



Full credit is given to the above companies including the OS that this PDF file was generated!

Rocky Enterprise Linux 9.2 Manual Pages on command 'EVP_PKEY_asn1_set_public.3ossl'

\$ man EVP_PKEY_asn1_set_public.3ossl

EVP_PKEY_ASN1_METHOD(3ossl) OpenSSL EVP_PKEY_ASN1_METHOD(3ossl)

NAME

EVP_PKEY_ASN1_METHOD, EVP_PKEY_asn1_new, EVP_PKEY_asn1_copy,
EVP_PKEY_asn1_free, EVP_PKEY_asn1_add0, EVP_PKEY_asn1_add_alias,
EVP_PKEY_asn1_set_public, EVP_PKEY_asn1_set_private,
EVP_PKEY_asn1_set_param, EVP_PKEY_asn1_set_free,
EVP_PKEY_asn1_set_ctrl, EVP_PKEY_asn1_set_item,
EVP_PKEY_asn1_set_siginf, EVP_PKEY_asn1_set_check,
EVP_PKEY_asn1_set_public_check, EVP_PKEY_asn1_set_param_check,
EVP_PKEY_asn1_set_security_bits, EVP_PKEY_asn1_set_set_priv_key,
EVP_PKEY_asn1_set_set_pub_key, EVP_PKEY_asn1_set_get_priv_key,
EVP_PKEY_asn1_set_get_pub_key, EVP_PKEY_get0_asn1 - manipulating and
registering EVP_PKEY_ASN1_METHOD structure

SYNOPSIS

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

typedef struct evp_pkey_asn1_method_st EVP_PKEY_ASN1_METHOD;

EVP_PKEY_ASN1_METHOD *EVP_PKEY_asn1_new(int id, int flags,

const char *pem_str,
```

```

        const char *info);

void EVP_PKEY_asn1_copy(EVP_PKEY_ASN1_METHOD *dst,
        const EVP_PKEY_ASN1_METHOD *src);

void EVP_PKEY_asn1_free(EVP_PKEY_ASN1_METHOD *ameth);

int EVP_PKEY_asn1_add0(const EVP_PKEY_ASN1_METHOD *ameth);

int EVP_PKEY_asn1_add_alias(int to, int from);

void EVP_PKEY_asn1_set_public(EVP_PKEY_ASN1_METHOD *ameth,
        int (*pub_decode) (EVP_PKEY *pk,
                const X509_PUBKEY *pub),
        int (*pub_encode) (X509_PUBKEY *pub,
                const EVP_PKEY *pk),
        int (*pub_cmp) (const EVP_PKEY *a,
                const EVP_PKEY *b),
        int (*pub_print) (BIO *out,
                const EVP_PKEY *pkey,
                int indent, ASN1_PCTX *pctx),
        int (*pkey_size) (const EVP_PKEY *pk),
        int (*pkey_bits) (const EVP_PKEY *pk));

void EVP_PKEY_asn1_set_private(EVP_PKEY_ASN1_METHOD *ameth,
        int (*priv_decode) (EVP_PKEY *pk,
                const PKCS8_PRIV_KEY_INFO
                *p8inf),
        int (*priv_encode) (PKCS8_PRIV_KEY_INFO *p8,
                const EVP_PKEY *pk),
        int (*priv_print) (BIO *out,
                const EVP_PKEY *pkey,
                int indent,
                ASN1_PCTX *pctx));

void EVP_PKEY_asn1_set_param(EVP_PKEY_ASN1_METHOD *ameth,
        int (*param_decode) (EVP_PKEY *pkey,
                const unsigned char **pder,
                int derlen),
        int (*param_encode) (const EVP_PKEY *pkey,

```

```

        unsigned char **pder),
int (*param_missing) (const EVP_PKEY *pk),
int (*param_copy) (EVP_PKEY *to,
        const EVP_PKEY *from),
int (*param_cmp) (const EVP_PKEY *a,
        const EVP_PKEY *b),
int (*param_print) (BIO *out,
        const EVP_PKEY *pkey,
        int indent,
        ASN1_PCTX *pctx));
void EVP_PKEY_asn1_set_free(EVP_PKEY_ASN1_METHOD *ameth,
        void (*pkey_free) (EVP_PKEY *pkey));
void EVP_PKEY_asn1_set_ctrl(EVP_PKEY_ASN1_METHOD *ameth,
        int (*pkey_ctrl) (EVP_PKEY *pkey, int op,
        long arg1, void *arg2));
void EVP_PKEY_asn1_set_item(EVP_PKEY_ASN1_METHOD *ameth,
        int (*item_verify) (EVP_MD_CTX *ctx,
        const ASN1_ITEM *it,
        void *asn,
        X509_ALGOR *a,
        ASN1_BIT_STRING *sig,
        EVP_PKEY *pkey),
        int (*item_sign) (EVP_MD_CTX *ctx,
        const ASN1_ITEM *it,
        void *asn,
        X509_ALGOR *alg1,
        X509_ALGOR *alg2,
        ASN1_BIT_STRING *sig));
void EVP_PKEY_asn1_set_siginf(EVP_PKEY_ASN1_METHOD *ameth,
        int (*siginf_set) (X509_SIG_INFO *siginf,
        const X509_ALGOR *alg,
        const ASN1_STRING *sig));
void EVP_PKEY_asn1_set_check(EVP_PKEY_ASN1_METHOD *ameth,

```

```

        int (*pkey_check) (const EVP_PKEY *pk));
void EVP_PKEY_asn1_set_public_check(EVP_PKEY_ASN1_METHOD *ameth,
        int (*pkey_pub_check) (const EVP_PKEY *pk));
void EVP_PKEY_asn1_set_param_check(EVP_PKEY_ASN1_METHOD *ameth,
        int (*pkey_param_check) (const EVP_PKEY *pk));
void EVP_PKEY_asn1_set_security_bits(EVP_PKEY_ASN1_METHOD *ameth,
        int (*pkey_security_bits) (const EVP_PKEY
                *pk));
void EVP_PKEY_asn1_set_set_priv_key(EVP_PKEY_ASN1_METHOD *ameth,
        int (*set_priv_key) (EVP_PKEY *pk,
                const unsigned char
                *priv,
                size_t len));
void EVP_PKEY_asn1_set_set_pub_key(EVP_PKEY_ASN1_METHOD *ameth,
        int (*set_pub_key) (EVP_PKEY *pk,
                const unsigned char *pub,
                size_t len));
void EVP_PKEY_asn1_set_get_priv_key(EVP_PKEY_ASN1_METHOD *ameth,
        int (*get_priv_key) (const EVP_PKEY *pk,
                unsigned char *priv,
                size_t *len));
void EVP_PKEY_asn1_set_get_pub_key(EVP_PKEY_ASN1_METHOD *ameth,
        int (*get_pub_key) (const EVP_PKEY *pk,
                unsigned char *pub,
                size_t *len));

const EVP_PKEY_ASN1_METHOD *EVP_PKEY_get0_asn1(const EVP_PKEY *pkey);

```

DESCRIPTION

EVP_PKEY_ASN1_METHOD is a structure which holds a set of ASN.1 conversion, printing and information methods for a specific public key algorithm.

There are two places where the EVP_PKEY_ASN1_METHOD objects are stored: one is a built-in array representing the standard methods for different algorithms, and the other one is a stack of user-defined application-

specific methods, which can be manipulated by using

EVP_PKEY_asn1_add0(3).

Methods

The methods are the underlying implementations of a particular public key algorithm present by the EVP_PKEY object.

```
int (*pub_decode) (EVP_PKEY *pk, const X509_PUBKEY *pub);
```

```
int (*pub_encode) (X509_PUBKEY *pub, const EVP_PKEY *pk);
```

```
int (*pub_cmp) (const EVP_PKEY *a, const EVP_PKEY *b);
```

```
int (*pub_print) (BIO *out, const EVP_PKEY *pkey, int indent,  
                 ASN1_PCTX *pctx);
```

The pub_decode() and pub_encode() methods are called to decode / encode X509_PUBKEY ASN.1 parameters to / from pk. They MUST return 0 on error, 1 on success. They're called by X509_PUBKEY_get0(3) and X509_PUBKEY_set(3).

The pub_cmp() method is called when two public keys are to be compared.

It MUST return 1 when the keys are equal, 0 otherwise. It's called by EVP_PKEY_eq(3).

The pub_print() method is called to print a public key in humanly readable text to out, indented indent spaces. It MUST return 0 on error, 1 on success. It's called by EVP_PKEY_print_public(3).

```
int (*priv_decode) (EVP_PKEY *pk, const PKCS8_PRIV_KEY_INFO *p8inf);
```

```
int (*priv_encode) (PKCS8_PRIV_KEY_INFO *p8, const EVP_PKEY *pk);
```

```
int (*priv_print) (BIO *out, const EVP_PKEY *pkey, int indent,  
                 ASN1_PCTX *pctx);
```

The priv_decode() and priv_encode() methods are called to decode / encode PKCS8_PRIV_KEY_INFO form private key to / from pk. They MUST return 0 on error, 1 on success. They're called by EVP_PKCS82PKEY(3) and EVP_PKEY2PKCS8(3).

The priv_print() method is called to print a private key in humanly readable text to out, indented indent spaces. It MUST return 0 on error, 1 on success. It's called by EVP_PKEY_print_private(3).

```
int (*pkey_size) (const EVP_PKEY *pk);
```

```
int (*pkey_bits) (const EVP_PKEY *pk);
```

```
int (*pkey_security_bits) (const EVP_PKEY *pk);
```

The `pkey_size()` method returns the key size in bytes. It's called by `EVP_PKEY_get_size(3)`.

The `pkey_bits()` method returns the key size in bits. It's called by `EVP_PKEY_get_bits(3)`.

```
int (*param_decode) (EVP_PKEY *pkey,  
                    const unsigned char **pder, int derlen);  
int (*param_encode) (const EVP_PKEY *pkey, unsigned char **pder);  
int (*param_missing) (const EVP_PKEY *pk);  
int (*param_copy) (EVP_PKEY *to, const EVP_PKEY *from);  
int (*param_cmp) (const EVP_PKEY *a, const EVP_PKEY *b);  
int (*param_print) (BIO *out, const EVP_PKEY *pkey, int indent,  
                   ASN1_PCTX *pctx);
```

The `param_decode()` and `param_encode()` methods are called to decode / encode DER formatted parameters to / from `pk`. They MUST return 0 on error, 1 on success. They're called by `PEM_read_bio_Parameters(3)` and the file: `OSSL_STORE_LOADER(3)`.

The `param_missing()` method returns 0 if a key parameter is missing, otherwise 1. It's called by `EVP_PKEY_missing_parameters(3)`.

The `param_copy()` method copies key parameters from `from` to `to`. It MUST return 0 on error, 1 on success. It's called by `EVP_PKEY_copy_parameters(3)`.

The `param_cmp()` method compares the parameters of keys `a` and `b`. It MUST return 1 when the keys are equal, 0 when not equal, or a negative number on error. It's called by `EVP_PKEY_parameters_eq(3)`.

The `param_print()` method prints the private key parameters in humanly readable text to `out`, indented `indent` spaces. It MUST return 0 on error, 1 on success. It's called by `EVP_PKEY_print_params(3)`.

```
int (*sig_print) (BIO *out,  
                 const X509_ALGOR *sigalg, const ASN1_STRING *sig,  
                 int indent, ASN1_PCTX *pctx);
```

The `sig_print()` method prints a signature in humanly readable text to `out`, indented `indent` spaces. `sigalg` contains the exact signature

algorithm. If the signature in sig doesn't correspond to what this method expects, X509_signature_dump() must be used as a last resort.

It MUST return 0 on error, 1 on success. It's called by

X509_signature_print(3).

```
void (*pkey_free) (EVP_PKEY *pkey);
```

The pkey_free() method helps freeing the internals of pkey. It's

called by EVP_PKEY_free(3), EVP_PKEY_set_type(3),

EVP_PKEY_set_type_str(3), and EVP_PKEY_assign(3).

```
int (*pkey_ctrl) (EVP_PKEY *pkey, int op, long arg1, void *arg2);
```

The pkey_ctrl() method adds extra algorithm specific control. It's

called by EVP_PKEY_get_default_digest_nid(3),

EVP_PKEY_set1_encoded_public_key(3),

EVP_PKEY_get1_encoded_public_key(3), PKCS7_SIGNER_INFO_set(3),

PKCS7_RECIP_INFO_set(3), ...

```
int (*old_priv_decode) (EVP_PKEY *pkey,  
                        const unsigned char **pder, int derlen);
```

```
int (*old_priv_encode) (const EVP_PKEY *pkey, unsigned char **pder);
```

The old_priv_decode() and old_priv_encode() methods decode / encode

they private key pkey from / to a DER formatted array. These are

exclusively used to help decoding / encoding older (pre PKCS#8) PEM

formatted encrypted private keys. old_priv_decode() MUST return 0 on

error, 1 on success. old_priv_encode() MUST the return same kind of

values as i2d_PrivateKey(). They're called by d2i_PrivateKey(3) and

i2d_PrivateKey(3).

```
int (*item_verify) (EVP_MD_CTX *ctx, const ASN1_ITEM *it, void *asn,  
                  X509_ALGOR *a, ASN1_BIT_STRING *sig, EVP_PKEY *pkey);
```

```
int (*item_sign) (EVP_MD_CTX *ctx, const ASN1_ITEM *it, void *asn,  
                 X509_ALGOR *alg1, X509_ALGOR *alg2,  
                 ASN1_BIT_STRING *sig);
```

The item_sign() and item_verify() methods make it possible to have algorithm specific signatures and verification of them.

item_sign() MUST return one of:

<=0 error

- 1 `item_sign()` did everything, OpenSSL internals just needs to pass the signature length back.
- 2 `item_sign()` did nothing, OpenSSL internal standard routines are expected to continue with the default signature production.
- 3 `item_sign()` set the algorithm identifier `algor1` and `algor2`, OpenSSL internals should just sign using those algorithms.

`item_verify()` MUST return one of:

`<=0` error

- 1 `item_sign()` did everything, OpenSSL internals just needs to pass the signature length back.
- 2 `item_sign()` did nothing, OpenSSL internal standard routines are expected to continue with the default signature production.

`item_verify()` and `item_sign()` are called by `ASN1_item_verify(3)` and `ASN1_item_sign(3)`, and by extension, `X509_verify(3)`, `X509_REQ_verify(3)`, `X509_sign(3)`, `X509_REQ_sign(3)`, ...

```
int (*siginf_set) (X509_SIG_INFO *siginf, const X509_ALGOR *alg,
                 const ASN1_STRING *sig);
```

The `siginf_set()` method is used to set custom `X509_SIG_INFO` parameters.

It MUST return 0 on error, or 1 on success. It's called as part of `X509_check_purpose(3)`, `X509_check_ca(3)` and `X509_check_issued(3)`.

```
int (*pkey_check) (const EVP_PKEY *pk);
int (*pkey_public_check) (const EVP_PKEY *pk);
int (*pkey_param_check) (const EVP_PKEY *pk);
```

The `pkey_check()`, `pkey_public_check()` and `pkey_param_check()` methods are used to check the validity of `pk` for key-pair, public component and parameters, respectively. They MUST return 0 for an invalid key, or 1 for a valid key. They are called by `EVP_PKEY_check(3)`, `EVP_PKEY_public_check(3)` and `EVP_PKEY_param_check(3)` respectively.

```
int (*set_priv_key) (EVP_PKEY *pk, const unsigned char *priv, size_t len);
int (*set_pub_key) (EVP_PKEY *pk, const unsigned char *pub, size_t len);
```

The `set_priv_key()` and `set_pub_key()` methods are used to set the raw private and public key data for an `EVP_PKEY`. They MUST return 0 on error, or 1 on success. They are called by

EVP_PKEY_new_raw_private_key(3), and EVP_PKEY_new_raw_public_key(3) respectively.

```
size_t (*dirty) (const EVP_PKEY *pk);
```

```
void (*export_to) (const EVP_PKEY *pk, EVP_KEYMGMT *keymgmt);
```

dirty_cnt() returns the internal key's dirty count. This can be used to synchronise different copies of the same keys.

The export_to() method exports the key material from the given key to a provider, through the EVP_KEYMGMT(3) interface, if that provider supports importing key material.

Functions

EVP_PKEY_asn1_new() creates and returns a new EVP_PKEY_ASN1_METHOD object, and associates the given id, flags, pem_str and info. id is a NID, pem_str is the PEM type string, info is a descriptive string. The following flags are supported:

```
ASN1_PKEY_SIGPARAM_NULL
```

If ASN1_PKEY_SIGPARAM_NULL is set, then the signature algorithm parameters are given the type V_ASN1_NULL by default, otherwise they will be given the type V_ASN1_UNDEF (i.e. the parameter is omitted).

See X509_ALGOR_set0(3) for more information.

EVP_PKEY_asn1_copy() copies an EVP_PKEY_ASN1_METHOD object from src to dst. This function is not thread safe, it's recommended to only use this when initializing the application.

EVP_PKEY_asn1_free() frees an existing EVP_PKEY_ASN1_METHOD pointed by ameth.

EVP_PKEY_asn1_add0() adds ameth to the user defined stack of methods unless another EVP_PKEY_ASN1_METHOD with the same NID is already there.

This function is not thread safe, it's recommended to only use this when initializing the application.

EVP_PKEY_asn1_add_alias() creates an alias with the NID to for the EVP_PKEY_ASN1_METHOD with NID from unless another EVP_PKEY_ASN1_METHOD with the same NID is already added. This function is not thread safe, it's recommended to only use this when initializing the application.

```
EVP_PKEY_asn1_set_public(), EVP_PKEY_asn1_set_private(),
```

EVP_PKEY_asn1_set_param(), EVP_PKEY_asn1_set_free(),
EVP_PKEY_asn1_set_ctrl(), EVP_PKEY_asn1_set_item(),
EVP_PKEY_asn1_set_siginf(), EVP_PKEY_asn1_set_check(),
EVP_PKEY_asn1_set_public_check(), EVP_PKEY_asn1_set_param_check(),
EVP_PKEY_asn1_set_security_bits(), EVP_PKEY_asn1_set_set_priv_key(),
EVP_PKEY_asn1_set_set_pub_key(), EVP_PKEY_asn1_set_get_priv_key() and
EVP_PKEY_asn1_set_get_pub_key() set the diverse methods of the given
EVP_PKEY_ASN1_METHOD object.

EVP_PKEY_get0_asn1() finds the EVP_PKEY_ASN1_METHOD associated with the
key pkey.

RETURN VALUES

EVP_PKEY_asn1_new() returns NULL on error, or a pointer to an
EVP_PKEY_ASN1_METHOD object otherwise.

EVP_PKEY_asn1_add0() and EVP_PKEY_asn1_add_alias() return 0 on error,
or 1 on success.

EVP_PKEY_get0_asn1() returns NULL on error, or a pointer to a constant
EVP_PKEY_ASN1_METHOD object otherwise.

HISTORY

The signature of the pub_decode functional argument of
EVP_PKEY_asn1_set_public() has changed in OpenSSL 3.0 so its pub
parameter is now constified.

COPYRIGHT

Copyright 2017-2021 The OpenSSL Project Authors. All Rights Reserved.

Licensed under the Apache License 2.0 (the "License"). You may not use
this file except in compliance with the License. You can obtain a copy

in the file LICENSE in the source distribution or at

<<https://www.openssl.org/source/license.html>>.

3.0.7 2023-07-13 EVP_PKEY_ASN1_METHOD(3ossl)