

**NAME**

BN\_bn2binpad, BN\_bn2bin, BN\_bin2bn, BN\_bn2lebinpad, BN\_lebin2bn, BN\_bn2nativepad, BN\_native2bn, BN\_bn2hex, BN\_bn2dec, BN\_hex2bn, BN\_dec2bn, BN\_print, BN\_print\_fp, BN\_bn2mpi, BN\_mpi2bn - format conversions

**SYNOPSIS**

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

```
int BN_bn2bin(const BIGNUM *a, unsigned char *to);
int BN_bn2binpad(const BIGNUM *a, unsigned char *to, int tolen);
BIGNUM *BN_bin2bn(const unsigned char *s, int len, BIGNUM *ret);

int BN_bn2lebinpad(const BIGNUM *a, unsigned char *to, int tolen);
BIGNUM *BN_lebin2bn(const unsigned char *s, int len, BIGNUM *ret);

int BN_bn2nativepad(const BIGNUM *a, unsigned char *to, int tolen);
BIGNUM *BN_native2bn(const unsigned char *s, int len, BIGNUM *ret);

char *BN_bn2hex(const BIGNUM *a);
char *BN_bn2dec(const BIGNUM *a);
int BN_hex2bn(BIGNUM **a, const char *str);
int BN_dec2bn(BIGNUM **a, const char *str);

int BN_print(BIO *fp, const BIGNUM *a);
int BN_print_fp(FILE *fp, const BIGNUM *a);

int BN_bn2mpi(const BIGNUM *a, unsigned char *to);
BIGNUM *BN_mpi2bn(unsigned char *s, int len, BIGNUM *ret);
```

**DESCRIPTION**

**BN\_bn2bin()** converts the absolute value of **a** into big-endian form and stores it at **to**. **to** must point to `BN_num_bytes(a)` bytes of memory.

**BN\_bn2binpad()** also converts the absolute value of **a** into big-endian form and stores it at **to**. **tolen** indicates the length of the output buffer **to**. The result is padded with zeros if necessary. If **tolen** is less than `BN_num_bytes(a)` an error is returned.

**BN\_bin2bn()** converts the positive integer in big-endian form of length **len** at **s** into a **BIGNUM** and places it in **ret**. If **ret** is NULL, a new **BIGNUM** is created.

**BN\_bn2lebinpad()** and **BN\_lebin2bn()** are identical to **BN\_bn2binpad()** and **BN\_bin2bn()** except the buffer is in little-endian format.

**BN\_bn2nativepad()** and **BN\_native2bn()** are identical to **BN\_bn2binpad()** and **BN\_bin2bn()** except the buffer is in native format, i.e. most significant byte first on big-endian platforms, and least significant byte first on little-endian platforms.

**BN\_bn2hex()** and **BN\_bn2dec()** return printable strings containing the hexadecimal and decimal encoding of **a** respectively. For negative numbers, the string is prefaced with a leading '-'. The string must be freed later using **OPENSSL\_free()**.

**BN\_hex2bn()** takes as many characters as possible from the string **str**, including the leading character '-' which means negative, to form a valid hexadecimal number representation and converts them to a **BIGNUM** and stores it in **\*\*a**. If **\*a** is NULL, a new **BIGNUM** is created. If **a** is NULL, it only computes the length of valid representation. A "negative zero" is converted to zero. **BN\_dec2bn()** is the same using the decimal system.

**BN\_print()** and **BN\_print\_fp()** write the hexadecimal encoding of **a**, with a leading '-' for negative numbers, to the **BIO** or **FILE fp**.

**BN\_bn2mpi()** and **BN\_mpi2bn()** convert **BIGNUM**s from and to a format that consists of the number's length in bytes represented as a 4-byte big-endian number, and the number itself in big-endian format, where the most significant bit signals a negative number (the representation of numbers with the MSB set is prefixed with null byte).

**BN\_bn2mpi()** stores the representation of **a** at **to**, where **to** must be large enough to hold the result. The size can be determined by calling **BN\_bn2mpi(a, NULL)**.

**BN\_mpi2bn()** converts the **len** bytes long representation at **s** to a **BIGNUM** and stores it at **ret**, or in a newly allocated **BIGNUM** if **ret** is NULL.

## RETURN VALUES

**BN\_bn2bin()** returns the length of the big-endian number placed at **to**. **BN\_bin2bn()** returns the **BIGNUM**, NULL on error.

**BN\_bn2binpad()**, **BN\_bn2lebinpad()**, and **BN\_bn2nativepad()** return the number of bytes written or -1 if the supplied buffer is too small.

**BN\_bn2hex()** and **BN\_bn2dec()** return a NUL-terminated string, or NULL on error. **BN\_hex2bn()** and **BN\_dec2bn()** return the number of characters used in parsing, or 0 on error, in which case no new

**BIGNUM** will be created.

**BN\_print\_fp()** and **BN\_print()** return 1 on success, 0 on write errors.

**BN\_bn2mpi()** returns the length of the representation. **BN\_mpi2bn()** returns the **BIGNUM**, and NULL on error.

The error codes can be obtained by **ERR\_get\_error(3)**.

#### SEE ALSO

**ERR\_get\_error(3)**, **BN\_zero(3)**, **ASN1\_INTEGER\_to\_BN(3)**, **BN\_num\_bytes(3)**

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