#### NAME

- SSL\_CTX\_use\_certificate, SSL\_CTX\_use\_certificate\_ASN1, SSL\_CTX\_use\_certificate\_file,
- SSL\_use\_certificate, SSL\_use\_certificate\_ASN1, SSL\_use\_certificate\_file,
- SSL\_CTX\_use\_certificate\_chain\_file, SSL\_use\_certificate\_chain\_file, SSL\_CTX\_use\_PrivateKey,
- SSL\_CTX\_use\_PrivateKey\_ASN1, SSL\_CTX\_use\_PrivateKey\_file, SSL\_CTX\_use\_RSAPrivateKey,
- SSL\_CTX\_use\_RSAPrivateKey\_ASN1, SSL\_CTX\_use\_RSAPrivateKey\_file,
- SSL\_use\_PrivateKey\_file, SSL\_use\_PrivateKey\_ASN1, SSL\_use\_PrivateKey,
- SSL\_use\_RSAPrivateKey, SSL\_use\_RSAPrivateKey\_ASN1, SSL\_use\_RSAPrivateKey\_file,
- SSL\_CTX\_check\_private\_key, SSL\_check\_private\_key, SSL\_CTX\_use\_cert\_and\_key,
- SSL\_use\_cert\_and\_key load certificate and key data

# SYNOPSIS

#include <openssl/ssl.h>

- int SSL\_CTX\_use\_certificate(SSL\_CTX \*ctx, X509 \*x);
- int SSL\_CTX\_use\_certificate\_ASN1(SSL\_CTX \*ctx, int len, const unsigned char \*d);
- int SSL\_CTX\_use\_certificate\_file(SSL\_CTX \*ctx, const char \*file, int type);
- int SSL\_use\_certificate(SSL \*ssl, X509 \*x);
- int SSL\_use\_certificate\_ASN1(SSL \*ssl, const unsigned char \*d, int len);
- int SSL\_use\_certificate\_file(SSL \*ssl, const char \*file, int type);

int SSL\_CTX\_use\_certificate\_chain\_file(SSL\_CTX \*ctx, const char \*file);

- int SSL\_use\_certificate\_chain\_file(SSL \*ssl, const char \*file);
- int SSL\_CTX\_use\_PrivateKey(SSL\_CTX \*ctx, EVP\_PKEY \*pkey);
- int SSL\_CTX\_use\_PrivateKey\_file(SSL\_CTX \*ctx, const char \*file, int type);
- int SSL\_CTX\_use\_RSAPrivateKey(SSL\_CTX \*ctx, RSA \*rsa);
- int SSL\_CTX\_use\_RSAPrivateKey\_ASN1(SSL\_CTX \*ctx, const unsigned char \*d, long len);
- int SSL\_CTX\_use\_RSAPrivateKey\_file(SSL\_CTX \*ctx, const char \*file, int type);
- int SSL\_use\_PrivateKey(SSL \*ssl, EVP\_PKEY \*pkey);
- int SSL\_use\_PrivateKey\_ASN1(int pk, SSL \*ssl, const unsigned char \*d, long len);
- int SSL\_use\_PrivateKey\_file(SSL \*ssl, const char \*file, int type);
- int SSL\_use\_RSAPrivateKey(SSL \*ssl, RSA \*rsa);
- int SSL\_use\_RSAPrivateKey\_ASN1(SSL \*ssl, const unsigned char \*d, long len);
- int SSL\_use\_RSAPrivateKey\_file(SSL \*ssl, const char \*file, int type);
- int SSL\_CTX\_check\_private\_key(const SSL\_CTX \*ctx); int SSL\_check\_private\_key(const SSL \*ssl);

int SSL\_CTX\_use\_cert\_and\_key(SSL\_CTX \*ctx, X509 \*x, EVP\_PKEY \*pkey, STACK\_OF(X509) \*chain, int overri int SSL\_use\_cert\_and\_key(SSL \*ssl, X509 \*x, EVP\_PKEY \*pkey, STACK\_OF(X509) \*chain, int override);

### DESCRIPTION

These functions load the certificates and private keys into the SSL\_CTX or SSL object, respectively.

The SSL\_CTX\_\* class of functions loads the certificates and keys into the SSL\_CTX object **ctx**. The information is passed to SSL objects **ssl** created from **ctx** with **SSL\_new**(3) by copying, so that changes applied to **ctx** do not propagate to already existing SSL objects.

The SSL\_\* class of functions only loads certificates and keys into a specific SSL object. The specific information is kept, when **SSL\_clear**(3) is called for this SSL object.

**SSL\_CTX\_use\_certificate**() loads the certificate **x** into **ctx**, **SSL\_use\_certificate**() loads **x** into **ssl**. The rest of the certificates needed to form the complete certificate chain can be specified using the **SSL\_CTX\_add\_extra\_chain\_cert**(3) function.

**SSL\_CTX\_use\_certificate\_ASN1**() loads the ASN1 encoded certificate from the memory location **d** (with length **len**) into **ctx**, **SSL\_use\_certificate\_ASN1**() loads the ASN1 encoded certificate into **ssl**.

**SSL\_CTX\_use\_certificate\_file**() loads the first certificate stored in **file** into **ctx**. The formatting **type** of the certificate must be specified from the known types SSL\_FILETYPE\_PEM, SSL\_FILETYPE\_ASN1. **SSL\_use\_certificate\_file**() loads the certificate from **file** into **ssl**. See the NOTES section on why **SSL\_CTX\_use\_certificate\_chain\_file**() should be preferred.

**SSL\_CTX\_use\_certificate\_chain\_file**() loads a certificate chain from **file** into **ctx**. The certificates must be in PEM format and must be sorted starting with the subject's certificate (actual client or server certificate), followed by intermediate CA certificates if applicable, and ending at the highest level (root) CA. **SSL\_use\_certificate\_chain\_file**() is similar except it loads the certificate chain into **ssl**.

SSL\_CTX\_use\_PrivateKey() adds pkey as private key to ctx. SSL\_CTX\_use\_RSAPrivateKey() adds the private key rsa of type RSA to ctx. SSL\_use\_PrivateKey() adds pkey as private key to ssl; SSL\_use\_RSAPrivateKey() adds rsa as private key of type RSA to ssl. If a certificate has already been set and the private key does not belong to the certificate an error is returned. To change a [certificate/private-key] pair, the new certificate needs to be set first with SSL\_use\_certificate() or SSL\_CTX\_use\_certificate() before setting the private key with SSL\_CTX\_use\_PrivateKey() or SSL\_use\_PrivateKey().

**SSL\_CTX\_use\_cert\_and\_key**() and **SSL\_use\_cert\_and\_key**() assign the X.509 certificate **x**, private key **key**, and certificate **chain** onto the corresponding **ssl** or **ctx**. The **pkey** argument must be the private

key of the X.509 certificate **x**. If the **override** argument is 0, then **x**, **pkey** and **chain** are set only if all were not previously set. If **override** is non-0, then the certificate, private key and chain certs are always set. If **pkey** is NULL, then the public key of **x** is used as the private key. This is intended to be used with hardware (via the ENGINE interface) that stores the private key securely, such that it cannot be accessed by OpenSSL. The reference count of the public key is incremented (twice if there is no private key); it is not copied nor duplicated. This allows all private key validations checks to succeed without an actual private key being assigned via **SSL\_CTX\_use\_PrivateKey**(), etc.

SSL\_CTX\_use\_PrivateKey\_ASN1() adds the private key of type **pk** stored at memory location **d** (length **len**) to **ctx**. SSL\_CTX\_use\_RSAPrivateKey\_ASN1() adds the private key of type RSA stored at memory location **d** (length **len**) to **ctx**. SSL\_use\_PrivateKey\_ASN1() and SSL\_use\_RSAPrivateKey\_ASN1() add the private key to ssl.

SSL\_CTX\_use\_PrivateKey\_file() adds the first private key found in file to ctx. The formatting type of the private key must be specified from the known types SSL\_FILETYPE\_PEM, SSL\_FILETYPE\_ASN1. SSL\_CTX\_use\_RSAPrivateKey\_file() adds the first private RSA key found in file to ctx. SSL\_use\_PrivateKey\_file() adds the first private key found in file to ssl; SSL\_use\_RSAPrivateKey\_file() adds the first private RSA key found to ssl.

**SSL\_CTX\_check\_private\_key**() checks the consistency of a private key with the corresponding certificate loaded into **ctx**. If more than one key/certificate pair (RSA/DSA) is installed, the last item installed will be checked. If e.g. the last item was an RSA certificate or key, the RSA key/certificate pair will be checked. **SSL\_check\_private\_key**() performs the same check for **ssl**. If no key/certificate was explicitly added for this **ssl**, the last item added into **ctx** will be checked.

# NOTES

The internal certificate store of OpenSSL can hold several private key/certificate pairs at a time. The certificate used depends on the cipher selected, see also **SSL\_CTX\_set\_cipher\_list**(3).

When reading certificates and private keys from file, files of type SSL\_FILETYPE\_ASN1 (also known as **DER**, binary encoding) can only contain one certificate or private key, consequently **SSL\_CTX\_use\_certificate\_chain\_file**() is only applicable to PEM formatting. Files of type SSL\_FILETYPE\_PEM can contain more than one item.

**SSL\_CTX\_use\_certificate\_chain\_file**() adds the first certificate found in the file to the certificate store. The other certificates are added to the store of chain certificates using **SSL\_CTX\_add1\_chain\_cert**(3). Note: versions of OpenSSL before 1.0.2 only had a single certificate chain store for all certificate types, OpenSSL 1.0.2 and later have a separate chain store for each type.

**SSL\_CTX\_use\_certificate\_chain\_file**() should be used instead of the **SSL\_CTX\_use\_certificate\_file**() function in order to allow the use of complete certificate chains even when no trusted CA storage is

used or when the CA issuing the certificate shall not be added to the trusted CA storage.

If additional certificates are needed to complete the chain during the TLS negotiation, CA certificates are additionally looked up in the locations of trusted CA certificates, see **SSL\_CTX\_load\_verify\_locations**(3).

The private keys loaded from file can be encrypted. In order to successfully load encrypted keys, a function returning the passphrase must have been supplied, see **SSL\_CTX\_set\_default\_passwd\_cb**(3). (Certificate files might be encrypted as well from the technical point of view, it however does not make sense as the data in the certificate is considered public anyway.)

All of the functions to set a new certificate will replace any existing certificate of the same type that has already been set. Similarly all of the functions to set a new private key will replace any private key that has already been set. Applications should call **SSL\_CTX\_check\_private\_key**(3) or **SSL\_check\_private\_key**(3) as appropriate after loading a new certificate and private key to confirm that the certificate and key match.

#### **RETURN VALUES**

On success, the functions return 1. Otherwise check out the error stack to find out the reason.

### SEE ALSO

ssl(7), SSL\_new(3), SSL\_clear(3), SSL\_CTX\_load\_verify\_locations(3), SSL\_CTX\_set\_default\_passwd\_cb(3), SSL\_CTX\_set\_cipher\_list(3), SSL\_CTX\_set\_client\_CA\_list(3), SSL\_CTX\_set\_client\_cert\_cb(3), SSL\_CTX\_add\_extra\_chain\_cert(3)

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