free,  
TS\_MSG\_IMPRINT\_new, TS\_REQ\_dup, TS\_REQ\_free, TS\_REQ\_new, TS\_RESP\_dup,  
TS\_RESP\_free, TS\_RESP\_new, TS\_STATUS\_INFO\_dup, TS\_STATUS\_INFO\_free,  
TS\_STATUS\_INFO\_new, TS\_TST\_INFO\_dup, TS\_TST\_INFO\_free, TS\_TST\_INFO\_new,

USERNOTICE\_free, USERNOTICE\_new, X509\_ALGOR\_free, X509\_ALGOR\_it,  
 X509\_ALGOR\_new, X509\_ATTRIBUTE\_dup, X509\_ATTRIBUTE\_free, X509\_ATTRIBUTE\_new,  
 X509\_CERT\_AUX\_free, X509\_CERT\_AUX\_new, X509\_CINF\_free, X509\_CINF\_new,  
 X509\_CRL\_INFO\_free, X509\_CRL\_INFO\_new, X509\_CRL\_dup, X509\_CRL\_free,  
 X509\_CRL\_new\_ex, X509\_CRL\_new, X509\_EXTENSION\_dup, X509\_EXTENSION\_free,  
 X509\_EXTENSION\_new, X509\_NAME\_ENTRY\_dup, X509\_NAME\_ENTRY\_free,  
 X509\_NAME\_ENTRY\_new, X509\_NAME\_dup, X509\_NAME\_free, X509\_NAME\_new,  
 X509\_REQ\_INFO\_free, X509\_REQ\_INFO\_new, X509\_REQ\_dup, X509\_REQ\_free,  
 X509\_REQ\_new, X509\_REQ\_new\_ex, X509\_REVOKED\_dup, X509\_REVOKED\_free,  
 X509\_REVOKED\_new, X509\_SIG\_free, X509\_SIG\_new, X509\_VAL\_free, X509\_VAL\_new,  
 X509\_dup, - ASN1 object utilities

## SYNOPSIS

```
#include <openssl/asn1t.h>
```

```
DECLARE_ASN1_FUNCTIONS(type)
IMPLEMENT_ASN1_FUNCTIONS(stname)
```

```
typedef struct ASN1_ITEM_st ASN1_ITEM;
```

```
extern const ASN1_ITEM TYPE_it;
TYPE *TYPE_new(void);
TYPE *TYPE_dup(const TYPE *a);
void TYPE_free(TYPE *a);
int TYPE_print_ctx(BIO *out, TYPE *a, int indent, const ASN1_PCTX *pctx);
```

The following functions have been deprecated since OpenSSL 3.0, and can be hidden entirely by defining **OPENSSL\_API\_COMPAT** with a suitable version value, see **openssl\_user\_macros(7)**:

```
DSA *DSAParams_dup(const DSA *dsa);
RSA *RSAPrivateKey_dup(const RSA *rsa);
RSA *RSAPublicKey_dup(const RSA *rsa);
```

## DESCRIPTION

In the description below, **TYPE** is used as a placeholder for any of the OpenSSL datatypes, such as **X509**.

The OpenSSL ASN1 parsing library templates are like a data-driven bytecode interpreter. Every ASN1 object as a global variable, **TYPE\_it**, that describes the item such as its fields. (On systems which cannot export variables from shared libraries, the global is instead a function which returns a pointer to

a static variable.

The macro **DECLARE\_ASN1\_FUNCTIONS()** is typically used in header files to generate the function declarations.

The macro **IMPLEMENT\_ASN1\_FUNCTIONS()** is used once in a source file to generate the function bodies.

**TYPE\_new()** allocates an empty object of the indicated type. The object returned must be released by calling **TYPE\_free()**.

**TYPE\_new\_ex()** is similar to **TYPE\_new()** but also passes the library context *libctx* and the property query *propq* to use when retrieving algorithms from providers. This created object can then be used when loading binary data using **d2i\_TYPE()**.

**TYPE\_dup()** copies an existing object, leaving it untouched.

**TYPE\_free()** releases the object and all pointers and sub-objects within it.

**TYPE\_print\_ctx()** prints the object *a* on the specified BIO *out*. Each line will be prefixed with *indent* spaces. The *pctx* specifies the printing context and is for internal use; use NULL to get the default behavior. If a print function is user-defined, then pass in any *pctx* down to any nested calls.

## RETURN VALUES

**TYPE\_new()**, **TYPE\_new\_ex()** and **TYPE\_dup()** return a pointer to the object or NULL on failure.

**TYPE\_print\_ctx()** returns 1 on success or zero on failure.

## HISTORY

The functions **X509\_REQ\_new\_ex()**, **X509\_CRL\_new\_ex()**, **PKCS7\_new\_ex()** and **CMS\_ContentInfo\_new\_ex()** were added in OpenSSL 3.0.

The functions **DSAParams\_dup()**, **RSAPrivateKey\_dup()** and **RSAPublicKey\_dup()** were deprecated in 3.0.

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