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## **Red Hat Enterprise Linux Release 9.2 Manual Pages on 'X509\_VERIFY\_PARAM\_set\_auth\_level.3ossl' command**

**`$ man X509_VERIFY_PARAM_set_auth_level.3ossl`**

X509\_VERIFY\_PARAM\_SET\_FLAGS(3ossl) OpenSSL X509\_VERIFY\_PARAM\_SET\_FLAGS(3ossl)

### NAME

X509\_VERIFY\_PARAM\_set\_flags, X509\_VERIFY\_PARAM\_clear\_flags,  
X509\_VERIFY\_PARAM\_get\_flags, X509\_VERIFY\_PARAM\_set\_purpose,  
X509\_VERIFY\_PARAM\_get\_inh\_flags, X509\_VERIFY\_PARAM\_set\_inh\_flags,  
X509\_VERIFY\_PARAM\_set\_trust, X509\_VERIFY\_PARAM\_set\_depth,  
X509\_VERIFY\_PARAM\_get\_depth, X509\_VERIFY\_PARAM\_set\_auth\_level,  
X509\_VERIFY\_PARAM\_get\_auth\_level, X509\_VERIFY\_PARAM\_set\_time,  
X509\_VERIFY\_PARAM\_get\_time, X509\_VERIFY\_PARAM\_add0\_policy,  
X509\_VERIFY\_PARAM\_set1\_policies, X509\_VERIFY\_PARAM\_get0\_host,  
X509\_VERIFY\_PARAM\_set1\_host, X509\_VERIFY\_PARAM\_add1\_host,  
X509\_VERIFY\_PARAM\_set\_hostflags, X509\_VERIFY\_PARAM\_get\_hostflags,  
X509\_VERIFY\_PARAM\_get0\_peername, X509\_VERIFY\_PARAM\_get0\_email,  
X509\_VERIFY\_PARAM\_set1\_email, X509\_VERIFY\_PARAM\_set1\_ip,  
X509\_VERIFY\_PARAM\_get1\_ip\_asc, X509\_VERIFY\_PARAM\_set1\_ip\_asc - X509  
verification parameters

### SYNOPSIS

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

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_inh_flags(X509_VERIFY_PARAM *param,
    uint32_t flags);
uint32_t X509_VERIFY_PARAM_get_inh_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_time(X509_VERIFY_PARAM *param, time_t t);
time_t X509_VERIFY_PARAM_get_time(const X509_VERIFY_PARAM *param);
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);
void X509_VERIFY_PARAM_set_depth(X509_VERIFY_PARAM *param, int depth);
int X509_VERIFY_PARAM_get_depth(const X509_VERIFY_PARAM *param);
void X509_VERIFY_PARAM_set_auth_level(X509_VERIFY_PARAM *param,
    int auth_level);
int X509_VERIFY_PARAM_get_auth_level(const X509_VERIFY_PARAM *param);
char *X509_VERIFY_PARAM_get0_host(X509_VERIFY_PARAM *param, int n);
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);
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 emailen);
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);

```

These functions manipulate the X509\_VERIFY\_PARAM structure associated with a certificate verification operation.

The X509\_VERIFY\_PARAM\_set\_flags() function sets the flags in param by oring it with flags. See "VERIFICATION FLAGS" for a complete description of values the flags parameter can take.

X509\_VERIFY\_PARAM\_get\_flags() returns the flags in param.

X509\_VERIFY\_PARAM\_get\_inh\_flags() returns the inheritance flags in param which specifies how verification flags are copied from one structure to another. X509\_VERIFY\_PARAM\_set\_inh\_flags() sets the inheritance flags. See the INHERITANCE FLAGS section for a description of these bits.

X509\_VERIFY\_PARAM\_clear\_flags() clears the flags in param.

X509\_VERIFY\_PARAM\_set\_purpose() sets the verification purpose in param to purpose. This determines the acceptable purpose of the certificate chain, for example X509\_PURPOSE\_SSL\_CLIENT.

X509\_VERIFY\_PARAM\_set\_trust() sets the trust setting in param to trust.

X509\_VERIFY\_PARAM\_set\_time() sets the verification time in param to t.

Normally the current time is used.

X509\_VERIFY\_PARAM\_add0\_policy() adds policy to the acceptable policy set. Contrary to preexisting documentation of this function it does not enable policy checking.

X509\_VERIFY\_PARAM\_set1\_policies() enables policy checking (it is disabled by default) and sets the acceptable policy set to policies.

Any existing policy set is cleared. The policies parameter can be NULL to clear an existing policy set.

X509\_VERIFY\_PARAM\_set\_depth() sets the maximum verification depth to depth. That is the maximum number of intermediate CA certificates that can appear in a chain. A maximal depth chain contains 2 more certificates than the limit, since neither the end-entity certificate nor the trust-anchor count against this limit. Thus a depth limit of 0 only allows the end-entity certificate to be signed directly by the trust anchor, while with a depth limit of 1 there can be one intermediate CA certificate between the trust anchor and the end-entity

certificate.

X509\_VERIFY\_PARAM\_set\_auth\_level() sets the authentication security level to auth\_level. The authentication security level determines the acceptable signature and public key strength when verifying certificate chains. For a certificate chain to validate, the public keys of all the certificates must meet the specified security level. The signature algorithm security level is not enforced for the chain's trust anchor certificate, which is either directly trusted or validated by means other than its signature. See SSL\_CTX\_set\_security\_level(3) for the definitions of the available levels. The default security level is -1, or "not set". At security level 0 or lower all algorithms are acceptable. Security level 1 requires at least 80-bit-equivalent security and is broadly interoperable, though it will, for example, reject MD5 signatures or RSA keys shorter than 1024 bits.

X509\_VERIFY\_PARAM\_get0\_host() returns the nth expected DNS hostname that has been set using X509\_VERIFY\_PARAM\_set1\_host() or X509\_VERIFY\_PARAM\_add1\_host(). To obtain all names start with n = 0 and increment n as long as no NULL pointer is returned.

X509\_VERIFY\_PARAM\_set1\_host() sets the expected DNS hostname to name clearing any previously specified hostname. If name is NULL, or empty the list of hostnames is cleared, and name checks are not performed on the peer certificate. If name is NUL-terminated, namelen may be zero, otherwise namelen must be set to the length of name.

When a hostname is specified, certificate verification automatically invokes X509\_check\_host(3) with flags equal to the flags argument given to X509\_VERIFY\_PARAM\_set\_hostflags() (default zero). Applications are strongly advised to use this interface in preference to explicitly calling X509\_check\_host(3), hostname checks may be out of scope with the DANE-EE(3) certificate usage, and the internal check will be suppressed as appropriate when DANE verification is enabled.

When the subject CommonName will not be ignored, whether as a result of the X509\_CHECK\_FLAG\_ALWAYS\_CHECK\_SUBJECT host flag, or because no DNS subject alternative names are present in the certificate, any DNS name

constraints in issuer certificates apply to the subject CommonName as well as the subject alternative name extension.

When the subject CommonName will be ignored, whether as a result of the X509\_CHECK\_FLAG\_NEVER\_CHECK\_SUBJECT host flag, or because some DNS subject alternative names are present in the certificate, DNS name constraints in issuer certificates will not be applied to the subject DN. As described in X509\_check\_host(3) the X509\_CHECK\_FLAG\_NEVER\_CHECK\_SUBJECT flag takes precedence over the X509\_CHECK\_FLAG\_ALWAYS\_CHECK\_SUBJECT flag.

X509\_VERIFY\_PARAM\_get\_hostflags() returns any host flags previously set via a call to X509\_VERIFY\_PARAM\_set\_hostflags().

X509\_VERIFY\_PARAM\_add1\_host() adds name as an additional reference identifier that can match the peer's certificate. Any previous names set via X509\_VERIFY\_PARAM\_set1\_host() or X509\_VERIFY\_PARAM\_add1\_host() are retained, no change is made if name is NULL or empty. When multiple names are configured, the peer is considered verified when any name matches.

X509\_VERIFY\_PARAM\_get0\_peername() returns the DNS hostname or subject CommonName from the peer certificate that matched one of the reference identifiers. When wildcard matching is not disabled, or when a reference identifier specifies a parent domain (starts with ".") rather than a hostname, the peer name may be a wildcard name or a sub-domain of the reference identifier respectively. The return string is allocated by the library and is no longer valid once the associated param argument is freed. Applications must not free the return value.

X509\_VERIFY\_PARAM\_get0\_email() returns the expected RFC822 email address.

X509\_VERIFY\_PARAM\_set1\_email() sets the expected RFC822 email address to email. If email is NUL-terminated, emailen may be zero, otherwise emailen must be set to the length of email. When an email address is specified, certificate verification automatically invokes

X509\_check\_email(3).

X509\_VERIFY\_PARAM\_get1\_ip\_asc() returns the expected IP address as a

string. The caller is responsible for freeing it.

X509\_VERIFY\_PARAM\_set1\_ip() sets the expected IP address to ip. The ip argument is in binary format, in network byte-order and iplen must be set to 4 for IPv4 and 16 for IPv6. When an IP address is specified, certificate verification automatically invokes X509\_check\_ip(3).

X509\_VERIFY\_PARAM\_set1\_ip\_asc() sets the expected IP address to ipasc. The ipasc argument is a NUL-terminal ASCII string: dotted decimal quad for IPv4 and colon-separated hexadecimal for IPv6. The condensed "::" notation is supported for IPv6 addresses.

## RETURN VALUES

X509\_VERIFY\_PARAM\_set\_flags(), X509\_VERIFY\_PARAM\_clear\_flags(), X509\_VERIFY\_PARAM\_set\_inh\_flags(), X509\_VERIFY\_PARAM\_set\_purpose(), X509\_VERIFY\_PARAM\_set\_trust(), X509\_VERIFY\_PARAM\_add0\_policy(), X509\_VERIFY\_PARAM\_set1\_policies(), X509\_VERIFY\_PARAM\_set1\_host(), X509\_VERIFY\_PARAM\_add1\_host(), X509\_VERIFY\_PARAM\_set1\_email(), X509\_VERIFY\_PARAM\_set1\_ip() and X509\_VERIFY\_PARAM\_set1\_ip\_asc() return 1 for success and 0 for failure.

X509\_VERIFY\_PARAM\_get0\_host(), X509\_VERIFY\_PARAM\_get0\_email(), and X509\_VERIFY\_PARAM\_get1\_ip\_asc(), return the string pointers specified above or NULL if the respective value has not been set or on error.

X509\_VERIFY\_PARAM\_get\_flags() returns the current verification flags.

X509\_VERIFY\_PARAM\_get\_hostflags() returns any current host flags.

X509\_VERIFY\_PARAM\_get\_inh\_flags() returns the current inheritance flags.

X509\_VERIFY\_PARAM\_set\_time() and X509\_VERIFY\_PARAM\_set\_depth() do not return values.

X509\_VERIFY\_PARAM\_get\_depth() returns the current verification depth.

X509\_VERIFY\_PARAM\_get\_auth\_level() returns the current authentication security level.

## VERIFICATION FLAGS

The verification flags consists of zero or more of the following flags or'd together.

X509\_V\_FLAG\_CRL\_CHECK enables CRL checking for the certificate chain

leaf certificate. An error occurs if a suitable CRL cannot be found.

X509\_V\_FLAG\_CRL\_CHECK\_ALL enables CRL checking for the entire certificate chain.

X509\_V\_FLAG\_IGNORE\_CRITICAL disables critical extension checking. By default any unhandled critical extensions in certificates or (if checked) CRLs result in a fatal error. If this flag is set unhandled critical extensions are ignored. WARNING setting this option for anything other than debugging purposes can be a security risk. Finer control over which extensions are supported can be performed in the verification callback.

The X509\_V\_FLAG\_X509\_STRICT flag disables workarounds for some broken certificates and makes the verification strictly apply X509 rules.

X509\_V\_FLAG\_ALLOW\_PROXY\_CERTS enables proxy certificate verification.

X509\_V\_FLAG\_POLICY\_CHECK enables certificate policy checking, by default no policy checking is performed. Additional information is sent to the verification callback relating to policy checking.

X509\_V\_FLAG\_EXPLICIT\_POLICY, X509\_V\_FLAG\_INHIBIT\_ANY and X509\_V\_FLAG\_INHIBIT\_MAP set the require explicit policy, inhibit any policy and inhibit policy mapping flags respectively as defined in RFC3280. Policy checking is automatically enabled if any of these flags are set.

If X509\_V\_FLAG\_NOTIFY\_POLICY is set and the policy checking is successful a special status code is set to the verification callback.

This permits it to examine the valid policy tree and perform additional checks or simply log it for debugging purposes.

By default some additional features such as indirect CRLs and CRLs signed by different keys are disabled. If

X509\_V\_FLAG\_EXTENDED\_CRL\_SUPPORT is set they are enabled.

If X509\_V\_FLAG\_USE\_DELTAS is set delta CRLs (if present) are used to determine certificate status. If not set deltas are ignored.

X509\_V\_FLAG\_CHECK\_SS\_SIGNATURE requests checking the signature of the last certificate in a chain if the certificate is supposedly self-signed. This is prohibited and will result in an error if it is a non-

conforming CA certificate with key usage restrictions not including the keyCertSign bit. By default this check is disabled because it doesn't add any additional security but in some cases applications might want to check the signature anyway. A side effect of not checking the self-signature of such a certificate is that disabled or unsupported message digests used for the signature are not treated as fatal errors.

When X509\_V\_FLAG\_TRUSTED\_FIRST is set, which is always the case since OpenSSL 1.1.0, construction of the certificate chain in X509\_verify\_cert(3) searches the trust store for issuer certificates before searching the provided untrusted certificates. Local issuer certificates are often more likely to satisfy local security requirements and lead to a locally trusted root. This is especially important when some certificates in the trust store have explicit trust settings (see "TRUST SETTINGS" in openssl-x509(1)).

The X509\_V\_FLAG\_NO\_ALT\_CHAINS flag could have been used before OpenSSL 1.1.0 to suppress checking for alternative chains. By default, unless X509\_V\_FLAG\_TRUSTED\_FIRST is set, when building a certificate chain, if the first certificate chain found is not trusted, then OpenSSL will attempt to replace untrusted certificates supplied by the peer with certificates from the trust store to see if an alternative chain can be found that is trusted. As of OpenSSL 1.1.0, with X509\_V\_FLAG\_TRUSTED\_FIRST always set, this option has no effect.

The X509\_V\_FLAG\_PARTIAL\_CHAIN flag causes non-self-signed certificates in the trust store to be treated as trust anchors, in the same way as self-signed root CA certificates. This makes it possible to trust self-issued certificates as well as certificates issued by an intermediate CA without having to trust their ancestor root CA. With OpenSSL 1.1.0 and later and X509\_V\_FLAG\_PARTIAL\_CHAIN set, chain construction stops as soon as the first certificate contained in the trust store is added to the chain, whether that certificate is a self-signed "root" certificate or a not self-signed "intermediate" or self-issued certificate. Thus, when an intermediate certificate is found in the trust store, the verified chain passed to callbacks may be shorter

than it otherwise would be without the X509\_V\_FLAG\_PARTIAL\_CHAIN flag. The X509\_V\_FLAG\_NO\_CHECK\_TIME flag suppresses checking the validity period of certificates and CRLs against the current time. If X509\_VERIFY\_PARAM\_set\_time() is used to specify a verification time, the check is not suppressed.

## INHERITANCE FLAGS

These flags specify how parameters are "inherited" from one structure to another.

If X509\_VP\_FLAG\_ONCE is set then the current setting is zeroed after the next call.

If X509\_VP\_FLAG\_LOCKED is set then no values are copied. This overrides all of the following flags.

If X509\_VP\_FLAG\_DEFAULT is set then anything set in the source is copied to the destination. Effectively the values in "to" become default values which will be used only if nothing new is set in "from".

This is the default.

If X509\_VP\_FLAG\_OVERWRITE is set then all value are copied across whether they are set or not. Flags is still Ored though.

If X509\_VP\_FLAG\_RESET\_FLAGS is set then the flags value is copied instead of ORed.

## NOTES

The above functions should be used to manipulate verification parameters instead of functions which work in specific structures such as X509\_STORE\_CTX\_set\_flags() which are likely to be deprecated in a future release.

## BUGS

Delta CRL checking is currently primitive. Only a single delta can be used and (partly due to limitations of X509\_STORE) constructed CRLs are not maintained.

If CRLs checking is enable CRLs are expected to be available in the corresponding X509\_STORE structure. No attempt is made to download CRLs from the CRL distribution points extension.

## EXAMPLES

Enable CRL checking when performing certificate verification during SSL connections associated with an SSL\_CTX structure ctx:

```
X509_VERIFY_PARAM *param;  
param = X509_VERIFY_PARAM_new();  
X509_VERIFY_PARAM_set_flags(param, X509_V_FLAG_CRL_CHECK);  
SSL_CTX_set1_param(ctx, param);  
X509_VERIFY_PARAM_free(param);
```

#### SEE ALSO

X509\_verify\_cert(3), X509\_check\_host(3), X509\_check\_email(3),  
X509\_check\_ip(3), openssl-x509(1)

#### HISTORY

The X509\_V\_FLAG\_NO\_ALT\_CHAINS flag was added in OpenSSL 1.1.0. The flag X509\_V\_FLAG\_CB\_ISSUER\_CHECK was deprecated in OpenSSL 1.1.0 and has no effect.

The X509\_VERIFY\_PARAM\_get\_hostflags() function was added in OpenSSL 1.1.0i.

The X509\_VERIFY\_PARAM\_get0\_host(), X509\_VERIFY\_PARAM\_get0\_email(), and X509\_VERIFY\_PARAM\_get1\_ip\_asc() functions were added in OpenSSL 3.0.

The function X509\_VERIFY\_PARAM\_add0\_policy() was historically documented as enabling policy checking however the implementation has never done this. The documentation was changed to align with the implementation.

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