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### ***Rocky Enterprise Linux 9.2 Manual Pages on command 'BN\_mod\_exp\_mont.3ossl'***

***\$ man BN\_mod\_exp\_mont.3ossl***

BN\_MOD\_EXP\_MONT(3ossl)      OpenSSL      BN\_MOD\_EXP\_MONT(3ossl)

#### NAME

BN\_mod\_exp\_mont, BN\_mod\_exp\_mont\_consttime,  
BN\_mod\_exp\_mont\_consttime\_x2 - Montgomery exponentiation

#### SYNOPSIS

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

```
int BN_mod_exp_mont(BIGNUM *rr, const BIGNUM *a, const BIGNUM *p,  
                  const BIGNUM *m, BN_CTX *ctx, BN_MONT_CTX *in_mont);
```

```
int BN_mod_exp_mont_consttime(BIGNUM *rr, const BIGNUM *a, const BIGNUM *p,  
                              const BIGNUM *m, BN_CTX *ctx,  
                              BN_MONT_CTX *in_mont);
```

```
int BN_mod_exp_mont_consttime_x2(BIGNUM *rr1, const BIGNUM *a1,  
                                  const BIGNUM *p1, const BIGNUM *m1,
```

```
BN_MONT_CTX *in_mont1, BIGNUM *rr2,  
const BIGNUM *a2, const BIGNUM *p2,  
const BIGNUM *m2, BN_MONT_CTX *in_mont2,  
BN_CTX *ctx);
```

## DESCRIPTION

`BN_mod_exp_mont()` computes  $a$  to the  $p$ -th power modulo  $m$  (" $rr=a^p \% m$ ") using Montgomery multiplication. `in_mont` is a Montgomery context and can be `NULL`. In the case `in_mont` is `NULL`, it will be initialized within the function, so you can save time on initialization if you provide it in advance.

`BN_mod_exp_mont_consttime()` computes  $a$  to the  $p$ -th power modulo  $m$  (" $rr=a^p \% m$ ") using Montgomery multiplication. It is a variant of `BN_mod_exp_mont(3)` that uses fixed windows and the special precomputation memory layout to limit data-dependency to a minimum to protect secret exponents. It is called automatically when `BN_mod_exp_mont(3)` is called with parameters  $a$ ,  $p$ ,  $m$ , any of which have `BN_FLG_CONSTTIME` flag.

`BN_mod_exp_mont_consttime_x2()` computes two independent exponentiations  $a_1$  to the  $p_1$ -th power modulo  $m_1$  (" $rr1=a_1^{p_1} \% m_1$ ") and  $a_2$  to the  $p_2$ -th power modulo  $m_2$  (" $rr2=a_2^{p_2} \% m_2$ ") using Montgomery multiplication. For some fixed and equal modulus sizes  $m_1$  and  $m_2$  it uses optimizations that allow to speedup two exponentiations. In all other cases the function reduces to two calls of `BN_mod_exp_mont_consttime(3)`.

## RETURN VALUES

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

## SEE ALSO

`ERR_get_error(3)`, `BN_mod_exp_mont(3)`

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