

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_set_conn_mode, BIO_get_conn_mode, BIO_set_tfo – 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);

int BIO_set_conn_mode(BIO *b, int mode);
int BIO_get_conn_mode(BIO *b);

int BIO_set_tfo(BIO *b, int onoff);
```

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.

BIO_get_conn_mode() returns the BIO connection mode. **BIO_set_conn_mode()** sets the BIO connection mode.

BIO_set_tfo() disables TCP Fast Open when **onoff** is 0, and enables TCP Fast Open when **onoff** is nonzero. Setting the value to 1 is equivalent to setting **BIO_SOCK_TFO** in **BIO_set_conn_mode()**.

RETURN VALUES

BIO_reset() normally returns 1 for success and <=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 <=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 <=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.

BIO_set_conn_mode() returns 1 for success and 0 for failure. **BIO_get_conn_mode()** returns the current connection mode. Which may contain the bitwise-or of the following flags:

BIO_SOCK_REUSEADDR
 BIO_SOCK_V6_ONLY
 BIO_SOCK_KEEPALIVE
 BIO_SOCK_NONBLOCK
 BIO_SOCK_NODELAY
 BIO_SOCK_TFO

BIO_set_tfo() returns 1 for success, and 0 for failure.

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_rcv()** macros were added in OpenSSL 3.0. They were modified to never return -1 in OpenSSL 3.0.4.

The **BIO_get_conn_mode()**, **BIO_set_conn_mode()** and **BIO_set_tfo()** functions were added in OpenSSL 3.2.

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