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

\$ man BN_rand_ex.3ossl

BN_RAND(3ossl) OpenSSL BN_RAND(3ossl)

NAME

BN_rand_ex, BN_rand, BN_priv_rand_ex, BN_priv_rand, BN_pseudo_rand,
BN_rand_range_ex, BN_rand_range, BN_priv_rand_range_ex,
BN_priv_rand_range, BN_pseudo_rand_range - generate pseudo-random
number

SYNOPSIS

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

int BN_rand_ex(BIGNUM *rnd, int bits, int top, int bottom,
               unsigned int strength, BN_CTX *ctx);

int BN_rand(BIGNUM *rnd, int bits, int top, int bottom);

int BN_priv_rand_ex(BIGNUM *rnd, int bits, int top, int bottom,
                   unsigned int strength, BN_CTX *ctx);

int BN_priv_rand(BIGNUM *rnd, int bits, int top, int bottom);

int BN_rand_range_ex(BIGNUM *rnd, const BIGNUM *range, unsigned int strength,
                    BN_CTX *ctx);

int BN_rand_range(BIGNUM *rnd, const BIGNUM *range);

int BN_priv_rand_range_ex(BIGNUM *rnd, const BIGNUM *range, unsigned int strength,
                          BN_CTX *ctx);

int BN_priv_rand_range(BIGNUM *rnd, const BIGNUM *range);
```

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):

```
int BN_pseudo_rand(BIGNUM *rnd, int bits, int top, int bottom);  
int BN_pseudo_rand_range(BIGNUM *rnd, const BIGNUM *range);
```

DESCRIPTION

`BN_rand_ex()` generates a cryptographically strong pseudo-random number of bits in length and security strength at least strength bits using the random number generator for the library context associated with `ctx`. The function stores the generated data in `rnd`. The parameter `ctx` may be `NULL` in which case the default library context is used. If `bits` is less than zero, or too small to accommodate the requirements specified by the `top` and `bottom` parameters, an error is returned. The `top` parameters specifies requirements on the most significant bit of the generated number. If it is `BN_RAND_TOP_ANY`, there is no constraint. If it is `BN_RAND_TOP_ONE`, the top bit must be one. If it is `BN_RAND_TOP_TWO`, the two most significant bits of the number will be set to 1, so that the product of two such random numbers will always have $2 * \text{bits}$ length. If `bottom` is `BN_RAND_BOTTOM_ODD`, the number will be odd; if it is `BN_RAND_BOTTOM_ANY` it can be odd or even. If `bits` is 1 then `top` cannot also be `BN_RAND_TOP_TWO`.

`BN_rand()` is the same as `BN_rand_ex()` except that the default library context is always used.

`BN_rand_range_ex()` generates a cryptographically strong pseudo-random number `rnd`, of security strength at least strength bits, in the range $0 \leq \text{rnd} < \text{range}$ using the random number generator for the library context associated with `ctx`. The parameter `ctx` may be `NULL` in which case the default library context is used.

`BN_rand_range()` is the same as `BN_rand_range_ex()` except that the default library context is always used.

`BN_priv_rand_ex()`, `BN_priv_rand()`, `BN_priv_rand_range_ex()` and `BN_priv_rand_range()` have the same semantics as `BN_rand_ex()`, `BN_rand()`, `BN_rand_range_ex()` and `BN_rand_range()` respectively. They are intended to be used for generating values that should remain private, and mirror the same difference between `RAND_bytes(3)` and `RAND_priv_bytes(3)`.

NOTES

Always check the error return value of these functions and do not take randomness for granted: an error occurs if the CSPRNG has not been seeded with enough randomness to ensure an unpredictable byte sequence.

RETURN VALUES

The functions return 1 on success, 0 on error. The error codes can be obtained by `ERR_get_error(3)`.

SEE ALSO

`ERR_get_error(3)`, `RAND_add(3)`, `RAND_bytes(3)`, `RAND_priv_bytes(3)`, `RAND(7)`, `EVP RAND(7)`

HISTORY

? Starting with OpenSSL release 1.1.0, `BN_pseudo_rand()` has been identical to `BN_rand()` and `BN_pseudo_rand_range()` has been identical to `BN_rand_range()`. The `BN_pseudo_rand()` and `BN_pseudo_rand_range()` functions were deprecated in OpenSSL 3.0.

? The `BN_priv_rand()` and `BN_priv_rand_range()` functions were added in OpenSSL 1.1.1.

? The `BN_rand_ex()`, `BN_priv_rand_ex()`, `BN_rand_range_ex()` and `BN_priv_rand_range_ex()` functions were added in OpenSSL 3.0.

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