



Rocky Enterprise Linux 9.2 Manual Pages on command 'openssl-enc.1ssl'

C:\>man openssl-enc.1ssl

ENC(1SSL) OpenSSL ENC(1SSL)

NAME

openssl-enc, enc - symmetric cipher routines

SYNOPSIS

```
openssl enc -cipher [-help] [-list] [-ciphers] [-in filename] [-out filename]
[-pass arg] [-e] [-d] [-a] [-base64] [-A] [-k password] [-kfile filename] [-K key]
[-iv IV] [-S salt] [-salt] [-nosalt] [-z] [-md digest] [-iter count] [-pbkdf2] [-p]
[-P] [-bufsize number] [-nopad] [-debug] [-none] [-rand file...] [-writerand file]
[-engine id]
openssl [cipher] [...]
```

DESCRIPTION

The symmetric cipher commands allow data to be encrypted or decrypted using various block and stream ciphers using keys based on passwords or explicitly provided.

Base64 encoding or decoding can also be performed either by itself or in addition to the encryption or decryption.

OPTIONS

-help

Print out a usage message.

-list

List all supported ciphers.

-ciphers

Alias of -list to display all supported ciphers.

-in filename

The input filename, standard input by default.

-out filename

The output filename, standard output by default.

-pass arg

The password source. For more information about the format of arg see the PASS PHRASE ARGUMENTS section in openssl(1).

-e Encrypt the input data: this is the default.

-d Decrypt the input data.

-a Base64 process the data. This means that if encryption is taking place the data is base64 encoded after encryption. If decryption is set then the input data is base64 decoded before being decrypted.

-base64

Same as -a

-A If the -a option is set then base64 process the data on one line.

-k password

The password to derive the key from. This is for compatibility with previous versions of OpenSSL. Superseded by the -pass argument.

-kfile filename

Read the password to derive the key from the first line of filename. This is for compatibility with previous versions of OpenSSL. Superseded by the -pass argument.

-md digest

Use the specified digest to create the key from the passphrase. The default algorithm is sha-256.

-iter count

Use a given number of iterations on the password in deriving the encryption key. High values increase the time required to brute-force the resulting file.

This option enables the use of PBKDF2 algorithm to derive the key.

-pbkdf2

Use PBKDF2 algorithm with default iteration count unless otherwise specified.

-nosalt

Don't use a salt in the key derivation routines. This option SHOULD NOT be used

except for test purposes or compatibility with ancient versions of OpenSSL.

-salt

Use salt (randomly generated or provide with -S option) when encrypting, this is the default.

-S salt

The actual salt to use: this must be represented as a string of hex digits.

-K key

The actual key to use: this must be represented as a string comprised only of hex digits. If only the key is specified, the IV must additionally specified using the -iv option. When both a key and a password are specified, the key given with the -K option will be used and the IV generated from the password will be taken. It does not make much sense to specify both key and password.

-iv IV

The actual IV to use: this must be represented as a string comprised only of hex digits. When only the key is specified using the -K option, the IV must explicitly be defined. When a password is being specified using one of the other options, the IV is generated from this password.

-p Print out the key and IV used.

-P Print out the key and IV used then immediately exit: don't do any encryption or decryption.

-bufsize number

Set the buffer size for I/O.

-nopad

Disable standard block padding.

-debug

Debug the BIOs used for I/O.

-z Compress or decompress clear text using zlib before encryption or after decryption. This option exists only if OpenSSL with compiled with zlib or zlib-dynamic option.

-none

Use NULL cipher (no encryption or decryption of input).

-rand file...

A file or files containing random data used to seed the random number

generator. Multiple files can be specified separated by an OS-dependent character. The separator is ; for MS-Windows, , for OpenVMS, and : for all others.

[-writerand file]

Writes random data to the specified file upon exit. This can be used with a subsequent -rand flag.

NOTES

The program can be called either as openssl cipher or openssl enc -cipher. The first form doesn't work with engine-provided ciphers, because this form is processed before the configuration file is read and any ENGINES loaded. Use the list command to get a list of supported ciphers.

Engines which provide entirely new encryption algorithms (such as the ccgost engine which provides gost89 algorithm) should be configured in the configuration file.

Engines specified on the command line using -engine options can only be used for hardware-assisted implementations of ciphers which are supported by the OpenSSL core or another engine specified in the configuration file.

When the enc command lists supported ciphers, ciphers provided by engines, specified in the configuration files are listed too.

A password will be prompted for to derive the key and IV if necessary.

The -salt option should ALWAYS be used if the key is being derived from a password unless you want compatibility with previous versions of OpenSSL.

Without the -salt option it is possible to perform efficient dictionary attacks on the password and to attack stream cipher encrypted data. The reason for this is that without the salt the same password always generates the same encryption key.

When the salt is being used the first eight bytes of the encrypted data are reserved for the salt: it is generated at random when encrypting a file and read from the encrypted file when it is decrypted.

Some of the ciphers do not have large keys and others have security implications if not used correctly. A beginner is advised to just use a strong block cipher, such as AES, in CBC mode.

All the block ciphers normally use PKCS#5 padding, also known as standard block padding. This allows a rudimentary integrity or password check to be performed.

However since the chance of random data passing the test is better than 1 in 256 it

isn't a very good test.

If padding is disabled then the input data must be a multiple of the cipher block length.

All RC2 ciphers have the same key and effective key length.

Blowfish and RC5 algorithms use a 128 bit key.

SUPPORTED CIPHERS

Note that some of these ciphers can be disabled at compile time and some are available only if an appropriate engine is configured in the configuration file.

The output of the enc command run with the -ciphers option (that is openssl enc -ciphers) produces a list of ciphers, supported by your version of OpenSSL, including ones provided by configured engines.

The enc program does not support authenticated encryption modes like CCM and GCM, and will not support such modes in the future. The enc interface by necessity must begin streaming output (e.g., to standard output when -out is not used) before the authentication tag could be validated, leading to the usage of enc in pipelines that begin processing untrusted data and are not capable of rolling back upon authentication failure. The AEAD modes currently in common use also suffer from catastrophic failure of confidentiality and/or integrity upon reuse of key/iv/nonce, and since enc places the entire burden of key/iv/nonce management upon the user, the risk of exposing AEAD modes is too great to allow. These key/iv/nonce management issues also affect other modes currently exposed in enc, but the failure modes are less extreme in these cases, and the functionality cannot be removed with a stable release branch. For bulk encryption of data, whether using authenticated encryption modes or other modes, cms(1) is recommended, as it provides a standard data format and performs the needed key/iv/nonce management.

base64	Base 64
bf-cbc	Blowfish in CBC mode
bf	Alias for bf-cbc
blowfish	Alias for bf-cbc
bf-cfb	Blowfish in CFB mode
bf-ecb	Blowfish in ECB mode
bf-ofb	Blowfish in OFB mode
cast-cbc	CAST in CBC mode

cast	Alias for cast-cbc
cast5-cbc	CAST5 in CBC mode
cast5-cfb	CAST5 in CFB mode
cast5-ecb	CAST5 in ECB mode
cast5-ofb	CAST5 in OFB mode
chacha20	ChaCha20 algorithm
des-cbc	DES in CBC mode
des	Alias for des-cbc
des-cfb	DES in CFB mode
des-ofb	DES in OFB mode
des-ecb	DES in ECB mode
des-ede-cbc	Two key triple DES EDE in CBC mode
des-ede	Two key triple DES EDE in ECB mode
des-ede-cfb	Two key triple DES EDE in CFB mode
des-ede-ofb	Two key triple DES EDE in OFB mode
des-ede3-cbc	Three key triple DES EDE in CBC mode
des-ede3	Three key triple DES EDE in ECB mode
des3	Alias for des-ede3-cbc
des-ede3-cfb	Three key triple DES EDE CFB mode
des-ede3-ofb	Three key triple DES EDE in OFB mode
desx	DESX algorithm.
gost89	GOST 28147-89 in CFB mode (provided by ccgost engine)
gost89-cnt	`GOST 28147-89 in CNT mode (provided by ccgost engine)
idea-cbc	IDEA algorithm in CBC mode
idea	same as idea-cbc
idea-cfb	IDEA in CFB mode
idea-ecb	IDEA in ECB mode
idea-ofb	IDEA in OFB mode
rc2-cbc	128 bit RC2 in CBC mode
rc2	Alias for rc2-cbc
rc2-cfb	128 bit RC2 in CFB mode
rc2-ecb	128 bit RC2 in ECB mode
rc2-ofb	128 bit RC2 in OFB mode

rc2-64-cbc	64 bit RC2 in CBC mode
rc2-40-cbc	40 bit RC2 in CBC mode
rc4	128 bit RC4
rc4-64	64 bit RC4
rc4-40	40 bit RC4
rc5-cbc	RC5 cipher in CBC mode
rc5	Alias for rc5-cbc
rc5-cfb	RC5 cipher in CFB mode
rc5-ecb	RC5 cipher in ECB mode
rc5-ofb	RC5 cipher in OFB mode
seed-cbc	SEED cipher in CBC mode
seed	Alias for seed-cbc
seed-cfb	SEED cipher in CFB mode
seed-ecb	SEED cipher in ECB mode
seed-ofb	SEED cipher in OFB mode
sm4-cbc	SM4 cipher in CBC mode
sm4	Alias for sm4-cbc
sm4-cfb	SM4 cipher in CFB mode
sm4-ctr	SM4 cipher in CTR mode
sm4-ecb	SM4 cipher in ECB mode
sm4-ofb	SM4 cipher in OFB mode
aes-[128 192 256]-cbc	128/192/256 bit AES in CBC mode
aes[128 192 256]	Alias for aes-[128 192 256]-cbc
aes-[128 192 256]-cfb	128/192/256 bit AES in 128 bit CFB mode
aes-[128 192 256]-cfb1	128/192/256 bit AES in 1 bit CFB mode
aes-[128 192 256]-cfb8	128/192/256 bit AES in 8 bit CFB mode
aes-[128 192 256]-ctr	128/192/256 bit AES in CTR mode
aes-[128 192 256]-ecb	128/192/256 bit AES in ECB mode
aes-[128 192 256]-ofb	128/192/256 bit AES in OFB mode
aria-[128 192 256]-cbc	128/192/256 bit ARIA in CBC mode
aria[128 192 256]	Alias for aria-[128 192 256]-cbc
aria-[128 192 256]-cfb	128/192/256 bit ARIA in 128 bit CFB mode
aria-[128 192 256]-cfb1	128/192/256 bit ARIA in 1 bit CFB mode

aria-[128|192|256]-cfb8 128/192/256 bit ARIA in 8 bit CFB mode
aria-[128|192|256]-ctr 128/192/256 bit ARIA in CTR mode
aria-[128|192|256]-ecb 128/192/256 bit ARIA in ECB mode
aria-[128|192|256]-ofb 128/192/256 bit ARIA in OFB mode
camellia-[128|192|256]-cbc 128/192/256 bit Camellia in CBC mode
camellia[128|192|256] Alias for camellia-[128|192|256]-cbc
camellia-[128|192|256]-cfb 128/192/256 bit Camellia in 128 bit CFB mode
camellia-[128|192|256]-cfb1 128/192/256 bit Camellia in 1 bit CFB mode
camellia-[128|192|256]-cfb8 128/192/256 bit Camellia in 8 bit CFB mode
camellia-[128|192|256]-ctr 128/192/256 bit Camellia in CTR mode
camellia-[128|192|256]-ecb 128/192/256 bit Camellia in ECB mode
camellia-[128|192|256]-ofb 128/192/256 bit Camellia in OFB mode

EXAMPLES

Just base64 encode a binary file:

```
openssl base64 -in file.bin -out file.b64
```

Decode the same file

```
openssl base64 -d -in file.b64 -out file.bin
```

Encrypt a file using AES-128 using a prompted password and PBKDF2 key derivation:

```
openssl enc -aes128 -pbkdf2 -in file.txt -out file.aes128
```

Decrypt a file using a supplied password:

```
openssl enc -aes128 -pbkdf2 -d -in file.aes128 -out file.txt \  
-pass pass:<password>
```

Encrypt a file then base64 encode it (so it can be sent via mail for example) using

AES-256 in CTR mode and PBKDF2 key derivation:

```
openssl enc -aes-256-ctr -pbkdf2 -a -in file.txt -out file.aes256
```

Base64 decode a file then decrypt it using a password supplied in a file:

```
openssl enc -aes-256-ctr -pbkdf2 -d -a -in file.aes256 -out file.txt \  
-pass file:<passfile>
```

BUGS

The -A option when used with large files doesn't work properly.

The enc program only supports a fixed number of algorithms with certain parameters.

So if, for example, you want to use RC2 with a 76 bit key or RC4 with an 84 bit key

you can't use this program.

HISTORY

The default digest was changed from MD5 to SHA256 in OpenSSL 1.1.0.

The -list option was added in OpenSSL 1.1.1e.

COPYRIGHT

Copyright 2000-2018 The OpenSSL Project Authors. All Rights Reserved.

Licensed under the OpenSSL license (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>.

1.1.1f

2023-02-06

ENC(1SSL)