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### ***Rocky Enterprise Linux 9.2 Manual Pages on command 'BN\_RECP\_CTX\_set.3oss1'***

***\$ man BN\_RECP\_CTX\_set.3oss1***

BN\_MOD\_MUL\_RECIPROCAL(3oss1)    OpenSSL    BN\_MOD\_MUL\_RECIPROCAL(3oss1)

#### NAME

BN\_mod\_mul\_reciprocal, BN\_div\_recip, BN\_RECP\_CTX\_new, BN\_RECP\_CTX\_free,  
BN\_RECP\_CTX\_set - modular multiplication using reciprocal

#### SYNOPSIS

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

```
BN_RECP_CTX *BN_RECP_CTX_new(void);
```

```
void BN_RECP_CTX_free(BN_RECP_CTX *recp);
```

```
int BN_RECP_CTX_set(BN_RECP_CTX *recp, const BIGNUM *m, BN_CTX *ctx);
```

```
int BN_div_recip(BIGNUM *dv, BIGNUM *rem, const BIGNUM *a, BN_RECP_CTX *recp,  
                  BN_CTX *ctx);
```

```
int BN_mod_mul_reciprocal(BIGNUM *r, const BIGNUM *a, const BIGNUM *b,
```

BN\_RECP\_CTX \*recp, BN\_CTX \*ctx);

## DESCRIPTION

BN\_mod\_mul\_reciprocal() can be used to perform an efficient BN\_mod\_mul(3) operation when the operation will be performed repeatedly with the same modulus. It computes  $r=(a*b)\%m$  using  $recp=1/m$ , which is set as described below. ctx is a previously allocated BN\_CTX used for temporary variables.

BN\_RECP\_CTX\_new() allocates and initializes a BN\_RECP structure.

BN\_RECP\_CTX\_free() frees the components of the BN\_RECP, and, if it was created by BN\_RECP\_CTX\_new(), also the structure itself. If recp is NULL, nothing is done.

BN\_RECP\_CTX\_set() stores m in recp and sets it up for computing  $1/m$  and shifting it left by  $BN\_num\_bits(m)+1$  to make it an integer. The result and the number of bits it was shifted left will later be stored in recp.

BN\_div\_recip() divides a by m using recp. It places the quotient in dv and the remainder in rem.

The BN\_RECP\_CTX structure cannot be shared between threads.

## RETURN VALUES

BN\_RECP\_CTX\_new() returns the newly allocated BN\_RECP\_CTX, and NULL on error.

BN\_RECP\_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).

## SEE ALSO

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

## HISTORY

`BN_RECP_CTX_init()` was removed in OpenSSL 1.1.0

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