

NAME

EVP_SealInit, EVP_SealUpdate, EVP_SealFinal - EVP envelope encryption

SYNOPSIS

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

```
int EVP_SealInit(EVP_CIPHER_CTX *ctx, const EVP_CIPHER *type,
                unsigned char **ek, int *ekl, unsigned char *iv,
                EVP_PKEY **pubk, int npubk);
int EVP_SealUpdate(EVP_CIPHER_CTX *ctx, unsigned char *out,
                  int *outl, unsigned char *in, int inl);
int EVP_SealFinal(EVP_CIPHER_CTX *ctx, unsigned char *out, int *outl);
```

DESCRIPTION

The EVP envelope routines are a high-level interface to envelope encryption. They generate a random key and IV (if required) then "envelope" it by using public key encryption. Data can then be encrypted using this key.

EVP_SealInit() initializes a cipher context **ctx** for encryption with cipher **type** using a random secret key and IV. **type** is normally supplied by a function such as **EVP_aes_256_cbc()**. The secret key is encrypted using one or more public keys, this allows the same encrypted data to be decrypted using any of the corresponding private keys. **ek** is an array of buffers where the public key encrypted secret key will be written, each buffer must contain enough room for the corresponding encrypted key: that is **ek[i]** must have room for **EVP_PKEY_get_size(pubk[i])** bytes. The actual size of each encrypted secret key is written to the array **ekl**. **pubk** is an array of **npubk** public keys.

The **iv** parameter is a buffer where the generated IV is written to. It must contain enough room for the corresponding cipher's IV, as determined by (for example) **EVP_CIPHER_get_iv_length(type)**.

If the cipher does not require an IV then the **iv** parameter is ignored and can be **NULL**.

EVP_SealUpdate() and **EVP_SealFinal()** have exactly the same properties as the **EVP_EncryptUpdate()** and **EVP_EncryptFinal()** routines, as documented on the **EVP_EncryptInit(3)** manual page.

RETURN VALUES

EVP_SealInit() returns 0 on error or **npubk** if successful.

EVP_SealUpdate() and **EVP_SealFinal()** return 1 for success and 0 for failure.

NOTES

Because a random secret key is generated the random number generator must be seeded when **EVP_SealInit()** is called. If the automatic seeding or reseeding of the OpenSSL CSPRNG fails due to external circumstances (see **RAND(7)**), the operation will fail.

The public key must be RSA because it is the only OpenSSL public key algorithm that supports key transport.

Envelope encryption is the usual method of using public key encryption on large amounts of data, this is because public key encryption is slow but symmetric encryption is fast. So symmetric encryption is used for bulk encryption and the small random symmetric key used is transferred using public key encryption.

It is possible to call **EVP_SealInit()** twice in the same way as **EVP_EncryptInit()**. The first call should have **npubk** set to 0 and (after setting any cipher parameters) it should be called again with **type** set to NULL.

SEE ALSO

evp(7), **RAND_bytes(3)**, **EVP_EncryptInit(3)**, **EVP_OpenInit(3)**, **RAND(7)**

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