

**NAME**

BIO\_ctrl, BIO\_callback\_ctrl, BIO\_ptr\_ctrl, BIO\_int\_ctrl, BIO\_reset, BIO\_seek, BIO\_tell, BIO\_flush, BIO\_eof, BIO\_set\_close, BIO\_get\_close, BIO\_pending, BIO\_wpending, BIO\_ctrl\_pending, BIO\_ctrl\_wpending, BIO\_get\_info\_callback, BIO\_set\_info\_callback, BIO\_info\_cb, BIO\_get\_ktls\_send, BIO\_get\_ktls\_recv - BIO control operations

**SYNOPSIS**

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

```
typedef int BIO_info_cb(BIO *b, int state, int res);
```

```
long BIO_ctrl(BIO *bp, int cmd, long larg, void *parg);  
long BIO_callback_ctrl(BIO *b, int cmd, BIO_info_cb *cb);  
void *BIO_ptr_ctrl(BIO *bp, int cmd, long larg);  
long BIO_int_ctrl(BIO *bp, int cmd, long larg, int iarg);
```

```
int BIO_reset(BIO *b);  
int BIO_seek(BIO *b, int ofs);  
int BIO_tell(BIO *b);  
int BIO_flush(BIO *b);  
int BIO_eof(BIO *b);  
int BIO_set_close(BIO *b, long flag);  
int BIO_get_close(BIO *b);  
int BIO_pending(BIO *b);  
int BIO_wpending(BIO *b);  
size_t BIO_ctrl_pending(BIO *b);  
size_t BIO_ctrl_wpending(BIO *b);
```

```
int BIO_get_info_callback(BIO *b, BIO_info_cb **cbp);  
int BIO_set_info_callback(BIO *b, BIO_info_cb *cb);
```

```
int BIO_get_ktls_send(BIO *b);  
int BIO_get_ktls_recv(BIO *b);
```

**DESCRIPTION**

**BIO\_ctrl()**, **BIO\_callback\_ctrl()**, **BIO\_ptr\_ctrl()** and **BIO\_int\_ctrl()** are BIO "control" operations taking arguments of various types. These functions are not normally called directly, various macros are used instead. The standard macros are described below, macros specific to a particular type of BIO are described in the specific BIOs manual page as well as any special features of the standard calls.

**BIO\_reset()** typically resets a BIO to some initial state, in the case of file related BIOs for example it rewinds the file pointer to the start of the file.

**BIO\_seek()** resets a file related BIO's (that is file descriptor and FILE BIOs) file position pointer to **ofs** bytes from start of file.

**BIO\_tell()** returns the current file position of a file related BIO.

**BIO\_flush()** normally writes out any internally buffered data, in some cases it is used to signal EOF and that no more data will be written.

**BIO\_eof()** returns 1 if the BIO has read EOF, the precise meaning of "EOF" varies according to the BIO type.

**BIO\_set\_close()** sets the BIO **b** close flag to **flag**. **flag** can take the value BIO\_CLOSE or BIO\_NOCLOSE. Typically BIO\_CLOSE is used in a source/sink BIO to indicate that the underlying I/O stream should be closed when the BIO is freed.

**BIO\_get\_close()** returns the BIOs close flag.

**BIO\_pending()**, **BIO\_ctrl\_pending()**, **BIO\_wpending()** and **BIO\_ctrl\_wpending()** return the number of pending characters in the BIOs read and write buffers. Not all BIOs support these calls.

**BIO\_ctrl\_pending()** and **BIO\_ctrl\_wpending()** return a size\_t type and are functions, **BIO\_pending()** and **BIO\_wpending()** are macros which call **BIO\_ctrl()**.

**BIO\_get\_ktls\_send()** returns 1 if the BIO is using the Kernel TLS data-path for sending. Otherwise, it returns zero. **BIO\_get\_ktls\_recv()** returns 1 if the BIO is using the Kernel TLS data-path for receiving. Otherwise, it returns zero.

## RETURN VALUES

**BIO\_reset()** normally returns 1 for success and  $\leq 0$  for failure. File BIOs are an exception, they return 0 for success and -1 for failure.

**BIO\_seek()** and **BIO\_tell()** both return the current file position on success and -1 for failure, except file BIOs which for **BIO\_seek()** always return 0 for success and -1 for failure.

**BIO\_flush()** returns 1 for success and  $\leq 0$  for failure.

**BIO\_eof()** returns 1 if EOF has been reached, 0 if not, or negative values for failure.

**BIO\_set\_close()** returns 1 on success or  $\leq 0$  for failure.

**BIO\_get\_close()** returns the close flag value: **BIO\_CLOSE** or **BIO\_NOCLOSE**. It also returns other negative values if an error occurs.

**BIO\_pending()**, **BIO\_ctrl\_pending()**, **BIO\_wpending()** and **BIO\_ctrl\_wpending()** return the amount of pending data. **BIO\_pending()** and **BIO\_wpending()** return negative value or 0 on error.

**BIO\_ctrl\_pending()** and **BIO\_ctrl\_wpending()** return 0 on error.

**BIO\_get\_ktls\_send()** returns 1 if the BIO is using the Kernel TLS data-path for sending. Otherwise, it returns zero. **BIO\_get\_ktls\_recv()** returns 1 if the BIO is using the Kernel TLS data-path for receiving. Otherwise, it returns zero.

## NOTES

**BIO\_flush()**, because it can write data may return 0 or -1 indicating that the call should be retried later in a similar manner to **BIO\_write\_ex()**. The **BIO\_should\_retry()** call should be used and appropriate action taken is the call fails.

The return values of **BIO\_pending()** and **BIO\_wpending()** may not reliably determine the amount of pending data in all cases. For example in the case of a file BIO some data may be available in the FILE structures internal buffers but it is not possible to determine this in a portably way. For other types of BIO they may not be supported.

Filter BIOs if they do not internally handle a particular **BIO\_ctrl()** operation usually pass the operation to the next BIO in the chain. This often means there is no need to locate the required BIO for a particular operation, it can be called on a chain and it will be automatically passed to the relevant BIO. However, this can cause unexpected results: for example no current filter BIOs implement **BIO\_seek()**, but this may still succeed if the chain ends in a FILE or file descriptor BIO.

Source/sink BIOs return an 0 if they do not recognize the **BIO\_ctrl()** operation.

## BUGS

Some of the return values are ambiguous and care should be taken. In particular a return value of 0 can be returned if an operation is not supported, if an error occurred, if EOF has not been reached and in the case of **BIO\_seek()** on a file BIO for a successful operation.

In older versions of OpenSSL the **BIO\_ctrl\_pending()** and **BIO\_ctrl\_wpending()** could return values greater than **INT\_MAX** on error.

## HISTORY

The **BIO\_get\_ktls\_send()** and **BIO\_get\_ktls\_recv()** macros were added in OpenSSL 3.0. They were modified to never return -1 in OpenSSL 3.0.4.

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