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***Rocky Enterprise Linux 9.2 Manual Pages on command 'OSSL\_PARAM\_BLD\_push\_BN.3ossI'***

***\$ man OSSL\_PARAM\_BLD\_push\_BN.3ossI***

OSSL\_PARAM\_BLD(3ossI)          OpenSSL          OSSL\_PARAM\_BLD(3ossI)

**NAME**

OSSL\_PARAM\_BLD, OSSL\_PARAM\_BLD\_new, OSSL\_PARAM\_BLD\_to\_param,  
OSSL\_PARAM\_BLD\_free, OSSL\_PARAM\_BLD\_push\_int, OSSL\_PARAM\_BLD\_push\_uint,  
OSSL\_PARAM\_BLD\_push\_long, OSSL\_PARAM\_BLD\_push\_ulong,  
OSSL\_PARAM\_BLD\_push\_int32, OSSL\_PARAM\_BLD\_push\_uint32,  
OSSL\_PARAM\_BLD\_push\_int64, OSSL\_PARAM\_BLD\_push\_uint64,  
OSSL\_PARAM\_BLD\_push\_size\_t, OSSL\_PARAM\_BLD\_push\_time\_t,  
OSSL\_PARAM\_BLD\_push\_double, OSSL\_PARAM\_BLD\_push\_BN,  
OSSL\_PARAM\_BLD\_push\_BN\_pad, OSSL\_PARAM\_BLD\_push\_utf8\_string,  
OSSL\_PARAM\_BLD\_push\_utf8\_ptr, OSSL\_PARAM\_BLD\_push\_octet\_string,  
OSSL\_PARAM\_BLD\_push\_octet\_ptr - functions to assist in the creation of  
OSSL\_PARAM arrays

**SYNOPSIS**

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

```

typedef struct OSSL_PARAM_BLD;

OSSL_PARAM_BLD *OSSL_PARAM_BLD_new(void);
OSSL_PARAM *OSSL_PARAM_BLD_to_param(OSSL_PARAM_BLD *bld);
void OSSL_PARAM_BLD_free(OSSL_PARAM_BLD *bld);

int OSSL_PARAM_BLD_push_TYPE(OSSL_PARAM_BLD *bld, const char *key, TYPE val);

int OSSL_PARAM_BLD_push_BN(OSSL_PARAM_BLD *bld, const char *key,
                           const BIGNUM *bn);
int OSSL_PARAM_BLD_push_BN_pad(OSSL_PARAM_BLD *bld, const char *key,
                               const BIGNUM *bn, size_t sz);

int OSSL_PARAM_BLD_push_utf8_string(OSSL_PARAM_BLD *bld, const char *key,
                                    const char *buf, size_t bsize);
int OSSL_PARAM_BLD_push_utf8_ptr(OSSL_PARAM_BLD *bld, const char *key,
                                  char *buf, size_t bsize);
int OSSL_PARAM_BLD_push_octet_string(OSSL_PARAM_BLD *bld, const char *key,
                                     const void *buf, size_t bsize);
int OSSL_PARAM_BLD_push_octet_ptr(OSSL_PARAM_BLD *bld, const char *key,
                                  void *buf, size_t bsize);

```

## DESCRIPTION

A collection of utility functions that simplify the creation of OSSL\_PARAM arrays. The TYPE names are as per OSSL\_PARAM\_int(3).

OSSL\_PARAM\_BLD\_new() allocates and initialises a new OSSL\_PARAM\_BLD structure so that values can be added. Any existing values are cleared.

OSSL\_PARAM\_BLD\_free() deallocates the memory allocated by OSSL\_PARAM\_BLD\_new().

`OSSL_PARAM_BLD_to_param()` converts a built up `OSSL_PARAM_BLD` structure `bl` into an allocated `OSSL_PARAM` array. The `OSSL_PARAM` array and all associated storage must be freed by calling `OSSL_PARAM_free()` with the functions return value. `OSSL_PARAM_BLD_free()` can safely be called any time after this function is.

`OSSL_PARAM_BLD_push_TYPE()` are a series of functions which will create `OSSL_PARAM` objects of the specified size and correct type for the `val` argument. `val` is stored by value and an expression or auto variable can be used.

`OSSL_PARAM_BLD_push_BN()` is a function that will create an `OSSL_PARAM` object that holds the specified `BIGNUM` `bn`. If `bn` is marked as being securely allocated, its `OSSL_PARAM` representation will also be securely allocated. The `bn` argument is stored by reference and the underlying `BIGNUM` object must exist until after `OSSL_PARAM_BLD_to_param()` has been called.

`OSSL_PARAM_BLD_push_BN_pad()` is a function that will create an `OSSL_PARAM` object that holds the specified `BIGNUM` `bn`. The object will be padded to occupy exactly `sz` bytes, if insufficient space is specified an error results. If `bn` is marked as being securely allocated, its `OSSL_PARAM` representation will also be securely allocated. The `bn` argument is stored by reference and the underlying `BIGNUM` object must exist until after `OSSL_PARAM_BLD_to_param()` has been called.

`OSSL_PARAM_BLD_push_utf8_string()` is a function that will create an `OSSL_PARAM` object that references the UTF8 string specified by `buf`. The length of the string `bsize` should not include the terminating NUL byte. If it is zero then it will be calculated. The string that `buf` points to is stored by reference and must remain in scope until after `OSSL_PARAM_BLD_to_param()` has been called.

`OSSL_PARAM_BLD_push_octet_string()` is a function that will create an `OSSL_PARAM` object that references the octet string specified by `buf` and `<bsize>`. The memory that `buf` points to is stored by reference and must remain in scope until after `OSSL_PARAM_BLD_to_param()` has been called.

`OSSL_PARAM_BLD_push_utf8_ptr()` is a function that will create an `OSSL_PARAM` object that references the UTF8 string specified by `buf`. The length of the string `bsize` should not include the terminating NUL byte. If it is zero then it will be calculated. The string `buf` points to is stored by reference and must remain in scope until the `OSSL_PARAM` array is freed.

`OSSL_PARAM_BLD_push_octet_ptr()` is a function that will create an `OSSL_PARAM` object that references the octet string specified by `buf`. The memory `buf` points to is stored by reference and must remain in scope until the `OSSL_PARAM` array is freed.

## RETURN VALUES

`OSSL_PARAM_BLD_new()` returns the allocated `OSSL_PARAM_BLD` structure, or `NULL` on error.

`OSSL_PARAM_BLD_to_param()` returns the allocated `OSSL_PARAM` array, or `NULL` on error.

All of the `OSSL_PARAM_BLD_push_TYPE` functions return 1 on success and 0 on error.

## NOTES

`OSSL_PARAM_BLD_push_BN()` and `OSSL_PARAM_BLD_push_BN_pad()` currently only support nonnegative `BIGNUMs`. They return an error on negative `BIGNUMs`.

## EXAMPLES

Both examples creating an OSSL\_PARAM array that contains an RSA key.

For both, the predefined key variables are:

```
BIGNUM *n;      /* modulus */
unsigned int e; /* public exponent */
BIGNUM *d;      /* private exponent */
BIGNUM *p, *q;  /* first two prime factors */
BIGNUM *dmp1, *dmq1; /* first two CRT exponents */
BIGNUM *iqmp;   /* first CRT coefficient */
```

### Example 1

This example shows how to create an OSSL\_PARAM array that contains an RSA private key.

```
OSSL_PARAM_BLD *bld = OSSL_PARAM_BLD_new();
OSSL_PARAM *params = NULL;

if (bld == NULL
    || !OSSL_PARAM_BLD_push_BN(bld, "n", n)
    || !OSSL_PARAM_BLD_push_uint(bld, "e", e)
    || !OSSL_PARAM_BLD_push_BN(bld, "d", d)
    || !OSSL_PARAM_BLD_push_BN(bld, "rsa-factor1", p)
    || !OSSL_PARAM_BLD_push_BN(bld, "rsa-factor2", q)
    || !OSSL_PARAM_BLD_push_BN(bld, "rsa-exponent1", dmp1)
    || !OSSL_PARAM_BLD_push_BN(bld, "rsa-exponent2", dmq1)
    || !OSSL_PARAM_BLD_push_BN(bld, "rsa-coefficient1", iqmp)
    || (params = OSSL_PARAM_BLD_to_param(bld)) == NULL)
    goto err;

OSSL_PARAM_BLD_free(bld);

/* Use params */

...

OSSL_PARAM_free(params);
```

## Example 2

This example shows how to create an OSSL\_PARAM array that contains an RSA public key.

```
OSSL_PARAM_BLD *bld = OSSL_PARAM_BLD_new();
OSSL_PARAM *params = NULL;

if (nld == NULL
    || !OSSL_PARAM_BLD_push_BN(bld, "n", n)
    || !OSSL_PARAM_BLD_push_uint(bld, "e", e)
    || (params = OSSL_PARAM_BLD_to_param(bld)) == NULL)
    goto err;

OSSL_PARAM_BLD_free(bld);
/* Use params */

...

OSSL_PARAM_free(params);
```

## SEE ALSO

OSSL\_PARAM\_int(3), OSSL\_PARAM(3), OSSL\_PARAM\_free(3)

## HISTORY

The functions described here were all added in OpenSSL 3.0.

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