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### ***Rocky Enterprise Linux 9.2 Manual Pages on command 'EVP\_PBE\_scrypt\_ex.3ossl'***

***\$ man EVP\_PBE\_scrypt\_ex.3ossl***

PKCS5\_PBE\_KEYIVGEN(3ossl)      OpenSSL      PKCS5\_PBE\_KEYIVGEN(3ossl)

#### NAME

PKCS5\_PBE\_keyivgen, PKCS5\_PBE\_keyivgen\_ex, PKCS5\_pbe2\_set, PKCS5\_pbe2\_set\_iv, PKCS5\_pbe2\_set\_iv\_ex, PKCS5\_pbe\_set, PKCS5\_pbe\_set\_ex, PKCS5\_pbe2\_set\_scrypt, PKCS5\_pbe\_set0\_algor, PKCS5\_pbe\_set0\_algor\_ex, PKCS5\_v2\_PBE\_keyivgen, PKCS5\_v2\_PBE\_keyivgen\_ex, PKCS5\_v2\_scrypt\_keyivgen, PKCS5\_v2\_scrypt\_keyivgen\_ex, PKCS5\_pbkdf2\_set, PKCS5\_pbkdf2\_set\_ex, EVP\_PBE\_scrypt, EVP\_PBE\_scrypt\_ex - PKCS#5 Password based encryption routines

#### SYNOPSIS

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

```
int PKCS5_PBE_keyivgen(EVP_CIPHER_CTX *ctx, const char *pass, int passlen, ASN1_TYPE *param, const EVP_CIPHER *cipher, const EVP_MD *md, int en_de);
```

```

int PKCS5_PBE_keyivgen_ex(EVP_CIPHER_CTX *cctx, const char *pass, int passlen,
    ASN1_TYPE *param, const EVP_CIPHER *cipher,
    const EVP_MD *md, int en_de, OSSL_LIB_CTX *libctx,
    const char *propq);

int PKCS5_v2_PBE_keyivgen(EVP_CIPHER_CTX *ctx, const char *pass, int passlen,
    ASN1_TYPE *param, const EVP_CIPHER *cipher,
    const EVP_MD *md, int en_de);

int PKCS5_v2_PBE_keyivgen_ex(EVP_CIPHER_CTX *ctx, const char *pass, int passlen,
    ASN1_TYPE *param, const EVP_CIPHER *cipher,
    const EVP_MD *md, int en_de,
    OSSL_LIB_CTX *libctx, const char *propq);

int EVP_PBE_scrypt(const char *pass, size_t passlen,
    const unsigned char *salt, size_t saltlen,
    uint64_t N, uint64_t r, uint64_t p, uint64_t maxmem,
    unsigned char *key, size_t keylen);

int EVP_PBE_scrypt_ex(const char *pass, size_t passlen,
    const unsigned char *salt, size_t saltlen,
    uint64_t N, uint64_t r, uint64_t p, uint64_t maxmem,
    unsigned char *key, size_t keylen,
    OSSL_LIB_CTX *ctx, const char *propq);

int PKCS5_v2_scrypt_keyivgen(EVP_CIPHER_CTX *ctx, const char *pass,
    int passlen, ASN1_TYPE *param,
    const EVP_CIPHER *c, const EVP_MD *md, int en_de);

int PKCS5_v2_scrypt_keyivgen_ex(EVP_CIPHER_CTX *ctx, const char *pass,
    int passlen, ASN1_TYPE *param,
    const EVP_CIPHER *c, const EVP_MD *md, int en_de,
    OSSL_LIB_CTX *libctx, const char *propq);

#include <openssl/x509.h>

int PKCS5_pbe_set0_algor(X509_ALGOR *algor, int alg, int iter,
    const unsigned char *salt, int saltlen);

int PKCS5_pbe_set0_algor_ex(X509_ALGOR *algor, int alg, int iter,

```

```
const unsigned char *salt, int saltlen,  
OSSL_LIB_CTX *libctx);
```

```
X509_ALGOR *PKCS5_pbe_set(int alg, int iter,  
const unsigned char *salt, int saltlen);
```

```
X509_ALGOR *PKCS5_pbe_set_ex(int alg, int iter,  
const unsigned char *salt, int saltlen,  
OSSL_LIB_CTX *libctx);
```

```
X509_ALGOR *PKCS5_pbe2_set(const EVP_CIPHER *cipher, int iter,  
unsigned char *salt, int saltlen);
```

```
X509_ALGOR *PKCS5_pbe2_set_iv(const EVP_CIPHER *cipher, int iter,  
unsigned char *salt, int saltlen,  
unsigned char *aiv, int prf_nid);
```

```
X509_ALGOR *PKCS5_pbe2_set_iv_ex(const EVP_CIPHER *cipher, int iter,  
unsigned char *salt, int saltlen,  
unsigned char *aiv, int prf_nid,  
OSSL_LIB_CTX *libctx);
```

```
X509_ALGOR *PKCS5_pbe2_set_scrypt(const EVP_CIPHER *cipher,  
const unsigned char *salt, int saltlen,  
unsigned char *aiv, uint64_t N, uint64_t r,  
uint64_t p);
```

```
X509_ALGOR *PKCS5_pbkdf2_set(int iter, unsigned char *salt, int saltlen,  
int prf_nid, int keylen);
```

```
X509_ALGOR *PKCS5_pbkdf2_set_ex(int iter, unsigned char *salt, int saltlen,  
int prf_nid, int keylen,  
OSSL_LIB_CTX *libctx);
```

## DESCRIPTION

### Key Derivation

PKCS5\_PBE\_keyivgen() and PKCS5\_PBE\_keyivgen\_ex() take a password pass of length passlen, parameters param and a message digest function

md\_type and performs a key derivation according to PKCS#5 PBES1. The resulting key is then used to initialise the cipher context ctx with a cipher cipher for encryption (en\_de=1) or decryption (en\_de=0).

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

PKCS5\_v2\_PBE\_keyivgen() and PKCS5\_v2\_PBE\_keyivgen\_ex() are similar to the above but instead use PKCS#5 PBES2 as the encryption algorithm using the supplied parameters.

PKCS5\_v2\_scrypt\_keyivgen() and PKCS5\_v2\_scrypt\_keyivgen\_ex() use SCRYPT as the key derivation part of the encryption algorithm.

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.

Functions ending in \_ex() take optional parameters libctx and propq which are used to select appropriate algorithm implementations.

#### Algorithm Identifier Creation

PKCS5\_pbe\_set(), PKCS5\_pbe\_set\_ex(), PKCS5\_pbe2\_set(), PKCS5\_pbe2\_set\_iv(), PKCS5\_pbe2\_set\_iv\_ex() and PKCS5\_pbe2\_set\_scrypt() generate an X509\_ALGOR object which represents an AlgorithmIdentifier containing the algorithm OID and associated parameters for the PBE

algorithm.

PKCS5\_pbkdf2\_set() and PKCS5\_pbkdf2\_set\_ex() generate an X509\_ALGOR object which represents an AlgorithmIdentifier containing the algorithm OID and associated parameters for the PBKDF2 algorithm.

PKCS5\_pbe\_set0\_algor() and PKCS5\_pbe\_set0\_algor\_ex() set the PBE algorithm OID and parameters into the supplied X509\_ALGOR.

## NOTES

The \*\_keyivgen() functions are typically used in PKCS#12 to encrypt objects.

These functions make no assumption regarding the given password. It will simply be treated as a byte sequence.

## RETURN VALUES

PKCS5\_PBE\_keyivgen(), PKCS5\_v2\_PBE\_keyivgen(), PKCS5\_v2\_PBE\_keyivgen\_ex(), PKCS5\_v2\_scrypt\_keyivgen(), PKCS5\_v2\_scrypt\_keyivgen\_ex(), PKCS5\_pbe\_set0\_algor() and PKCS5\_pbe\_set0\_algor\_ex() return 1 for success and 0 if an error occurs.

PKCS5\_pbe\_set(), PKCS5\_pbe\_set\_ex(), PKCS5\_pbe2\_set(), PKCS5\_pbe2\_set\_iv(), PKCS5\_pbe2\_set\_iv\_ex(), PKCS5\_pbe2\_set\_scrypt(), PKCS5\_pbkdf2\_set() and PKCS5\_pbkdf2\_set\_ex() return an X509\_ALGOR object or NULL if an error occurs.

## CONFORMING TO

IETF RFC 8018 (<<https://tools.ietf.org/html/rfc8018>>)

## SEE ALSO

EVP\_PBE\_CipherInit\_ex(3), PKCS12\_pbe\_crypt\_ex(3),

passphrase-encoding(7)

## HISTORY

PKCS5\_v2\_PBE\_keyivgen\_ex(), EVP\_PBE\_scrypt\_ex(),  
PKCS5\_v2\_scrypt\_keyivgen\_ex(), PKCS5\_pbe\_set0\_algor\_ex(),  
PKCS5\_pbe\_set\_ex(), PKCS5\_pbe2\_set\_iv\_ex() and PKCS5\_pbkdf2\_set\_ex()  
were added in OpenSSL 3.0.

From OpenSSL 3.0 the PBKDF1 algorithm used in PKCS5\_PBE\_keyivgen() and  
PKCS5\_PBE\_keyivgen\_ex() has been moved to the legacy provider as an  
EVP\_KDF.

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