

## NAME

openssl-ec, ec – EC key processing

## SYNOPSIS

**openssl ec** [**-help**] [**-inform** PEM|DER] [**-outform** PEM|DER] [**-in** filename] [**-passin** arg] [**-out** filename] [**-passout** arg] [**-des**] [**-des3**] [**-idea**] [**-text**] [**-noout**] [**-param\_out**] [**-pubin**] [**-pubout**] [**-conv\_form** arg] [**-param\_enc** arg] [**-no\_public**] [**-check**] [**-engine** id]

## DESCRIPTION

The **ec** command processes EC keys. They can be converted between various forms and their components printed out. **Note** OpenSSL uses the private key format specified in 'SEC 1: Elliptic Curve Cryptography' (<http://www.secg.org/>). To convert an OpenSSL EC private key into the PKCS#8 private key format use the **pkcs8** command.

## OPTIONS

### **-help**

Print out a usage message.

### **-inform** DER|PEM

This specifies the input format. The **DER** option with a private key uses an ASN.1 DER encoded SEC1 private key. When used with a public key it uses the SubjectPublicKeyInfo structure as specified in RFC 3280. The **PEM** form is the default format: it consists of the **DER** format base64 encoded with additional header and footer lines. In the case of a private key PKCS#8 format is also accepted.

### **-outform** DER|PEM

This specifies the output format, the options have the same meaning and default as the **-inform** option.

### **-in** filename

This specifies the input filename to read a key from or standard input if this option is not specified. If the key is encrypted a pass phrase will be prompted for.

### **-passin** arg

The input file password source. For more information about the format of **arg** see "Pass Phrase Options" in **openssl**(1).

### **-out** filename

This specifies the output filename to write a key to or standard output by is not specified. If any encryption options are set then a pass phrase will be prompted for. The output filename should **not** be the same as the input filename.

### **-passout** arg

The output file password source. For more information about the format of **arg** see "Pass Phrase Options" in **openssl**(1).

### **-des**|-**des3**|-**idea**

These options encrypt the private key with the DES, triple DES, IDEA or any other cipher supported by OpenSSL before outputting it. A pass phrase is prompted for. If none of these options is specified the key is written in plain text. This means that using the **ec** utility to read in an encrypted key with no encryption option can be used to remove the pass phrase from a key, or by setting the encryption options it can be use to add or change the pass phrase. These options can only be used with PEM format output files.

### **-text**

Prints out the public, private key components and parameters.

### **-noout**

This option prevents output of the encoded version of the key.

### **-pubin**

By default, a private key is read from the input file. With this option a public key is read instead.

**-pubout**

By default a private key is output. With this option a public key will be output instead. This option is automatically set if the input is a public key.

**-conv\_form**

This specifies how the points on the elliptic curve are converted into octet strings. Possible values are: **compressed** (the default value), **uncompressed** and **hybrid**. For more information regarding the point conversion forms please read the X9.62 standard. **Note** Due to patent issues the **compressed** option is disabled by default for binary curves and can be enabled by defining the preprocessor macro **OPENSSL\_EC\_BIN\_PT\_COMP** at compile time.

**-param\_enc arg**

This specifies how the elliptic curve parameters are encoded. Possible value are: **named\_curve**, i.e. the ec parameters are specified by an OID, or **explicit** where the ec parameters are explicitly given (see RFC 3279 for the definition of the EC parameters structures). The default value is **named\_curve**. **Note** the **implicitlyCA** alternative, as specified in RFC 3279, is currently not implemented in OpenSSL.

**-no\_public**

This option omits the public key components from the private key output.

**-check**

This option checks the consistency of an EC private or public key.

**-engine id**

Specifying an engine (by its unique **id** string) will cause **ec** 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.

**NOTES**

The PEM private key format uses the header and footer lines:

```
-----BEGIN EC PRIVATE KEY-----
-----END EC PRIVATE KEY-----
```

The PEM public key format uses the header and footer lines:

```
-----BEGIN PUBLIC KEY-----
-----END PUBLIC KEY-----
```

**EXAMPLES**

To encrypt a private key using triple DES:

```
openssl ec -in key.pem -des3 -out keyout.pem
```

To convert a private key from PEM to DER format:

```
openssl ec -in key.pem -outform DER -out keyout.der
```

To print out the components of a private key to standard output:

```
openssl ec -in key.pem -text -noout
```

To just output the public part of a private key:

```
openssl ec -in key.pem -pubout -out pubkey.pem
```

To change the parameters encoding to **explicit**:

```
openssl ec -in key.pem -param_enc explicit -out keyout.pem
```

To change the point conversion form to **compressed**:

```
openssl ec -in key.pem -conv_form compressed -out keyout.pem
```

**SEE ALSO**

**ecparam**(1), **dsa**(1), **rsa**(1)

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