

**NAME**

PKCS12\_key\_gen\_asc, PKCS12\_key\_gen\_asc\_ex, PKCS12\_key\_gen\_uni, PKCS12\_key\_gen\_uni\_ex, PKCS12\_key\_gen\_utf8, PKCS12\_key\_gen\_utf8\_ex - PKCS#12 Password based key derivation

**SYNOPSIS**

```
#include <openssl/pkcs12.h>
```

```
int PKCS12_key_gen_asc(const char *pass, int passlen, unsigned char *salt,
                      int saltlen, int id, int iter, int n,
                      unsigned char *out, const EVP_MD *md_type);
int PKCS12_key_gen_asc_ex(const char *pass, int passlen, unsigned char *salt,
                          int saltlen, int id, int iter, int n,
                          unsigned char *out, const EVP_MD *md_type,
                          OSSL_LIB_CTX *ctx, const char *propq);
int PKCS12_key_gen_uni(unsigned char *pass, int passlen, unsigned char *salt,
                      int saltlen, int id, int iter, int n,
                      unsigned char *out, const EVP_MD *md_type);
int PKCS12_key_gen_uni_ex(unsigned char *pass, int passlen, unsigned char *salt,
                          int saltlen, int id, int iter, int n,
                          unsigned char *out, const EVP_MD *md_type,
                          OSSL_LIB_CTX *ctx, const char *propq);
int PKCS12_key_gen_utf8(const char *pass, int passlen, unsigned char *salt,
                       int saltlen, int id, int iter, int n,
                       unsigned char *out, const EVP_MD *md_type);
int PKCS12_key_gen_utf8_ex(const char *pass, int passlen, unsigned char *salt,
                          int saltlen, int id, int iter, int n,
                          unsigned char *out, const EVP_MD *md_type,
                          OSSL_LIB_CTX *ctx, const char *propq);
```

**DESCRIPTION**

These methods perform a key derivation according to PKCS#12 (RFC7292) with an input password *pass* of length *passlen*, a salt *salt* of length *saltlen*, an iteration count *iter* and a digest algorithm *md\_type*. The ID byte *id* determines how the resulting key is intended to be used:

- ⊕ If ID=1, then the pseudorandom bits being produced are to be used as key material for performing encryption or decryption.
- ⊕ If ID=2, then the pseudorandom bits being produced are to be used as an IV (Initial Value) for encryption or decryption.

- ⊕ If `ID=3`, then the pseudorandom bits being produced are to be used as an integrity key for MACing.

The intended format of the supplied password is determined by the method chosen:

- ⊕ **PKCS12\_key\_gen\_asc()** and **PKCS12\_key\_gen\_asc\_ex()** expect an ASCII-formatted password.
- ⊕ **PKCS12\_key\_gen\_uni()** and **PKCS12\_key\_gen\_uni\_ex()** expect a Unicode-formatted password.
- ⊕ **PKCS12\_key\_gen\_utf8()** and **PKCS12\_key\_gen\_utf8\_ex()** expect a UTF-8 encoded password.

*pass* is the password used in the derivation of length *passlen*. *pass* is an optional parameter and can be NULL. If *passlen* is -1, then the function will calculate the length of *pass* using **strlen()**.

*salt* is the salt used in the derivation of length *saltlen*. If the *salt* is NULL, then *saltlen* must be 0. The function will not attempt to calculate the length of the *salt* because it is not assumed to be NULL terminated.

*iter* is the iteration count and its value should be greater than or equal to 1. RFC 2898 suggests an iteration count of at least 1000. Any *iter* less than 1 is treated as a single iteration.

*digest* is the message digest function used in the derivation.

The derived key will be written to *out*. The size of the *out* buffer is specified via *n*.

Functions ending in **\_ex()** allow for a library context *ctx* and property query *propq* to be used to select algorithm implementations.

## NOTES

A typical application of this function is to derive keying material for an encryption algorithm from a password in the *pass*, a salt in *salt*, and an iteration count.

Increasing the *iter* parameter slows down the algorithm which makes it harder for an attacker to perform a brute force attack using a large number of candidate passwords.

## RETURN VALUES

Returns 1 on success or 0 on error.

## CONFORMING TO

IETF RFC 7292 (<<https://tools.ietf.org/html/rfc7292>>)

**SEE ALSO**

**PKCS12\_create\_ex(3)**, **PKCS12\_pbe\_crypt\_ex(3)**, **passphrase-encoding(7)**

**HISTORY**

**PKCS12\_key\_gen\_asc\_ex()**, **PKCS12\_key\_gen\_uni\_ex()** and **PKCS12\_key\_gen\_utf8\_ex()** were added in OpenSSL 3.0.

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