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

$ man BN_MONT_CTX_set.3ossl

BN_MOD_MUL_MONTGOMERY(3ossl) OpenSSL BN_MOD_MUL_MONTGOMERY(3ossl)

NAME

BN_mod_mul_montgomery, BN_MONT_CTX_new, BN_MONT_CTX_free,

BN_MONT_CTX_set, BN_MONT_CTX_copy, BN_from_montgomery, BN_to_montgomery

- Montgomery multiplication

SYNOPSIS

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

BN_MONT_CTX *BN_MONT_CTX_new(void);
void BN_MONT_CTX_free(BN_MONT_CTX *mont);

int BN_MONT_CTX_set(BN_MONT_CTX *mont, const BIGNUM *m, BN_CTX *ctx);
BN_MONT_CTX *BN_MONT_CTX_copy(BN_MONT_CTX *to, BN_MONT_CTX *from);

int BN_mod_mul_montgomery(BIGNUM *r, BIGNUM *a, BIGNUM *b,
                          BN_MONT_CTX *mont, BN_CTX *ctx);

int BN_from_montgomery(BIGNUM *r, BIGNUM *a, BN_MONT_CTX *mont,
                       BN_CTX *ctx);

int BN_to_montgomery(BIGNUM *r, BIGNUM *a, BN_MONT_CTX *mont,
```

BN_CTX *ctx);

DESCRIPTION

These functions implement Montgomery multiplication. They are used automatically when BN_mod_exp(3) is called with suitable input, but they may be useful when several operations are to be performed using the same modulus.

BN_MONT_CTX_new() allocates and initializes a BN_MONT_CTX structure.

BN_MONT_CTX_set() sets up the mont structure from the modulus m by precomputing its inverse and a value R.

BN_MONT_CTX_copy() copies the BN_MONT_CTX from to to.

BN_MONT_CTX_free() frees the components of the BN_MONT_CTX, and, if it was created by BN_MONT_CTX_new(), also the structure itself. If mont is NULL, nothing is done.

BN_mod_mul_montgomery() computes Mont(a,b):=a*b*R^-1 and places the result in r.

BN_from_montgomery() performs the Montgomery reduction r = a*R^-1.

BN_to_montgomery() computes Mont(a,R^2), i.e. a*R. Note that a must be nonnegative and smaller than the modulus.

For all functions, ctx is a previously allocated BN_CTX used for temporary variables.

RETURN VALUES

BN_MONT_CTX_new() returns the newly allocated BN_MONT_CTX, and NULL on error.

BN_MONT_CTX_free() has no return value.

For the other functions, 1 is returned for success, 0 on error. The error codes can be obtained by ERR_get_error(3).

WARNINGS

The inputs must be reduced modulo m, otherwise the result will be outside the expected range.

SEE ALSO

ERR_get_error(3), BN_add(3), BN_CTX_new(3)

HISTORY

BN_MONT_CTX_init() was removed in OpenSSL 1.1.0

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