

**NAME**

openssl-genrsa, genrsa – generate an RSA private key

**SYNOPSIS**

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openssl genrsa [-help] [-out filename] [-passout arg] [-aes128] [-aes192] [-aes256] [-aria128]
[-aria192] [-aria256] [-camellia128] [-camellia192] [-camellia256] [-des] [-des3] [-idea] [-f4] [-3]
[-rand file...] [-writerand file] [-engine id] [-primes num] [numbits]
```

**DESCRIPTION**

The **genrsa** 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 of **arg** see the **PASS PHRASE ARGUMENTS** section in **openssl(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|-3**

The public exponent to use, either 65537 or 3. The default is 65537.

**-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.

**-engine id**

Specifying an engine (by its unique **id** string) will cause **genrsa** to attempt to obtain a functional reference to the specified engine, thus initialising it if needed. The engine will then be set as the default for all available algorithms.

**-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.

**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**

**gendsa**(1)

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