

# Software Changes from Release to Release for HDF5-1.10

(For a description of the major new features that were introduced, please see [New Features in HDF5 Release 1.10.](#))

This page provides information on the changes that a maintenance developer needs to be aware of between successive releases of HDF5, such as:

- New or changed features or tools
- Syntax and behavioral changes in the existing application programming interface (the API)
- Certain types of changes in configuration or build processes

Note that bug fixes and performance enhancements in the C library are automatically picked up by the C++, Fortran, and Java libraries.

The following information is included below.

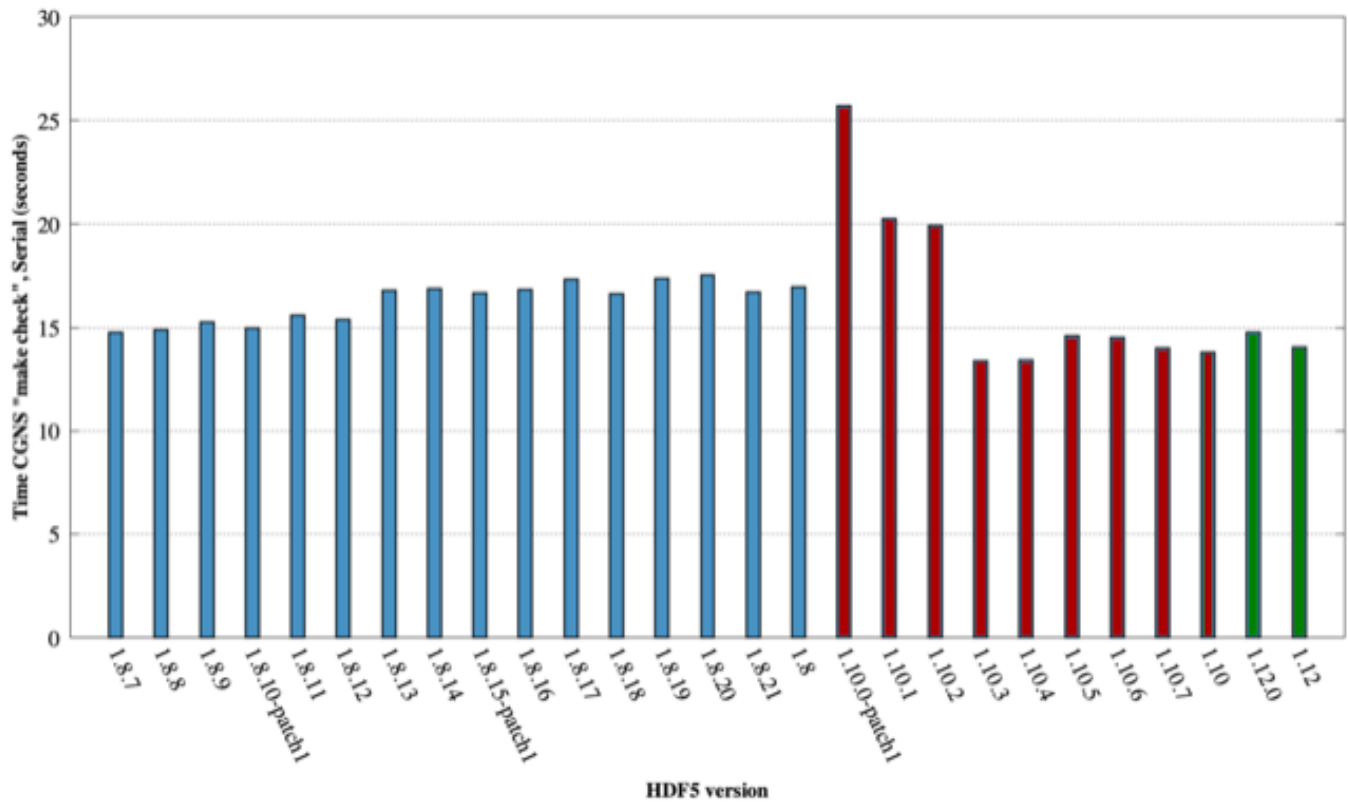
- [Compatibility and Performance Issues](#)
- [Release 1.10.7 versus 1.10.6](#)
- [Release 1.10.6 versus 1.10.5](#)
- [Release 1.10.5 versus 1.10.4, 1.10.3, and 1.10.2](#)
- [Release 1.10.4 versus Release 1.10.3](#)
- [Release 1.10.3 versus Release 1.10.2](#)
- [Release 1.10.2 versus Release 1.10.1](#)
- [Release 1.10.1 versus Release 1.10.0 \(and 1.10.0-patch1\)](#)
- [Release 1.10.0 of March 2016 versus Release 1.8.16](#)

## Compatibility and Performance Issues

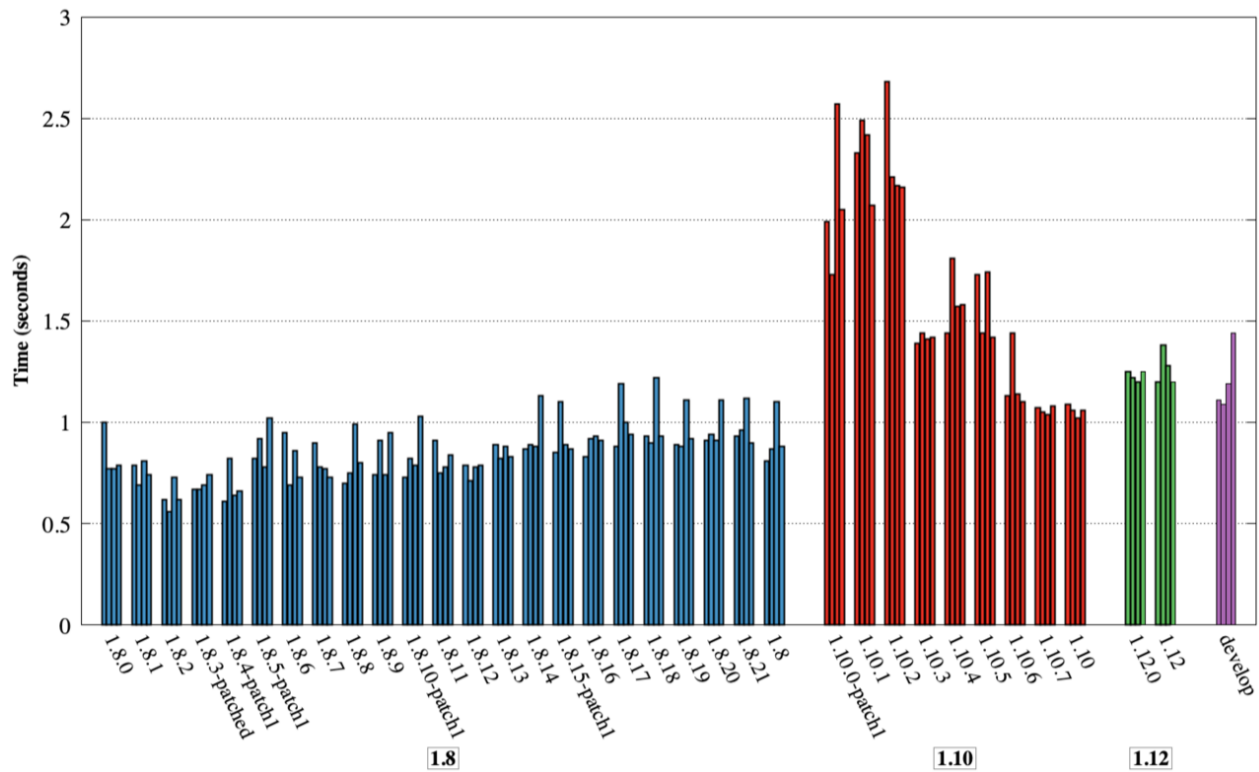
Not all HDF5-1.10 releases are compatible. **Users should NOT be using 1.10 releases prior to HDF5-1.10.3.** See the compatibility matrix below for details on compatibility between 1.10 releases:

Release	1.10.5+	1.10.4	1.10.3	1.10.2	1.10.1	1.10.0-patch1	1.10.0
1.10.5+		Yes	Yes	No	No	No	No
1.10.4	Yes		Yes	No	No	No	No
1.10.3	Yes	Yes		No	No	No	No
1.10.2	No	No	No		No	No	No

The following images show how performance has changed from release to release.



writeLargeNumDsets.cpp, 4 runs per HDF5 version, Jelly (CentOS 7)



The release notes also list changes made to the library, but these notes tend to be more at a more detail-oriented level. The release notes may include new features, bugs fixed, supported configuration features, platforms on which the library has been tested, and known problems. The release note files are listed below and can be found at the top level of the HDF5 source code tree in the `release_docs` directory.

**Release Notes**

Technical notes regarding the current release of the HDF5 library (`RELEASE.txt` in the source code)

<code>HISTORY-1_10.txt</code>	Release information for all HDF5-1.10 releases
<code>HISTORY-1_8_0-1_10_0.txt</code>	Development history between the HDF5-1.8.0 and HDF5-1.10.0 releases
<code>HISTORY-1_8.txt</code>	Release information for HDF5-1.8.0 through HDF5-1.8.17 releases
<code>HISTORY-1_0-1_8_0_rc3.txt</code>	Technical notes starting with HDF5-1.0.0 and ending with HDF5-1.8.0-rc3 (the state of the code prior to the HDF5-1.8.0 release)

## Release 1.10.7 versus 1.10.6

### New and Changed Functions, Classes, Subroutines, Wrappers, and Macros

#### In the C Interface (main library)

The following are new C functions in this release:

Function	Description
<code>H5P_GET_FAPL_SPLITTER</code>	Retrieves information for a splitter file access property list
<code>H5P_SET_FAPL_SPLITTER</code>	Sets the file access property list to use the splitter driver
<code>H5P_GET_FILE_LOCKING</code>	Gets the file locking property values
<code>H5P_SET_FILE_LOCKING</code>	Sets the file locking property values
<code>H5_GET_ALLOC_STATS</code>	Gets the memory allocation statistics for the library
<code>H5_GET_FREE_LIST_SIZES</code>	Gets the current size of the free lists used to manage memory
<code>H5S_COMBINE_HYPERSLAB</code>	Performs an operation on a hyperslab and an existing selection and returns the resulting selection
<code>H5S_COMBINE_SELECT</code>	Combines two hyperslab selections with an operation, returning a dataspace with the resulting selection
<code>H5S_MODIFY_SELECT</code>	Refines a hyperslab selection with an operation using a second hyperslab to modify it
<code>H5S_SELECT_ADJUST</code>	Adjusts a selection by subtracting an offset
<code>H5S_SELECT_COPY</code>	Copies a selection from one dataspace to another
<code>H5S_SELECT_INTERSECT_BLOCK</code>	Checks if current selection intersects with a block
<code>H5S_SELECT_PROJECT_INTERSECTION</code>	Projects the intersection of two source selections to a destination selection
<code>H5S_SELECT_SHAPE_SAME</code>	Checks if two selections are the same shape

#### In the C++ Wrapper

The following C++ wrappers were added:

Wrapper	Description
<code>FileAccPropList::getFileLocking</code>	See <a href="#">H5P_GET_FILE_LOCKING</a> for details
<code>FileAccPropList::setFileLocking</code>	See <a href="#">H5P_SET_FILE_LOCKING</a> for details

## Compatibility Notes and Reports

See the [API compatibility report for the HDF5 library between 1.10.6 and 1.10.7](#) for information regarding compatibility with the previous release. The [API Compatibility Report](#) page includes all 1.10 compatibility reports.

## Release 1.10.6 versus 1.10.5

### New and Changed Functions, Classes, Subroutines, Wrappers, and Macros

#### In the C Interface (main library)

The following are new C functions in this release:

Function	Description
<a href="#">H5P_GET_FAPL_HDFS</a>	Gets the information of the given Read-Only HDFS virtual file driver
<a href="#">H5P_GET_FAPL_ROS3</a>	Gets the information of the given Read-Only S3 virtual file driver
<a href="#">H5P_SET_FAPL_HDFS</a>	Sets up Read-Only HDFS virtual file driver
<a href="#">H5P_SET_FAPL_ROS3</a>	Sets up Read-Only S3 virtual file driver

#### In the C++ Wrapper

The following C++ wrapper was added:

Wrapper	Description
<code>LinkCreatPropList::getCreateIntermediateGroup ( ) const</code>	See <a href="#">H5P_GET_CREATE_INTERMEDIATE_GROUP</a>
<code>LinkCreatPropList::setCreateIntermediateGroup ( bool crt_intmd_group ) const</code>	See <a href="#">H5P_SET_CREATE_INTERMEDIATE_GROUP</a>

### Compatibility Notes and Reports

See the [API Compatibility Report](#) for information regarding compatibility with previous releases.

## Release 1.10.5 versus 1.10.4, 1.10.3, and 1.10.2

### New and Changed Functions, Classes, Subroutines, Wrappers, and Macros

#### In the C Interface (main library)

The following are new C functions in this release:

Function	Description
<a href="#">H5D_GET_CHUNK_INFO</a>	Retrieves information about a chunk specified by the chunk index
<a href="#">H5D_GET_CHUNK_INFO_BY_COORD</a>	Retrieves information about a chunk specified by its coordinates
<a href="#">H5D_GET_NUM_CHUNKS</a>	Retrieves number of chunks that have nonempty intersection with a specified selection
<a href="#">H5F_GET_DSET_NO_ATTRS_HINT</a>	Retrieves the setting for determining whether the specified file does or does not create minimized dataset object headers
<a href="#">H5F_SET_DSET_NO_ATTRS_HINT</a>	Sets the flag to create minimized dataset object headers
<a href="#">H5P_GET_DSET_NO_ATTRS_HINT</a>	Retrieves the setting for determining whether the specified DCPL does or does not create minimized dataset object headers
<a href="#">H5P_SET_DSET_NO_ATTRS_HINT</a>	Sets the flag to create minimized dataset object headers

The following changed in this release:

Function	Description
----------	-------------

<a href="#">H5O_GET_INFO</a> , <a href="#">H5O_GET_INFO_BY_NAME</a> , <a href="#">H5O_GET_INFO_BY_IDX</a> , <a href="#">H5O_VISIT</a> , <a href="#">H5O_VISIT_BY_NAME</a>	In 1.10.3 the original functions were versioned to <code>H5Oget_info*1</code> and <code>H5Ovisit*1</code> and the macros <code>H5Oget_info*</code> and <code>H5Ovisit*</code> were created. This broke the API compatibility for a maintenance release. In HDF5-1.10.5, the macros introduced in HDF5-1.10.3 were removed. The <code>H5Oget_info*1</code> and <code>H5Ovisit*1</code> APIs were copied to <code>H5Oget_Info*</code> and <code>H5Ovisit*</code> . As an example, <code>H5Oget_info</code> and <code>H5Oget_info1</code> are identical in this release.
---	---

### In the C++ Wrapper

The following C++ wrapper was added:

C++ Wrapper	Description
<code>H5Object::visit()</code>	Wrapper for the C API <a href="#">H5O_VISIT2</a> . Recursively visit elements reachable from an HDF5 object and perform a common set of operations across all of those elements. See <a href="#">H5O_VISIT2</a> for more information on this function.

### In the Fortran Wrapper

The following Fortran wrappers were added or changed:

Fortran Wrapper	Description
<code>h5fget_dset_no_attrs_hint_f</code> <code>h5fset_dset_no_attrs_hint_f</code> <code>h5pget_dset_no_attrs_hint_f</code> <code>h5pset_dset_no_attrs_hint_f</code>	Wrappers for the dataset object header minimization calls. See <a href="#">H5F_GET_DSET_NO_ATTRS_HINT</a> , <a href="#">H5F_SET_DSET_NO_ATTRS_HINT</a> , <a href="#">H5P_GET_DSET_NO_ATTRS_HINT</a> , and <a href="#">H5P_SET_DSET_NO_ATTRS_HINT</a> .
<code>h5ovisit_f</code> <code>h5oget_info_by_name_f</code> <code>h5oget_info</code> <code>h5oget_info_by_idx</code> <code>h5ovisit_by_name_f</code>	Added new Fortran 'fields' optional parameter. See <a href="#">H5O_VISIT2</a> , <a href="#">H5O_GET_INFO_BY_NAME2</a> , <a href="#">H5O_GET_INFO2</a> , <a href="#">H5O_GET_INFO_BY_IDX2</a> , and <a href="#">H5O_VISIT_BY_NAME2</a> .

The following Fortran utility function was added:

Function	Description
<code>h5gmtime</code>	converts (C) 'time_t' structure to Fortran DATE AND TIME storage format

A new Fortran derived type was added:

Derived Type	Description
<code>c_h5o_info_t</code>	This is interoperable with C's <code>h5o_info_t</code> . This is needed for callback functions which pass C's <code>h5o_info_t</code> data type definition. See the Fortran signature for <a href="#">H5O_GET_INFO2</a> .

### In the Java wrapper

The following Java wrappers were added or changed:

Java Wrapper	Description
<code>H5Fset_libver_bounds</code>	See the C API <a href="#">H5F_SET_LIBVER_BOUNDS</a> for information on this function

H5Fget_dset_no_attrs_hint	Wrappers for the dataset object header minimization calls. See <a href="#">H5F_GET_DSET_NO_ATTRS_HINT</a> , <a href="#">H5F_SET_DSET_NO_ATTRS_HINT</a> , <a href="#">H5P_GET_DSET_NO_ATTRS_HINT</a> , and <a href="#">H5P_SET_DSET_NO_ATTRS_HINT</a> for more information on these APIs.
H5Fset_dset_no_attrs_hint	
H5Pget_dset_no_attrs_hint	
H5Pset_dset_no_attrs_hint	

## Compatibility Notes and Reports

See these [API Compatibility Reports for 1.10](#) for information regarding compatibility with previous releases. Reports are available comparing HDF5-1.10.5 vs 1.10.2, HDF5-1.10.5 vs 1.10.3, and HDF5-1.10.5 vs 1.10.4.

## Release 1.10.4 versus Release 1.10.3

See the [API compatibility Report](#) for information regarding compatibility with previous releases.

## Release 1.10.3 versus Release 1.10.2

### New and Changed Functions, Classes, Subroutines, Wrappers, and Macros

#### In the C Interface (main library)

The following are new C functions in this release:

Function	Description
<a href="#">H5D_READ_CHUNK</a>	Moved from HDF5 High Level Optimizations library to core library.
<a href="#">H5D_WRITE_CHUNK</a>	Moved from HDF5 High Level Optimizations library to core library.
<a href="#">H5O_GET_INFO</a> <a href="#">H5O_GET_INFO1</a> <a href="#">H5O_GET_INFO2</a>	The function <a href="#">H5O_GET_INFO</a> was moved to <a href="#">H5O_GET_INFO1</a> , and the macro <a href="#">H5O_GET_INFO</a> was created that can be mapped to either <a href="#">H5O_GET_INFO1</a> or <a href="#">H5O_GET_INFO2</a> . For <i>HDF5-1.10</i> and earlier releases, <a href="#">H5O_GET_INFO</a> is mapped to <a href="#">H5O_GET_INFO1</a> by default.
<a href="#">H5O_GET_INFO_BY_IDX</a> <a href="#">H5O_GET_INFO_BY_IDX1</a> <a href="#">H5O_GET_INFO_BY_IDX2</a>	The function <a href="#">H5O_GET_INFO_BY_IDX</a> was moved to <a href="#">H5O_GET_INFO_BY_IDX1</a> , and the macro <a href="#">H5O_GET_INFO_BY_IDX</a> was created that can be mapped to either <a href="#">H5O_GET_INFO_BY_IDX1</a> or <a href="#">H5O_GET_INFO_BY_IDX2</a> . For <i>HDF5-1.10</i> and earlier releases, <a href="#">H5O_GET_INFO_BY_IDX</a> is mapped to <a href="#">H5O_GET_INFO_BY_IDX1</a> by default.
<a href="#">H5O_GET_INFO_BY_NAME</a> <a href="#">H5O_GET_INFO_BY_NAME1</a> <a href="#">H5O_GET_INFO_BY_NAME2</a>	The function <a href="#">H5O_GET_INFO_BY_NAME</a> was moved to <a href="#">H5O_GET_INFO_BY_NAME1</a> , and the macro <a href="#">H5O_GET_INFO_BY_NAME</a> was created that can be mapped to either <a href="#">H5O_GET_INFO_BY_NAME1</a> or <a href="#">H5O_GET_INFO_BY_NAME2</a> . For <i>HDF5-1.10</i> and earlier releases, <a href="#">H5O_GET_INFO_BY_NAME</a> is mapped to <a href="#">H5O_GET_INFO_BY_NAME1</a> by default.
<a href="#">H5O_VISIT</a> <a href="#">H5O_VISIT1</a> <a href="#">H5O_VISIT2</a>	The function <a href="#">H5O_VISIT</a> was moved to <a href="#">H5O_VISIT1</a> , and the macro <a href="#">H5O_VISIT</a> was created that can be mapped to either <a href="#">H5O_VISIT1</a> or <a href="#">H5O_VISIT2</a> . For <i>HDF5-1.10</i> and earlier releases, <a href="#">H5O_VISIT</a> is mapped to <a href="#">H5O_VISIT1</a> by default.
<a href="#">H5O_VISIT_BY_NAME</a> <a href="#">H5O_VISIT_BY_NAME1</a> <a href="#">H5O_VISIT_BY_NAME2</a>	The function <a href="#">H5O_VISIT_BY_NAME</a> was moved to <a href="#">H5O_VISIT_BY_NAME1</a> , and the macro <a href="#">H5O_VISIT_BY_NAME</a> was created that can be mapped to either <a href="#">H5O_VISIT_BY_NAME1</a> or <a href="#">H5O_VISIT_BY_NAME2</a> . For <i>HDF5-1.10</i> and earlier releases, <a href="#">H5O_VISIT_BY_NAME</a> is mapped to <a href="#">H5O_VISIT_BY_NAME1</a> by default.

#### In the C High Level Interface

The following C functions were deprecated in this release:

Function	Description
<a href="#">H5DO_READ_CHUNK</a>	Deprecated, moved to <a href="#">H5D_READ_CHUNK</a>
<a href="#">H5DO_WRITE_CHUNK</a>	Deprecated, moved to <a href="#">H5D_WRITE_CHUNK</a>

### In the C++ Wrapper

Several C++ wrappers were added or modified to provide additional support. See the [API Compatibility Report](#) for details.

## Compatibility Notes and Report

See the [API Compatibility Report](#) for information regarding compatibility with previous releases.

## Release 1.10.2 versus Release 1.10.1

This section lists interface-level changes and other user-visible changes in behavior in the transition from HDF5 Release 1.10.1 to Release 1.10.2.

## New and Changed Functions, Classes, Subroutines, Wrappers, and Macros

### In the C Interface (main library)

The following are new C functions in this release:

Function	Description
<a href="#">H5D_GET_CHUNK_STORAGE_SIZE</a>	Returns storage amount allocated within a file for a raw data chunk in a dataset
<a href="#">H5F_GET_EOA</a>	Retrieves the file's EOA
<a href="#">H5F_INCREMENT_FILESIZE</a>	Sets the file's EOA to the maximum of (EOA, EOF) + increment
<a href="#">H5F_SET_LIBVER_BOUNDS</a>	Enables the switch of version bounds setting for a file
<a href="#">H5FDdriver_query</a>	Queries a VFL driver for its feature flags when a file is not available (not documented in Reference Manual)
<a href="#">H5P_GET_VIRTUAL_PREFIX</a>	Retrieves prefix applied to VDS source file paths
<a href="#">H5P_SET_VIRTUAL_PREFIX</a>	Sets prefix to be applied to VDS source file paths

The following C functions changed in this release:

Function	Change
<a href="#">H5P_SET_LIBVER_BOUNDS</a>	HDF5-1.10 was added to the range of versions
<a href="#">H5P_SET_VIRTUAL</a>	A change was made to the method of searching for VDS source files
H5PL*	The parameters for many of the H5PL APIs were renamed

### In the C High Level Interface

The following new C function was added to this release:

Function	Description
<a href="#">H5DO_READ_CHUNK</a>	Reads a raw data chunk directly from a dataset in a file

## In the C++ Wrapper

The following C++ wrappers were added:

C++ Wrapper	Description
H5Lcreate_soft	Creates a soft link from link_name to target_name
H5Lcreate_hard	Creates a hard link from new_name to curr_name
H5Lcopy	Copy an object from a group or file
H5Lmove	Rename an object in a group or file
H5Ldelete	Removes the specified link from this location
H5Tencode	Creates a binary object description of this datatype
H5Tdecode	Returns the decoded type from the binary object description
H5Lget_info	Returns the information of the named link

These were also added:

- Class `LinkCreatPropList` for link create property list
- Overloaded functions `H5Location::createGroup` to take a link creation property list

See the API Compatibility report for complete details.

## In the Java Wrapper

The following Java wrappers were added:

Java Wrapper	Description
H5Pset_evict_on_close	Controls the library's behavior of evicting metadata associated with a closed object
H5Pget_evict_on_close	Retrieves the file access property list setting that determines whether an HDF5 object will be evicted from the library's metadata cache when closed
H5Pset_chunk_opts	Sets the edge chunk option in a dataset creation property list
H5Pget_chunk_opts	Retrieves the edge chunk option setting from a dataset creation property list
H5Pset_efile_prefix	Sets the external dataset storage file prefix in the dataset access property list
H5Pget_efile_prefix	Retrieves the prefix for external raw data storage files as set in the dataset access property list
H5Pset_virtual_prefix	Sets prefix to be applied to VDS source file paths
H5Pget_virtual_prefix	Retrieves prefix applied to VDS source file paths

See the `Release.txt` file for details.

## Tools



New options were added to the `h5clear` utility:

<code>--filesize</code>	Print the file's EOA and EOF
<code>--increment=C</code>	Set the file's EOA to the maximum of (EOA, EOF) + C for the file C is $\geq 0$ ; C is optional and will default to 1M when not set

A new option was added to `h5diff`:

<code>--enable-error-stack</code>	Enable the error stack
-----------------------------------	------------------------

## Compatibility Notes and Report

See [API Compatibility Reports for 1.10](#) for information regarding compatibility with previous releases.

## Release 1.10.1 versus Release 1.10.0 (and 1.10.0-patch1)

This section lists interface-level changes and other user-visible changes in behavior in the transition from HDF5 Release 1.10.0 (and HDF5-1.10.0-patch1) to Release 1.10.1.

### New Features

Several new features are introduced in HDF5 Release 1.10.1.

- Metadata Cache Image

- Metadata Cache Evict on Close

- Paged Aggregation

- Page Buffering

### New Features, including associated C Functions

The following features are described and documented in New Features in HDF5 Release 1.10. Each new feature in 1.10.1 is listed below along with the associated C functions:

Metadata Cache Image:

<code>H5Pget_mdc_image_config</code>	Retrieves the metadata cache image configuration values for a file access property list.
<code>H5Pset_mdc_image_config</code>	Sets the metadata cache image option for a file access property list.
<code>H5Fget_mdc_image_info</code>	Gets information about a metadata cache image if it exists.

Metadata Cache Evict on Close:

<code>H5Pget_evict_on_close</code>	Retrieves the property list setting that determines whether an HDF5 object will be evicted from the library's metadata cache when it is closed.
<code>H5Pset_evict_on_close</code>	Controls the library's behavior of evicting metadata associated with a closed object.

Paged Aggregation:

<code>H5Pget_file_space_page_size</code>	Retrieves the file space page size for a file creation property list.
<code>H5Pset_file_space_page_size</code>	Sets the file space page size (used with paged aggregation) for a file creation property list.

H5Pget_file_space_strategy	Retrieves the file space handling strategy for a file creation property list.
H5Pset_file_space_strategy	Sets the file space allocation strategy for a file creation property list.

#### Page Buffering:

H5Pget_page_buffer_size	Retrieves the maximum size for the page buffer and the minimum percentage for metadata and raw data pages.
H5Pset_page_buffer_size	Sets the maximum size for the page buffer and the minimum percentage for metadata and raw data pages.
H5Fget_page_buffering_stats	Retrieves statistics about page access when it is enabled.
H5Freset_page_buffering_stats	Resets the page buffer statistics.

## New and Changed Functions, Classes, Subroutines, Wrappers, and Macros

### In the C Interface (main library)

The following new C functions were added:

H5PLappend
H5PLget
H5PLinsert
H5PLprepend
H5PLremove
H5PLreplace
H5PLsize

### In the C++ Wrapper

New member functions were added to provide `const` versions. For example, these methods,

```
ArrayType::getArrayDims ( hsize_t* dims ) const
```

```
ArrayType::getArrayNDims ( ) const
```

replace these:

```
ArrayType::getArrayDims ( hsize_t* dims )
```

```
ArrayType::getArrayNDims ( )
```

Several functions were *moved* to other classes. For example, this method,

```
H5Location::openDataSet ( char const* name ) const
```

replaces:

```
CommonFG::openDataSet ( char const* name ) const
```

PLEASE review the Compatibility report below for complete information on the C++ changes in this release.

## Compatibility Report

### Compatibility report for Release 1.10.1 versus Release 1.10.0-patch1

See [API Compatibility Reports for 1.10](#) for information regarding compatibility with previous releases.

## Release 1.10.0 of March 2016 versus Release 1.8.16

This section lists interface-level changes and other user-visible changes in behavior in the transition from HDF5 Release 1.8.16 to Release 1.10.0.

### Changed Type

`hid_t`

Changed from a 32-bit to a 64-bit value.

`hid_t` is the type used for all HDF5 identifiers. This change, which is necessary to accommodate the capacities of modern computing systems, therefore affects all HDF5 applications. If an application has been using HDF5's `hid_t` type, recompilation will normally be sufficient to take advantage of HDF5 Release 1.10.0. If an application uses an integer type instead of HDF5's `hid_t` type, those identifiers must be changed to a 64-bit type when the application is ported to the 1.10.x series.

### New Features and Feature Sets

Several new features are introduced in HDF5 Release 1.10.0.

Single-Writer / Multiple-Reader or SWMR

Collective Metadata I/O

Fine-tuning the metadata cache

File Space Management

Virtual Datasets or VDS

Partial Edge Chunk Options

Relative Pathnames for External Links

Property List Encoding and Decoding

More substantial lists follow, including new and modified C functions and Fortran subroutines.

### New Features, including associated C Functions and Fortran Wrappers

The following features are described and documented in New Features in HDF5 Release 1.10.0. On this page, we list each feature and its associated C functions and Fortran wrappers.

Single-writer / Multiple-reader, commonly called SWMR:

<code>H5Fstart_swmr_write</code>	Enables SWMR writing mode for a file.
<code>H5D0append</code>	Appends data to a dataset along a specified dimension. <i>(This is a high-level API.)</i>
<code>H5Pget_append_flush</code>	Retrieves the values of the append property that is set up in the dataset access property list.
<code>H5Pset_append_flush</code>	Sets two actions to perform when the size of a dataset's dimension being appended reaches a specified boundary.
<code>H5Pget_object_flush_cb</code>	Retrieves the object flush property values from the file access property list.
<code>H5Pset_object_flush_cb</code>	Sets a callback function to invoke when an object flush occurs in the file.
<code>H5Odisable_mdc_flushes</code>	Prevents metadata entries for an HDF5 object from being flushed from the metadata cache to storage.
<code>H5Oenable_mdc_flushes</code>	Returns the cache entries associated with an HDF5 object to the default metadata flush and eviction algorithm.

H5Oare_mdc_flushes_disabled	
	Determines if an HDF5 object (dataset, group, committed datatype) has had flushes of metadata entries disabled.
H5Fdisable_mdc_flushes	Globally prevents dirty metadata entries from being flushed from the metadata cache to storage.
H5Fenable_mdc_flushes	Returns a file's metadata cache to the standard eviction and flushing algorithm.
H5Fare_mdc_flushes_disabled	
	Determines if flushes have been globally disabled for a file's metadata cache.
H5Fget_mdc_flush_disabled_obj_ids	
	Returns a list of all object identifiers for which flushes have been disabled in a file's metadata cache.
<b><u>Command-line Tools:</u></b>	
h5watch	Allows users to output new records appended to a dataset under SWMR access as it grows. The functionality is similar to the Unix user command <code>tail</code> with the follow option, which outputs appended data as the file grows.
h5format_convert	This tool allows users to convert the indexing type of a chunked dataset made with a 1.10.x version of the HDF5 Library when the latest file format is used to the 1.8.x version 1 B-tree indexing type. For example, datasets created using SWMR access, can be converted to be accessed by the HDF5 1.18 library and tools. The tool does not rewrite raw data, but it does rewrite HDF5 metadata.

#### Collective Metadata I/O:

H5Pset_coll_metadata_write h5pset_coll_metadata_write_f	Establishes I/O mode property setting, collective or independent, for metadata writes.
H5Pget_coll_metadata_write h5pget_coll_metadata_write_f	Retrieves I/O mode property setting for metadata writes.
H5Pset_all_coll_metadata_ops h5pset_all_coll_metadata_ops_f	Establishes I/O mode, collective or independent, for metadata read operations.
H5Pget_all_coll_metadata_ops h5pget_all_coll_metadata_ops_f	Retrieves I/O mode for metadata read operations.

#### Fine-tuning the Metadata Cache:

H5Fget_metadata_read_retries_info	
	Retrieves the collection of read retries for metadata items with checksum.
H5Pget_metadata_read_attempts	
	Retrieves the number of read attempts from a file access property list.
H5Pset_metadata_read_attempts	
	Sets the number of read attempts in a file access property list.
H5Dflush	Causes all buffers associated with a dataset to be immediately written to disk without removing the data from the cache.
H5Drefresh	Causes all buffers associated with a dataset to be cleared and immediately re-loaded with updated contents from disk storage.
H5Gflush	Causes all buffers associated with a group to be immediately flushed to disk without removing the data from the cache.
H5Grefresh	Causes all buffers associated with a group to be cleared and immediately re-loaded with updated contents from disk storage.

H5Oflush	Causes all buffers associated with an object to be immediately flushed to disk without removing the data from the cache.
H5Orefresh	Causes all buffers associated with an object to be cleared and immediately re-loaded with updated contents from disk storage.
H5Tflush	Causes all buffers associated with a committed datatype to be immediately flushed to disk without removing the data from the cache.
H5Trefresh	Causes all buffers associated with a committed datatype to be cleared and immediately re-loaded with updated contents from disk storage.
H5Fget_intent	Determines the read/write or read-only status of a file.

Logging APIs:

H5Pset_mdc_log_options	Sets metadata cache logging options.
H5Pget_mdc_log_options	Gets metadata cache logging options.
H5Fstart_mdc_logging	Starts logging metadata cache events if logging was previously enabled.
H5Fstop_mdc_logging	Stops logging metadata cache events if logging was previously enabled and is currently ongoing.
H5Pget_mdc_logging_status	
	Gets the current metadata cache logging status.

File Space Management:

H5Fget_free_sections	Retrieves free-space section information for a file.
H5Fget_freespace	Returns the amount of free space in a file.
H5Fget_info2	Returns global information for a file.
H5Pset_file_space	Sets the file space management strategy and/or the free-space section threshold for an HDF5 file.
H5Pget_file_space	Retrieves the file space management strategy and/or the free-space section threshold for an HDF5 file.

The following tool has been modified to preserve or modify file frepace information appropriately when processing files employing the VDS feature:

h5repack	Repacks HDF5 files with various options, including the ability to change the applied filters. This version of h5repack understands the file free space feature and handles the file and metadata appropriately.
----------	---

Virtual Dataset or VDS:

H5Pset_virtual h5pset_virtual_f	Sets the mapping between virtual and source datasets.
H5Pget_virtual_count h5pget_virtual_count_f	Retrieves the number of mappings for the virtual dataset.
H5Pget_virtual_vspace h5pget_virtual_vspace_f	Retrieves a dataspace identifier for the selection within the virtual dataset used in the mapping.
H5Pget_virtual_srcspace h5pget_virtual_srcspace_f	Retrieves a dataspace identifier for the selection within the source dataset used in the mapping.
H5Pget_virtual_dsetname h5pget_virtual_dsetname_f	Retrieves the name of a source dataset used in the mapping.
H5Pget_virtual_filename h5pget_virtual_filename_f	Retrieves the filename of a source dataset used in the mapping.

H5Pset_virtual_printf_gap h5pset_virtual_printf_gap_f	Sets maximum number of missing source files and/or datasets with printf-style names when getting the extent of an unlimited virtual dataset.
H5Pget_virtual_printf_gap h5pget_virtual_printf_gap_f	Returns maximum number of missing source files and/or datasets with printf-style names when getting the extent for an unlimited virtual dataset.
H5Pset_virtual_view h5pset_virtual_view_f	Sets the view of the virtual dataset to include or exclude missing mapped elements.
H5Pget_virtual_view h5pget_virtual_view_f	Retrieves the view of a virtual dataset.
<b>Supporting Functions:</b>	
H5Sis_regular_hyperslab h5sis_regular_hyperslab_f	Determines whether a hyperslab selection is regular.
H5Sget_regular_hyperslab h5sget_regular_hyperslab_f	Retrieves a regular hyperslab selection.
<b>Modified Functions:</b> The following pre-existing functions have been modified to understand virtual datasets.	
H5Pset_layout h5pset_layout_f	Specifies the layout to be used for a dataset. Virtual dataset, H5D_VIRTUAL, has been added to the list of layouts available through this function.
H5Pget_layout h5pget_layout_f	Retrieves the layout in use for a dataset. Virtual dataset, H5D_VIRTUAL, has been added to the list of layouts.

**Partial Edge Chunks:**

H5Pset_chunk_opts	Sets a partial edge chunk option in a dataset access property list.
H5Pget_chunk_opts	Retrieves partial edge chunk option setting from a dataset access property list.

**Relative Pathnames for External Links:**

H5Pset_elinek_prefix	These functions enable the user to specify the locations of external files. <i>(These functions are not yet documented.)</i>
H5Pget_elinek_prefix	

**Property List Encoding and Decoding:**

H5Pencode
H5Pdecode

**Additional New Functions:**

The following new functions appear in HDF5 Release 1.10.0 but are not yet documented:

H5Dformat\_convert  
H5Dget\_chunk\_index\_type  
H5FDlock  
H5FDunlock  
H5Fformat\_convert  
H5LDget\_dset\_dims

```
H5LDget_dset_elmts
H5LDget_dset_type_size
```

## New and Changed Elements of the Packet Table (H5PT) High-level API

### In the C Interface

Replacement functions:

```
H5PTcreate
```

Takes a property list identifier to provide flexibility on creation properties.

`H5PTcreate_fl` has been removed.

```
H5PTfree_vlen_buff
```

Replaces `H5PTfree_vlen_readbuff`.

New functions:

Two accessor functions have been added.

```
H5PTget_dataset
```

Returns the identifier of the dataset associated a packet table.

```
H5PTget_type
```

Returns the identifier of the datatype used by a packet table.

```
H5PTis_varlen
```

Determines whether a type is variable-length.

### In the C++ Interface

Overloaded constructor

An overloaded constructor has been added.

```
FL_PacketTable
```

Takes a property list identifier to provide flexibility on creation properties.>/dd>

```
H5PTfree_vlen_buff
```

Replaces `H5PTfree_vlen_readbuff`.

Accessor wrappers

Two accessor wrappers are added to class `PacketTable`.

```
PacketTable::GetDataset()
```

Returns the identifier of the dataset associated a packet table.

```
PacketTable::GetDatatype()
```

Returns the identifier of the datatype used by a packet table.

Other wrappers

```
PacketTable::FreeBuff()
```

Replaces `VL_PacketTable::FreeReadBuff()`.

```
PacketTable::IsVariableLength()
```

Replaces `VL_PacketTable::IsVariableLength()`.

Overloaded functions:

Where a member functions has a `char*` as an argument, an overloaded functions has been added to provide the `const char*` argument.

The existing version will be deprecated in a future release.

## Java Interface Changes

### Integration into Main HDF5 Library

The Java HDF5 JNI library has been integrated into the HDF5 repository.

Configure option:

```
--enable-java
```

CMake option:

```
HDF5_BUILD_JAVA:BOOL=ON
```

Prior to the 1.10.x series, the HDF5 Java tools were built from an independent repository and were not as fully integrated with HDF5. were built from an independent repository and were not as fully integrated with HDF5.

### Package Hierarchy Change

The package hierarchy has changed to  `hdf.hdf5lib.hdf5` .

Prior to the 1.10.x series, the hierarchy was  `ncsa.hdf.hdf5lib.hdf5` .

### New Java APIs

A number of new APIs have been added in the Java interface, including APIs for the VDS and SWMR features.

## Functions with Changed Behavior

### H5Lexists

The behavior of this function has changed in this release. When testing the pathname / (a slash representing the root of an HDF5 file)  `H5Lexists`  now returns successfully with the value 1 (one). See the entry in the *—HDF5 Reference Manual* for  `H5Lexists`  for more information.

## API Compatibility

See API Compatibility Macros in HDF5 for details on the following.

### New API Compatibility Flag

A new  `v18`  flag was added enabling the building of HDF5 such that the default API is compatible with the HDF5 Release 1.8.x API:

```
--with-default-api-version=v18
```

### New versioned functions and associated compatibility macros

Two functions and a struct have been converted to a versioned form in this release. Compatibility macros have been created for each.

#### H5Fget\_info

The original function is renamed to  `H5Fget_info1`  and deprecated.

A new version of the function,  `H5Fget_info2` , is introduced.

The compatibility macro  `H5Fget_info`  is introduced.

#### H5F\_info\_t

This is the struct used by the  `H5Fget_info`  functions and macro.

The original struct is renamed to  `H5F_info1_t`  and deprecated.

A new version of the struct,  `H5F_info2_t` , is introduced.

The compatibility macro  `H5F_info_t`  is introduced.

#### H5Rdereference

The original function is renamed to  `H5Rdereference1`  and deprecated.

A new version of the function,  `H5Rdereference2` , is introduced.

The compatibility macro  `H5Rdereference`  is introduced.



## Autotools Configuration and Large File Support

Autotools configuration has been extensively reworked and autotool's handling of large file support has been overhauled in this release.

See the following sections in `RELEASE.txt`:

- "Autotools Configuration Has Been Extensively Reworked"
- "LFS Changes"

`RELEASE.txt` is found in the `release_docs/` subdirectory at the root level of the HDF5 code distribution.

## Compatibility Report and Comments

### Compatibility report for Release 1.10.0 versus Release 1.8.16

See [API Compatibility Reports for 1.10](#) for information regarding compatibility with previous releases.

### Comments regarding the report

In the C interface, the `hid_t` change from 32-bit to 64-bit was made in order to address a performance problem that arose when the library "ran out" of valid object identifiers to issue and thus needed to employ an expensive algorithm to find previously issued identifiers that could be re-issued. This problem is avoided by switching the size of the `hid_t` type to 64-bit integers instead of 32-bit integers in order to make the pool of available integers significantly larger. (`H5E_major_t` and `H5E_minor_t` are aliased to `hid_t` which is why they changed size as well). (An alternate solution to this problem was applied in release HDF5 1.8.5 but this is the cleaner/preferred solution and had to wait until 1.10.0 to be included).

`hbool_t` will now be defined as a `_Bool` type when configure determines that it's available.

Public structs that have members of type `hid_t` or `hbool_t` are affected by the above changes accordingly.

The `H5Fget_info` function was renamed due to the introduction of a newer version of the function which returns additional information. The `H5R_dereference` function was renamed due to the introduction of a newer version of the function which allows a data access property list to be passed in. Both changes are accompanied with compatibility macros, so while existing code will need to be recompiled in order to use the newer library version, these functions do not need to be changed in application code using them provided that the HDF5 API compatibility macros are configured appropriately.