#### OpenSSL

## NAME

openssl-genrsa - generate an RSA private key

# SYNOPSIS

openssl genrsa [-help] [-out *filename*] [-passout *arg*] [-aes128] [-aes192] [-aes256] [-aria128] [-aria192] [-aria256] [-camellia128] [-camellia192] [-camellia256] [-des] [-des3] [-idea] [-F4] [-f4] [-3] [-primes *num*] [-verbose] [-traditional] [-rand *files*] [-writerand *file*] [-engine *id*] [-provider *name*] [-provider-path *path*] [-propquery *propq*] [numbits]

# DESCRIPTION

This command generates an RSA private key.

# **OPTIONS**

## -help

Print out a usage message.

## -out filename

Output the key to the specified file. If this argument is not specified then standard output is used.

## -passout arg

The output file password source. For more information about the format see **openssl-passphrase-options**(1).

# -aes128, -aes192, -aes256, -aria128, -aria192, -aria256, -camellia128, -camellia192, -camellia256, -des, -des3, -idea

These options encrypt the private key with specified cipher before outputting it. If none of these options is specified no encryption is used. If encryption is used a pass phrase is prompted for if it is not supplied via the **-passout** argument.

# -F4, -f4, -3

The public exponent to use, either 65537 or 3. The default is 65537. The **-3** option has been deprecated.

# -primes num

Specify the number of primes to use while generating the RSA key. The *num* parameter must be a positive integer that is greater than 1 and less than 16. If *num* is greater than 2, then the generated key is called a 'multi-prime' RSA key, which is defined in RFC 8017.

#### -verbose

Print extra details about the operations being performed.

#### -traditional

Write the key using the traditional PKCS#1 format instead of the PKCS#8 format.

## -rand *files*, -writerand *file*

See "Random State Options" in **openssl**(1) for details.

#### -engine *id*

See "Engine Options" in **openssl**(1). This option is deprecated.

#### -provider name

#### -provider-path path

#### -propquery propq

See "Provider Options" in **openssl**(1), **provider**(7), and **property**(7).

#### numbits

The size of the private key to generate in bits. This must be the last option specified. The default is 2048 and values less than 512 are not allowed.

#### NOTES

RSA private key generation essentially involves the generation of two or more prime numbers. When generating a private key various symbols will be output to indicate the progress of the generation. A . represents each number which has passed an initial sieve test, + means a number has passed a single round of the Miller-Rabin primality test, \* means the current prime starts a regenerating progress due to some failed tests. A newline means that the number has passed all the prime tests (the actual number depends on the key size).

Because key generation is a random process the time taken to generate a key may vary somewhat. But in general, more primes lead to less generation time of a key.

#### SEE ALSO

openssl(1), openssl-genpkey(1), openssl-gendsa(1)

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