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Red Hat Enterprise Linux Release 9.2 Manual Pages on 'RSA_meth_get_mod_exp.3ossl' command

`$ man RSA_meth_get_mod_exp.3ossl`

RSA_METH_NEW(3ossl) OpenSSL RSA_METH_NEW(3ossl)

NAME

RSA_meth_get0_app_data, RSA_meth_set0_app_data, RSA_meth_new,
RSA_meth_free, RSA_meth_dup, RSA_meth_get0_name, RSA_meth_set1_name,
RSA_meth_get_flags, RSA_meth_set_flags, RSA_meth_get_pub_enc,
RSA_meth_set_pub_enc, RSA_meth_get_pub_dec, RSA_meth_set_pub_dec,
RSA_meth_get_priv_enc, RSA_meth_set_priv_enc, RSA_meth_get_priv_dec,
RSA_meth_set_priv_dec, RSA_meth_get_mod_exp, RSA_meth_set_mod_exp,
RSA_meth_get_bn_mod_exp, RSA_meth_set_bn_mod_exp, RSA_meth_get_init,
RSA_meth_set_init, RSA_meth_get_finish, RSA_meth_set_finish,
RSA_meth_get_sign, RSA_meth_set_sign, RSA_meth_get_verify,
RSA_meth_set_verify, RSA_meth_get_keygen, RSA_meth_set_keygen,
RSA_meth_get_multi_prime_keygen, RSA_meth_set_multi_prime_keygen -
Routines to build up RSA methods

SYNOPSIS

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

The following functions have been deprecated since OpenSSL 3.0, and can be hidden entirely by defining `OPENSSL_API_COMPAT` with a suitable version value, see `openssl_user_macros(7)`:

```

RSA_METHOD *RSA_meth_new(const char *name, int flags);
void RSA_meth_free(RSA_METHOD *meth);

RSA_METHOD *RSA_meth_dup(const RSA_METHOD *meth);

const char *RSA_meth_get0_name(const RSA_METHOD *meth);
int RSA_meth_set1_name(RSA_METHOD *meth, const char *name);

int RSA_meth_get_flags(const RSA_METHOD *meth);
int RSA_meth_set_flags(RSA_METHOD *meth, int flags);

void *RSA_meth_get0_app_data(const RSA_METHOD *meth);
int RSA_meth_set0_app_data(RSA_METHOD *meth, void *app_data);

int (*RSA_meth_get_pub_enc(const RSA_METHOD *meth))(int flen, const unsigned char *from,
                                                    unsigned char *to, RSA *rsa, int padding);
int RSA_meth_set_pub_enc(RSA_METHOD *rsa,
                        int (*pub_enc)(int flen, const unsigned char *from,
                                       unsigned char *to, RSA *rsa,
                                       int padding));

int (*RSA_meth_get_pub_dec(const RSA_METHOD *meth))
(int flen, const unsigned char *from,
 unsigned char *to, RSA *rsa, int padding);
int RSA_meth_set_pub_dec(RSA_METHOD *rsa,
                        int (*pub_dec)(int flen, const unsigned char *from,
                                       unsigned char *to, RSA *rsa,
                                       int padding));

int (*RSA_meth_get_priv_enc(const RSA_METHOD *meth))(int flen, const unsigned char *from,
                                                    unsigned char *to, RSA *rsa,
                                                    int padding);
int RSA_meth_set_priv_enc(RSA_METHOD *rsa,

```

```

int (*priv_enc)(int flen, const unsigned char *from,
                unsigned char *to, RSA *rsa, int padding));

int (*RSA_meth_get_priv_dec(const RSA_METHOD *meth))(int flen, const unsigned char *from,
                unsigned char *to, RSA *rsa,
                int padding);

int RSA_meth_set_priv_dec(RSA_METHOD *rsa,
                int (*priv_dec)(int flen, const unsigned char *from,
                unsigned char *to, RSA *rsa, int padding));

/* Can be null */
int (*RSA_meth_get_mod_exp(const RSA_METHOD *meth))(BIGNUM *r0, const BIGNUM *i,
                RSA *rsa, BN_CTX *ctx);

int RSA_meth_set_mod_exp(RSA_METHOD *rsa,
                int (*mod_exp)(BIGNUM *r0, const BIGNUM *i, RSA *rsa,
                BN_CTX *ctx));

/* Can be null */
int (*RSA_meth_get_bn_mod_exp(const RSA_METHOD *meth))(BIGNUM *r, const BIGNUM *a,
                const BIGNUM *p, const BIGNUM *m,
                BN_CTX *ctx, BN_MONT_CTX *m_ctx);

int RSA_meth_set_bn_mod_exp(RSA_METHOD *rsa,
                int (*bn_mod_exp)(BIGNUM *r, const BIGNUM *a,
                const BIGNUM *p, const BIGNUM *m,
                BN_CTX *ctx, BN_MONT_CTX *m_ctx));

/* called at new */
int (*RSA_meth_get_init(const RSA_METHOD *meth) (RSA *rsa);
int RSA_meth_set_init(RSA_METHOD *rsa, int (*init (RSA *rsa));

/* called at free */
int (*RSA_meth_get_finish(const RSA_METHOD *meth))(RSA *rsa);
int RSA_meth_set_finish(RSA_METHOD *rsa, int (*finish)(RSA *rsa));

```

```

int (*RSA_meth_get_sign(const RSA_METHOD *meth))(int type, const unsigned char *m,
        unsigned int m_length,
        unsigned char *sigret,
        unsigned int *siglen, const RSA *rsa);

int RSA_meth_set_sign(RSA_METHOD *rsa,
        int (*sign)(int type, const unsigned char *m,
        unsigned int m_length, unsigned char *sigret,
        unsigned int *siglen, const RSA *rsa));

int (*RSA_meth_get_verify(const RSA_METHOD *meth))(int dtype, const unsigned char *m,
        unsigned int m_length,
        const unsigned char *sigbuf,
        unsigned int siglen, const RSA *rsa);

int RSA_meth_set_verify(RSA_METHOD *rsa,
        int (*verify)(int dtype, const unsigned char *m,
        unsigned int m_length,
        const unsigned char *sigbuf,
        unsigned int siglen, const RSA *rsa));

int (*RSA_meth_get_keygen(const RSA_METHOD *meth))(RSA *rsa, int bits, BIGNUM *e,
        BN_GENCB *cb);

int RSA_meth_set_keygen(RSA_METHOD *rsa,
        int (*keygen)(RSA *rsa, int bits, BIGNUM *e,
        BN_GENCB *cb));

int (*RSA_meth_get_multi_prime_keygen(const RSA_METHOD *meth))(RSA *rsa, int bits,
        int primes, BIGNUM *e,
        BN_GENCB *cb);

int RSA_meth_set_multi_prime_keygen(RSA_METHOD *meth,
        int (*keygen) (RSA *rsa, int bits,
        int primes, BIGNUM *e,

```

```
BN_GENCB *cb));
```

DESCRIPTION

All of the functions described on this page are deprecated.

Applications should instead use the OSSL_PROVIDER APIs.

The RSA_METHOD type is a structure used for the provision of custom RSA implementations. It provides a set of functions used by OpenSSL for the implementation of the various RSA capabilities.

RSA_meth_new() creates a new RSA_METHOD structure. It should be given a unique name and a set of flags. The name should be a NULL terminated string, which will be duplicated and stored in the RSA_METHOD object.

It is the callers responsibility to free the original string. The flags will be used during the construction of a new RSA object based on this RSA_METHOD. Any new RSA object will have those flags set by default.

RSA_meth_dup() creates a duplicate copy of the RSA_METHOD object passed as a parameter. This might be useful for creating a new RSA_METHOD based on an existing one, but with some differences.

RSA_meth_free() destroys an RSA_METHOD structure and frees up any memory associated with it.

RSA_meth_get0_name() will return a pointer to the name of this RSA_METHOD. This is a pointer to the internal name string and so should not be freed by the caller. RSA_meth_set1_name() sets the name of the RSA_METHOD to name. The string is duplicated and the copy is stored in the RSA_METHOD structure, so the caller remains responsible for freeing the memory associated with the name.

RSA_meth_get_flags() returns the current value of the flags associated with this RSA_METHOD. RSA_meth_set_flags() provides the ability to set

these flags.

The functions `RSA_meth_get0_app_data()` and `RSA_meth_set0_app_data()` provide the ability to associate implementation specific data with the `RSA_METHOD`. It is the application's responsibility to free this data before the `RSA_METHOD` is freed via a call to `RSA_meth_free()`.

`RSA_meth_get_sign()` and `RSA_meth_set_sign()` get and set the function used for creating an RSA signature respectively. This function will be called in response to the application calling `RSA_sign()`. The parameters for the function have the same meaning as for `RSA_sign()`.

`RSA_meth_get_verify()` and `RSA_meth_set_verify()` get and set the function used for verifying an RSA signature respectively. This function will be called in response to the application calling `RSA_verify()`. The parameters for the function have the same meaning as for `RSA_verify()`.

`RSA_meth_get_mod_exp()` and `RSA_meth_set_mod_exp()` get and set the function used for CRT computations.

`RSA_meth_get_bn_mod_exp()` and `RSA_meth_set_bn_mod_exp()` get and set the function used for CRT computations, specifically the following value:

$$r = a^p \text{ mod } m$$

Both the `mod_exp()` and `bn_mod_exp()` functions are called by the default OpenSSL method during encryption, decryption, signing and verification.

`RSA_meth_get_init()` and `RSA_meth_set_init()` get and set the function used for creating a new RSA instance respectively. This function will be called in response to the application calling `RSA_new()` (if the current default `RSA_METHOD` is this one) or `RSA_new_method()`. The

`RSA_new()` and `RSA_new_method()` functions will allocate the memory for the new RSA object, and a pointer to this newly allocated structure will be passed as a parameter to the function. This function may be NULL.

`RSA_meth_get_finish()` and `RSA_meth_set_finish()` get and set the function used for destroying an instance of an RSA object respectively. This function will be called in response to the application calling `RSA_free()`. A pointer to the RSA to be destroyed is passed as a parameter. The destroy function should be used for RSA implementation specific clean up. The memory for the RSA itself should not be freed by this function. This function may be NULL.

`RSA_meth_get_keygen()` and `RSA_meth_set_keygen()` get and set the function used for generating a new RSA key pair respectively. This function will be called in response to the application calling `RSA_generate_key_ex()`. The parameter for the function has the same meaning as for `RSA_generate_key_ex()`.

`RSA_meth_get_multi_prime_keygen()` and `RSA_meth_set_multi_prime_keygen()` get and set the function used for generating a new multi-prime RSA key pair respectively. This function will be called in response to the application calling `RSA_generate_multi_prime_key()`. The parameter for the function has the same meaning as for `RSA_generate_multi_prime_key()`.

`RSA_meth_get_pub_enc()`, `RSA_meth_set_pub_enc()`, `RSA_meth_get_pub_dec()`, `RSA_meth_set_pub_dec()`, `RSA_meth_get_priv_enc()`, `RSA_meth_set_priv_enc()`, `RSA_meth_get_priv_dec()`, `RSA_meth_set_priv_dec()` get and set the functions used for public and private key encryption and decryption. These functions will be called in response to the application calling `RSA_public_encrypt()`, `RSA_private_decrypt()`, `RSA_private_encrypt()` and `RSA_public_decrypt()`

and take the same parameters as those.

RETURN VALUES

`RSA_meth_new()` and `RSA_meth_dup()` return the newly allocated `RSA_METHOD` object or `NULL` on failure.

`RSA_meth_get0_name()` and `RSA_meth_get_flags()` return the name and flags associated with the `RSA_METHOD` respectively.

All other `RSA_meth_get_*`() functions return the appropriate function pointer that has been set in the `RSA_METHOD`, or `NULL` if no such pointer has yet been set.

`RSA_meth_set1_name` and all `RSA_meth_set_*`() functions return 1 on success or 0 on failure.

SEE ALSO

`RSA_new(3)`, `RSA_generate_key_ex(3)`, `RSA_sign(3)`, `RSA_set_method(3)`,
`RSA_size(3)`, `RSA_get0_key(3)`, `RSA_generate_multi_prime_key(3)`

HISTORY

All of these functions were deprecated in OpenSSL 3.0.

`RSA_meth_get_multi_prime_keygen()` and `RSA_meth_set_multi_prime_keygen()` were added in OpenSSL 1.1.1.

Other functions described here were added in OpenSSL 1.1.0.

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