

**NAME**

X509\_STORE\_CTX\_get\_cleanup, X509\_STORE\_CTX\_get\_lookup\_crls,  
 X509\_STORE\_CTX\_get\_lookup\_certs, X509\_STORE\_CTX\_get\_check\_policy,  
 X509\_STORE\_CTX\_get\_cert\_crl, X509\_STORE\_CTX\_get\_check\_crl,  
 X509\_STORE\_CTX\_get\_get\_crl, X509\_STORE\_CTX\_get\_check\_revocation,  
 X509\_STORE\_CTX\_get\_check\_issued, X509\_STORE\_CTX\_get\_get\_issuer,  
 X509\_STORE\_CTX\_get\_verify\_cb, X509\_STORE\_CTX\_set\_verify\_cb,  
 X509\_STORE\_CTX\_verify\_cb, X509\_STORE\_CTX\_print\_verify\_cb - get and set  
 X509\_STORE\_CTX components such as verification callback

**SYNOPSIS**

```
#include <openssl/x509_vfy.h>
```

```
typedef int (*X509_STORE_CTX_verify_cb)(int, X509_STORE_CTX *);
int X509_STORE_CTX_print_verify_cb(int ok, X509_STORE_CTX *ctx);
```

```
X509_STORE_CTX_verify_cb X509_STORE_CTX_get_verify_cb(X509_STORE_CTX *ctx);
```

```
void X509_STORE_CTX_set_verify_cb(X509_STORE_CTX *ctx,
                                  X509_STORE_CTX_verify_cb verify_cb);
```

```
X509_STORE_CTX_get_issuer_fn X509_STORE_CTX_get_get_issuer(X509_STORE_CTX *ctx);
X509_STORE_CTX_check_issued_fn X509_STORE_CTX_get_check_issued(X509_STORE_CTX *ctx);
X509_STORE_CTX_check_revocation_fn X509_STORE_CTX_get_check_revocation(X509_STORE_CTX *ctx);
X509_STORE_CTX_get_crl_fn X509_STORE_CTX_get_get_crl(X509_STORE_CTX *ctx);
X509_STORE_CTX_check_crl_fn X509_STORE_CTX_get_check_crl(X509_STORE_CTX *ctx);
X509_STORE_CTX_cert_crl_fn X509_STORE_CTX_get_cert_crl(X509_STORE_CTX *ctx);
X509_STORE_CTX_check_policy_fn X509_STORE_CTX_get_check_policy(X509_STORE_CTX *ctx);
X509_STORE_CTX_lookup_certs_fn X509_STORE_CTX_get_lookup_certs(X509_STORE_CTX *ctx);
X509_STORE_CTX_lookup_crls_fn X509_STORE_CTX_get_lookup_crls(X509_STORE_CTX *ctx);
X509_STORE_CTX_cleanup_fn X509_STORE_CTX_get_cleanup(X509_STORE_CTX *ctx);
```

**DESCRIPTION**

**X509\_STORE\_CTX\_set\_verify\_cb()** sets the verification callback of **ctx** to **verify\_cb** overwriting any existing callback.

The verification callback can be used to customise the operation of certificate verification, for instance by overriding error conditions or logging errors for debugging purposes.

However, a verification callback is **not** essential and the default operation is often sufficient.

The **ok** parameter to the callback indicates the value the callback should return to retain the default behaviour. If it is zero then an error condition is indicated. If it is 1 then no error occurred. If the flag **X509\_V\_FLAG\_NOTIFY\_POLICY** is set then **ok** is set to 2 to indicate the policy checking is complete.

The **ctx** parameter to the callback is the **X509\_STORE\_CTX** structure that is performing the verification operation. A callback can examine this structure and receive additional information about the error, for example by calling **X509\_STORE\_CTX\_get\_current\_cert()**. Additional application data can be passed to the callback via the **ex\_data** mechanism.

**X509\_STORE\_CTX\_print\_verify\_cb()** is a verification callback function that, when a certificate verification has failed, adds an entry to the error queue with code **X509\_R\_CERTIFICATE\_VERIFICATION\_FAILED** and with diagnostic details, including the most relevant fields of the target certificate that failed to verify and, if appropriate, of the available untrusted and trusted certificates.

**X509\_STORE\_CTX\_get\_verify\_cb()** returns the value of the current callback for the specific **ctx**.

**X509\_STORE\_CTX\_get\_get\_issuer()**, **X509\_STORE\_CTX\_get\_check\_issued()**, **X509\_STORE\_CTX\_get\_check\_revocation()**, **X509\_STORE\_CTX\_get\_get\_crl()**, **X509\_STORE\_CTX\_get\_check\_crl()**, **X509\_STORE\_CTX\_get\_cert\_crl()**, **X509\_STORE\_CTX\_get\_check\_policy()**, **X509\_STORE\_CTX\_get\_lookup\_certs()**, **X509\_STORE\_CTX\_get\_lookup\_crls()** and **X509\_STORE\_CTX\_get\_cleanup()** return the function pointers cached from the corresponding **X509\_STORE**, please see **X509\_STORE\_set\_verify(3)** for more information.

## WARNINGS

In general a verification callback should **NOT** unconditionally return 1 in all circumstances because this will allow verification to succeed no matter what the error. This effectively removes all security from the application because **any** certificate (including untrusted generated ones) will be accepted.

## NOTES

The verification callback can be set and inherited from the parent structure performing the operation. In some cases (such as S/MIME verification) the **X509\_STORE\_CTX** structure is created and destroyed internally and the only way to set a custom verification callback is by inheriting it from the associated **X509\_STORE**.

## RETURN VALUES

**X509\_STORE\_CTX\_set\_verify\_cb()** does not return a value.

**EXAMPLES**

Default callback operation:

```
int verify_callback(int ok, X509_STORE_CTX *ctx) {
    return ok;
}
```

Simple example, suppose a certificate in the chain is expired and we wish to continue after this error:

```
int verify_callback(int ok, X509_STORE_CTX *ctx) {
    /* Tolerate certificate expiration */
    if (X509_STORE_CTX_get_error(ctx) == X509_V_ERR_CERT_HAS_EXPIRED)
        return 1;
    /* Otherwise don't override */
    return ok;
}
```

More complex example, we don't wish to continue after **any** certificate has expired just one specific case:

```
int verify_callback(int ok, X509_STORE_CTX *ctx)
{
    int err = X509_STORE_CTX_get_error(ctx);
    X509 *err_cert = X509_STORE_CTX_get_current_cert(ctx);

    if (err == X509_V_ERR_CERT_HAS_EXPIRED) {
        if (check_is_acceptable_expired_cert(err_cert))
            return 1;
    }
    return ok;
}
```

Full featured logging callback. In this case the **bio\_err** is assumed to be a global logging **BIO**, an alternative would be to store a BIO in **ctx** using **ex\_data**.

```
int verify_callback(int ok, X509_STORE_CTX *ctx)
{
    X509 *err_cert;
    int err, depth;
```

```

err_cert = X509_STORE_CTX_get_current_cert(ctx);
err = X509_STORE_CTX_get_error(ctx);
depth = X509_STORE_CTX_get_error_depth(ctx);

BIO_printf(bio_err, "depth=%d ", depth);
if (err_cert) {
    X509_NAME_print_ex(bio_err, X509_get_subject_name(err_cert),
                      0, XN_FLAG_ONELINE);
    BIO_puts(bio_err, "\n");
}
else
    BIO_puts(bio_err, "<no cert>\n");
if (!ok)
    BIO_printf(bio_err, "verify error:num=%d:%s\n", err,
              X509_verify_cert_error_string(err));
switch (err) {
case X509_V_ERR_UNABLE_TO_GET_ISSUER_CERT:
    BIO_puts(bio_err, "issuer=");
    X509_NAME_print_ex(bio_err, X509_get_issuer_name(err_cert),
                      0, XN_FLAG_ONELINE);
    BIO_puts(bio_err, "\n");
    break;
case X509_V_ERR_CERT_NOT_YET_VALID:
case X509_V_ERR_ERROR_IN_CERT_NOT_BEFORE_FIELD:
    BIO_printf(bio_err, "notBefore=");
    ASN1_TIME_print(bio_err, X509_get_notBefore(err_cert));
    BIO_printf(bio_err, "\n");
    break;
case X509_V_ERR_CERT_HAS_EXPIRED:
case X509_V_ERR_ERROR_IN_CERT_NOT_AFTER_FIELD:
    BIO_printf(bio_err, "notAfter=");
    ASN1_TIME_print(bio_err, X509_get_notAfter(err_cert));
    BIO_printf(bio_err, "\n");
    break;
case X509_V_ERR_NO_EXPLICIT_POLICY:
    policies_print(bio_err, ctx);
    break;
}
if (err == X509_V_OK && ok == 2)
    /* print out policies */

```

```
BIO_printf(bio_err, "verify return:%d\n", ok);  
return(ok);  
}
```

## SEE ALSO

**X509\_STORE\_CTX\_get\_error(3)** **X509\_STORE\_set\_verify\_cb\_func(3)**  
**X509\_STORE\_CTX\_get\_ex\_new\_index(3)**

## HISTORY

The **X509\_STORE\_CTX\_get\_get\_issuer()**, **X509\_STORE\_CTX\_get\_check\_issued()**, **X509\_STORE\_CTX\_get\_check\_revocation()**, **X509\_STORE\_CTX\_get\_get\_crl()**, **X509\_STORE\_CTX\_get\_check\_crl()**, **X509\_STORE\_CTX\_get\_cert\_crl()**, **X509\_STORE\_CTX\_get\_check\_policy()**, **X509\_STORE\_CTX\_get\_lookup\_certs()**, **X509\_STORE\_CTX\_get\_lookup\_crls()** and **X509\_STORE\_CTX\_get\_cleanup()** functions were added in OpenSSL 1.1.0.

**X509\_STORE\_CTX\_print\_verify\_cb()** was added in OpenSSL 3.0.

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