

NAME

EVP_PKEY_derive_init, EVP_PKEY_derive_init_ex, EVP_PKEY_derive_set_peer_ex,
EVP_PKEY_derive_set_peer, EVP_PKEY_derive - derive public key algorithm shared secret

SYNOPSIS

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

```
int EVP_PKEY_derive_init(EVP_PKEY_CTX *ctx);  
int EVP_PKEY_derive_init_ex(EVP_PKEY_CTX *ctx, const OSSL_PARAM params[]);  
int EVP_PKEY_derive_set_peer_ex(EVP_PKEY_CTX *ctx, EVP_PKEY *peer,  
                               int validate_peer);  
int EVP_PKEY_derive_set_peer(EVP_PKEY_CTX *ctx, EVP_PKEY *peer);  
int EVP_PKEY_derive(EVP_PKEY_CTX *ctx, unsigned char *key, size_t *keylen);
```

DESCRIPTION

EVP_PKEY_derive_init() initializes a public key algorithm context *ctx* for shared secret derivation using the algorithm given when the context was created using **EVP_PKEY_CTX_new(3)** or variants thereof. The algorithm is used to fetch a **EVP_KEYEXCH** method implicitly, see "Implicit fetch" in **provider(7)** for more information about implicit fetches.

EVP_PKEY_derive_init_ex() is the same as **EVP_PKEY_derive_init()** but additionally sets the passed parameters *params* on the context before returning.

EVP_PKEY_derive_set_peer_ex() sets the peer key: this will normally be a public key. The *validate_peer* will validate the public key if this value is non zero.

EVP_PKEY_derive_set_peer() is similar to **EVP_PKEY_derive_set_peer_ex()** with *validate_peer* set to 1.

EVP_PKEY_derive() derives a shared secret using *ctx*. If *key* is NULL then the maximum size of the output buffer is written to the *keylen* parameter. If *key* is not NULL then before the call the *keylen* parameter should contain the length of the *key* buffer, if the call is successful the shared secret is written to *key* and the amount of data written to *keylen*.

NOTES

After the call to **EVP_PKEY_derive_init()**, algorithm specific control operations can be performed to set any appropriate parameters for the operation.

The function **EVP_PKEY_derive()** can be called more than once on the same context if several operations are performed using the same parameters.

RETURN VALUES

EVP_PKEY_derive_init() and **EVP_PKEY_derive()** return 1 for success and 0 or a negative value for failure. In particular a return value of -2 indicates the operation is not supported by the public key algorithm.

EXAMPLES

Derive shared secret (for example DH or EC keys):

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

EVP_PKEY_CTX *ctx;
ENGINE *eng;
unsigned char *skey;
size_t skeylen;
EVP_PKEY *pkey, *peerkey;
/* NB: assumes pkey, eng, peerkey have been already set up */

ctx = EVP_PKEY_CTX_new(pkey, eng);
if (!ctx)
    /* Error occurred */
if (EVP_PKEY_derive_init(ctx) <= 0)
    /* Error */
if (EVP_PKEY_derive_set_peer(ctx, peerkey) <= 0)
    /* Error */

/* Determine buffer length */
if (EVP_PKEY_derive(ctx, NULL, &skeylen) <= 0)
    /* Error */

skey = OPENSSL_malloc(skeylen);

if (!skey)
    /* malloc failure */

if (EVP_PKEY_derive(ctx, skey, &skeylen) <= 0)
    /* Error */

/* Shared secret is skey bytes written to buffer skey */
```

SEE ALSO

**EVP_PKEY_CTX_new(3), EVP_PKEY_encrypt(3), EVP_PKEY_decrypt(3), EVP_PKEY_sign(3),
EVP_PKEY_verify(3), EVP_PKEY_verify_recover(3), EVP_KEYEXCH_fetch(3)**

HISTORY

The **EVP_PKEY_derive_init()**, **EVP_PKEY_derive_set_peer()** and **EVP_PKEY_derive()** functions were originally added in OpenSSL 1.0.0.

The **EVP_PKEY_derive_init_ex()** and **EVP_PKEY_derive_set_peer_ex()** functions were added in OpenSSL 3.0.

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