

# hdf5hio

HDF5 HIO Plugin 1.0

API Document

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# Chapter 1

## HDF5 HIO Plugin

### 1.1 About HDF5 HIO plugin

libhio is a library intended for writing data to hierarchical data store systems. These systems may be comprised of one or more logical layers including parallel file systems, burst buffers, and local memory. libhio provides support for automated fall-back on alternate destinations if part of the storage hierarchy becomes unavailable.

The HDF5 HIO plugin allows HDF5 to use HIO as the file driver. The user does not have to use HIO directly. Instead HDF5 is used as normal and is initialized to use the HIO plugin. The plugin then uses HIO to do the actual IO for HDF5.

### 1.2 API

The API is used for setting options for the plugin. The settings structure needs to first be initialized:

```
H5FD_hio_settings_init(settings);
```

Then the options can be set with the H5FD\_hio\_set functions. See src/hdf5\_hio\_example.c for a full example.



# Chapter 2

## Class Index

### 2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

<a href="#">hio_settings_t</a> . . . . .	<a href="#">7</a>
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# Chapter 3

## File Index

### 3.1 File List

Here is a list of all files with brief descriptions:

<a href="#">H5FDhio.h</a> (API for HDF5 HIO plugin ) . . . . .	9
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## Chapter 4

# Class Documentation

### 4.1 hio\_settings\_t Struct Reference

```
#include <H5FDhio.h>
```

#### Public Attributes

- int `read_blocking`
- int `write_blocking`
- int `read_io_mode`
- int `write_io_mode`
- int `dataset_mode`
- size\_t `stride_size`
- hio\_request\_t \* `request`
- char `name` [HIO\_FILE\_NAME\_SIZE]
- char `element_name` [HIO\_ELEM\_NAME\_SIZE]
- char `config_file` [HIO\_CONFIG\_FILE\_SIZE]
- char `config_prefix` [HIO\_CONFIG\_PREFIX\_SIZE]
- MPI\_Comm `comm`
- int64\_t `setid`
- int `flags`

### 4.1.1 Member Data Documentation

- 4.1.1.1 `int hio_settings_t::read_blocking`
- 4.1.1.2 `int hio_settings_t::write_blocking`
- 4.1.1.3 `int hio_settings_t::read_io_mode`
- 4.1.1.4 `int hio_settings_t::write_io_mode`
- 4.1.1.5 `int hio_settings_t::dataset_mode`
- 4.1.1.6 `size_t hio_settings_t::stride_size`
- 4.1.1.7 `hio_request_t* hio_settings_t::request`
- 4.1.1.8 `char hio_settings_t::name[HIO_FILE_NAME_SIZE]`
- 4.1.1.9 `char hio_settings_t::element_name[HIO_ELEM_NAME_SIZE]`
- 4.1.1.10 `char hio_settings_t::config_file[HIO_CONFIG_FILE_SIZE]`
- 4.1.1.11 `char hio_settings_t::config_prefix[HIO_CONFIG_PREFIX_SIZE]`
- 4.1.1.12 `MPI_Comm hio_settings_t::comm`
- 4.1.1.13 `int64_t hio_settings_t::setid`
- 4.1.1.14 `int hio_settings_t::flags`

The documentation for this struct was generated from the following file:

- [H5FDhio.h](#)

# Chapter 5

## File Documentation

### 5.1 H5FDhio.h File Reference

API for HDF5 HIO plugin. `#include <hio.h>`

`#include <mpi.h>`

#### Classes

- struct `hio_settings_t`

#### Defines

- `#define H5FD_HIO` (`H5FD_hio_init()`)
- `#define HIO_FILE_NAME_SIZE` 1024
- `#define HIO_ELEM_NAME_SIZE` 256
- `#define HIO_CONFIG_FILE_SIZE` 128
- `#define HIO_CONFIG_PREFIX_SIZE` 256

#### Enumerations

- enum `H5FD_hio_io_t` {  
    `H5FD_HIO_BLOCKING` = 0, `H5FD_HIO_NONBLOCKING`, `H5FD_HIO_CONTIGUOUS`,  
    `H5FD_HIO_STRIDED`,  
    `H5FD_HIO_DATASET_SHARED`, `H5FD_HIO_DATASET_UNIQUE` }

#### Functions

- `H5_DLL herr_t H5Pset_fapl_hio` (`hid_t fapl_id`, `hio_settings_t *settings`)
- `H5_DLL herr_t H5Pget_fapl_hio` (`hid_t fapl_id`, `hio_settings_t *settings`)
- `H5_DLL void H5FD_hio_settings_init` (`hio_settings_t *`)
- `H5_DLL void H5FD_hio_set_read_blocking` (`hio_settings_t *settings`, `H5FD_hio_io_t read_blocking`)
- `H5_DLL void H5FD_hio_set_write_blocking` (`hio_settings_t *settings`, `H5FD_hio_io_t write_blocking`)

- H5\_DLL void [H5FD\\_hio\\_set\\_read\\_io](#) ([hio\\_settings\\_t](#) \*settings, [H5FD\\_hio\\_io\\_t](#) read\_io\_mode)
- H5\_DLL void [H5FD\\_hio\\_set\\_write\\_io](#) ([hio\\_settings\\_t](#) \*settings, [H5FD\\_hio\\_io\\_t](#) write\_io\_mode)
- H5\_DLL void [H5FD\\_hio\\_set\\_request](#) ([hio\\_settings\\_t](#) \*settings, [hio\\_request\\_t](#) \*request)
- H5\_DLL void [H5FD\\_hio\\_set\\_elem\\_name](#) ([hio\\_settings\\_t](#) \*settings, char \*elem\_name)
- H5\_DLL void [H5FD\\_hio\\_set\\_comm](#) ([hio\\_settings\\_t](#) \*settings, MPI\_Comm comm)
- H5\_DLL void [H5FD\\_hio\\_set\\_stride](#) ([hio\\_settings\\_t](#) \*settings, [size\\_t](#) stride\_size)
- H5\_DLL void [H5FD\\_hio\\_set\\_setid](#) ([hio\\_settings\\_t](#) \*settings, [int64\\_t](#) set\_id)
- H5\_DLL void [H5FD\\_hio\\_set\\_dataset\\_mode](#) ([hio\\_settings\\_t](#) \*settings, [H5FD\\_hio\\_io\\_t](#) dataset\_mode)
- H5\_DLL void [H5FD\\_hio\\_set\\_config](#) ([hio\\_settings\\_t](#) \*settings, char \*config\_file)
- H5\_DLL void [H5FD\\_hio\\_set\\_config\\_prefix](#) ([hio\\_settings\\_t](#) \*settings, char \*config\_prefix)

## Variables

- H5\_DLLVAR [hbool\\_t](#) [H5FD\\_hio\\_opt\\_types\\_g](#)

### 5.1.1 Detailed Description

API for HDF5 HIO plugin. This file describes the purpose and API of the HDF5 HIO plugin.

### 5.1.2 Define Documentation

5.1.2.1 `#define H5FD_HIO (H5FD_hio_init())`

5.1.2.2 `#define HIO_FILE_NAME_SIZE 1024`

5.1.2.3 `#define HIO_ELEM_NAME_SIZE 256`

5.1.2.4 `#define HIO_CONFIG_FILE_SIZE 128`

5.1.2.5 `#define HIO_CONFIG_PREFIX_SIZE 256`

### 5.1.3 Enumeration Type Documentation

5.1.3.1 `enum H5FD_hio_io_t`

Enumerator:

```
H5FD_HIO_BLOCKING
H5FD_HIO_NONBLOCKING
H5FD_HIO_CONTIGUOUS
H5FD_HIO_STRIDED
H5FD_HIO_DATASET_SHARED
H5FD_HIO_DATASET_UNIQUE
```

### 5.1.4 Function Documentation

5.1.4.1 `H5_DLL herr_t H5Pset_fapl_hio (hid_t fapl_id, hio_settings_t * settings)`

Set the HIO file access properties

**Parameters:**

*settings* a settings structure set with the hio\_settings\* functions

**Returns:**

SUCCESS or FAIL

#### 5.1.4.2 H5\_DLL herr\_t H5Pget\_fapl\_hio (hid\_t *fapl\_id*, hio\_settings\_t \* *settings*)

Get the HIO file access properties

**Parameters:**

*fapl\_id* the file access properties id

*settings* a pointer to the settings structure

**Returns:**

SUCCESS or FAIL

#### 5.1.4.3 H5\_DLL void H5FD\_hio\_settings\_init (hio\_settings\_t \*)

#### 5.1.4.4 H5\_DLL void H5FD\_hio\_set\_read\_blocking (hio\_settings\_t \* *settings*, H5FD\_hio\_io\_t *read\_blocking*)

Set the HIO read blocking mode

**Parameters:**

*settings* a pointer to the settings structure

*read\_blocking* H5FD\_HIO\_BLOCKING or H5FD\_HIO\_NONBLOCKING

#### 5.1.4.5 H5\_DLL void H5FD\_hio\_set\_write\_blocking (hio\_settings\_t \* *settings*, H5FD\_hio\_io\_t *write\_blocking*)

Set the HIO write blocking mode

**Parameters:**

*settings* a pointer to the settings structure

*write\_blocking* H5FD\_HIO\_BLOCKING or H5FD\_HIO\_NONBLOCKING

#### 5.1.4.6 H5\_DLL void H5FD\_hio\_set\_read\_io (hio\_settings\_t \* *settings*, H5FD\_hio\_io\_t *read\_io\_mode*)

Set the HIO read IO mode

**Parameters:**

*settings* a pointer to the settings structure

*read\_io\_mode* H5FD\_HIO\_STRIDED or H5FD\_HIO\_CONTIGUOUS

**5.1.4.7 H5\_DLL void H5FD\_hio\_set\_write\_io** (hio\_settings\_t \* *settings*,  
H5FD\_hio\_io\_t *write\_io\_mode*)

Set the HIO write IO mode

**Parameters:**

*settings* a pointer to the settings structure

*write\_io\_mode* H5FD\_HIO\_STRIDED or H5FD\_HIO\_CONTIGUOUS

**5.1.4.8 H5\_DLL void H5FD\_hio\_set\_request** (hio\_settings\_t \* *settings*, hio\_request\_t \*  
*request*)

Set the HIO request

**Parameters:**

*settings* a pointer to the settings structure

*request* a pointer to an HIO request for async operations

**5.1.4.9 H5\_DLL void H5FD\_hio\_set\_elem\_name** (hio\_settings\_t \* *settings*, char \*  
*elem\_name*)

Set the HIO element name

**Parameters:**

*settings* a pointer to the settings structure

*elem\_name* The element name to use

**5.1.4.10 H5\_DLL void H5FD\_hio\_set\_comm** (hio\_settings\_t \* *settings*, MPI\_Comm  
*comm*)

Set the HIO MPI communicator

**Parameters:**

*settings* a pointer to the settings structure

*comm* The MPI communicator to use if using MPI

**5.1.4.11 H5\_DLL void H5FD\_hio\_set\_stride** (hio\_settings\_t \* *settings*, size\_t  
*stride\_size*)

Set the HIO stride size

**Parameters:**

*settings* a pointer to the settings structure

*stride* the stride size



**5.1.4.12 H5\_DLL void H5FD\_hio\_set\_setid (hio\_settings\_t \* *settings*, int64\_t *set\_id*)**

Set the HIO setid

**Parameters:**

*settings* a pointer to the settings structure

*set\_id* the HIO setid to use

**5.1.4.13 H5\_DLL void H5FD\_hio\_set\_dataset\_mode (hio\_settings\_t \* *settings*, H5FD\_hio\_io\_t *dataset\_mode*)**

Set the HIO dataset mode

**Parameters:**

*settings* a pointer to the settings structure

*dataset\_mode* H5FD\_HIO\_SHARED or H5FD\_HIO\_UNIQUE

**5.1.4.14 H5\_DLL void H5FD\_hio\_set\_config (hio\_settings\_t \* *settings*, char \* *config\_file*)**

Set the HIO config file name

**Parameters:**

*settings* a pointer to the settings structure

*config\_file* the config file name

**5.1.4.15 H5\_DLL void H5FD\_hio\_set\_config\_prefix (hio\_settings\_t \* *settings*, char \* *config\_prefix*)**

Set the HIO config file directory prefix

**Parameters:**

*settings* a pointer to the settings structure

*config\_prefix* the config file directory prefix

**5.1.5 Variable Documentation****5.1.5.1 H5\_DLLVAR hbool\_t H5FD\_hio\_opt\_types\_g**

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