Package ‘rhdf5’

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Type Package

Title R Interface to HDF5

Version 2.46.1

Description This package provides an interface between HDF5 and R.

HDF5’s main features are the ability to store and access very large and/or complex datasets and a wide variety of metadata on mass storage (disk) through a completely portable file format. The rhdf5 package is thus suited for the exchange of large and/or complex datasets between R and other software package, and for letting R applications work on datasets that are larger than the available RAM.

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URL https://github.com/grimbough/rhdf5

BugReports https://github.com/grimbough/rhdf5/issues

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**H5Aclose**

Close an HDF5 attribute

**Usage**

\[ \text{H5Aclose(h5attribute)} \]

**Arguments**

- **h5attribute**
  An object of class \texttt{H5IdComponent} representing the attribute to be closed. Normally created by \texttt{H5Aopen()} or similar.

**See Also**

- \texttt{H5Aopen()}

---

**H5Acreate**

Create an attribute for an HDF5 object

**Description**

Creates an attribute, \texttt{name}, which is attached to the object specified by the identifier \texttt{h5obj}. The attribute name must be unique for the object.

**Usage**

\[ \text{H5Acreate(h5obj, name, dtype_id, h5space)} \]

**Arguments**

- **h5obj**
  An object of class \texttt{H5IdComponent} representing a H5 object identifier (file, group, or dataset). See \texttt{H5Fcreate()}, \texttt{H5Fopen()}, \texttt{H5Gcreate()}, \texttt{H5Gopen()}, \texttt{H5Dcreate()}, or \texttt{H5Dopen()} to create an object of this kind.

- **name**
  The name of the attribute (character).

- **dtype_id**
  A character name of a datatype. See \texttt{h5const("H5T")} for possible datatypes. Can also be an integer representing an HDF5 datatype. Only simple datatypes are allowed for attributes.

- **h5space**
  An object of class \texttt{H5IdComponent} representing a H5 dataspace. See \texttt{H5Dget_space()}, \texttt{H5Screate_simple()}, \texttt{H5Screate()} to create an object of this kind.
**Value**

An object of class `H5IdComponent` representing a H5 attribute identifier.

---

**H5Adelete**

*Delete an specified attribute of an HDF5 object*

**Description**

Delete an specified attribute of an HDF5 object

**Usage**

`H5Adelete(h5obj, name)`

**Arguments**

- **h5obj**: An object of class `H5IdComponent` representing a H5 object identifier (file, group, or dataset). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()`, `H5Dcreate()`, or `H5Dopen()` to create an object of this kind.
- **name**: The name of the attribute (character).

---

**H5Aexists**

*Check whether an specific attribute exists for an HDF5 object*

**Description**

Check whether an specific attribute exists for an HDF5 object

**Usage**

`H5Aexists(h5obj, name)`

**Arguments**

- **h5obj**: An object of class `H5IdComponent` representing a H5 object identifier (file, group, or dataset). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()`, `H5Dcreate()`, or `H5Dopen()` to create an object of this kind.
- **name**: The name of the attribute (character).
H5Aget_name

Get the name of an HDF5 attribute object

Description

Retrieves the name of the attribute specified by an HDF5 attribute object.

Usage

H5Aget_name(h5attribute)

Arguments

h5attribute An object of class H5IdComponent representing an attribute. Normally created by H5Aopen() or similar.

Value

A character vector of length 1 containing the name of the attribute.

H5Aget_space

Get a copy of the attribute dataspace

Description

Get a copy of the attribute dataspace

Usage

H5Aget_space(h5attribute)

Arguments

h5attribute An object of class H5IdComponent representing an attribute. Normally created by H5Aopen() or similar.

Value

Returns an object of class H5IdComponent representing a H5 dataspace identifier
**H5Aget_type**  
*Get a copy of the attribute datatype*

**Description**  
Get a copy of the attribute datatype

**Usage**  
```
H5Aget_type(h5attribute)
```

**Arguments**  
- `h5attribute`: An object of class `H5IdComponent` representing an attribute. Normally created by `H5Aopen()` or similar.

**H5Aopen**  
*Open an attribute for an HDF5 object*

**Description**  
Open an attribute for an HDF5 object

**Usage**  
```
H5Aopen(h5obj, name)
H5Aopen_by_name(h5obj, objname = ".", name)
H5Aopen_by_idx(h5obj, n, objname = ".", index_type = h5default("H5_INDEX"), order = h5default("H5_ITER")
```

**Arguments**  
- `h5obj`: An object of class `H5IdComponent` representing a H5 object identifier (file, group, or dataset). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()`, `H5Dcreate()`, or `H5Dopen()` to create an object of this kind.
- `name`: The name of the attribute (character).
- `objname`: The name of the object the attribute belongs to.
**Value**

An object of class `H5IdComponent` representing a H5 attribute identifier.

---

**Description**

Read data from an HDF5 attribute

**Usage**

```r
H5Aread(h5attribute, buf = NULL, bit64conversion)
```

**Arguments**

- `h5attribute`: An object of class `H5IdComponent` representing an attribute. Normally created by `H5Aopen()` or similar.
- `buf`: Optional buffer to store retrieved values. The buffer size has to fit the size of the memory space `h5spaceMem`. No extra memory will be allocated for the data. Default is `NULL` which means the function will return the attribute data.
- `bit64conversion`: Defines how 64-bit integers are converted. (See the details section for more information on these options.)

**Details**

Internally, R does not support 64-bit integers. All integers in R are 32-bit integers. By setting `bit64conversion='int'`, a coercing to 32-bit integers is enforced, with the risk of data loss, but with the insurance that numbers are represented as integers. `bit64conversion='double'` coerces the 64-bit integers to floating point numbers. doubles can represent integers with up to 54-bits, but they are not represented as integer values anymore. For larger numbers there is again a data loss. `bit64conversion='bit64'` is recommended way of coercing. It represents the 64-bit integers as objects of class `integer64` as defined in the package `bit64`. Make sure that you have installed `bit64`. The datatype `integer64` is not part of base R, but defined in an external package. This can produce unexpected behaviour when working with the data.

**Value**

If `buf=NULL` returns the contents of the attribute. Otherwise return 0 if attribute is read successfully.
H5Awrite

Write data to an HDF5 attribute

Description

Write data to an HDF5 attribute

Usage

H5Awrite(h5attribute, buf)

Arguments

h5attribute
An object of class H5IdComponent representing an attribute. Normally created by H5Aopen() or similar.

buf
The data to be written.

h5checkFilters
Identifies the filters required to read a dataset If filters aren’t available it will try to identify them and print the names to the user.

Description

Identifies the filters required to read a dataset If filters aren’t available it will try to identify them and print the names to the user.

Usage

h5checkFilters(h5id)

h5closeAll
Close open HDF5 handles

Description

This function can be used in two ways. Firstly, it can be passed one or more H5IdComponent objects and it will try to close all of them regardless of whether they represent a file, group, dataset etc. This can be easier than making multiple calls to H5Fclose(), H5Gclose(), etc.

Usage

h5closeAll(...)
Arguments

One or more objects of class `H5IdComponent` which should be closed. If nothing is provided to the function, all open handles will be closed.

Details

Secondly, occasionally references to HDF5 files, groups, datasets etc can be created and not closed correctly. Maybe because a function stopped before getting to the close statement, or the open handle was not assigned to an R variable. If no arguments are provide this function identifies all open handles and closes them.

Value

Doesn’t return anything. Called for the side-effect of closing open HDF5 handles.

Author(s)

Mike Smith

Examples

```r
## create an empty file and then re-open it
h5File <- tempfile(pattern = "ex_h5closeAll.h5")
h5createFile(h5File)
H5Fopen(h5File)

## list all open identifiers
h5listIdentifier()

## close all open identifiers and verify
h5closeAll()
h5listIdentifier()
```

---

**h5constants**

_HDF5 library constants._

**Description**

Access to HDF5 constants.

**Usage**

```r
h5const(type = "")
h5constType()
h5default(type = ")
```
**Arguments**

- **type**: A character name of a group of constants.

**Details**

These functions provide a list of HDF5 constants that are defined in the R package. `h5constType` provides a list of group names and `h5const` gives the constants defined within a group. `h5default` gives the default choice for each group.

**Value**

A character vector with names of HDF5 constants or groups.

**Author(s)**

Bernd Fischer

**Examples**

```r
h5constType()[1]
h5const(h5constType()[1])
```

---

**H5Dclose**

*Close an open HDF5 dataset*

**Description**

Close an open HDF5 dataset

**Usage**

```r
H5Dclose(h5dataset)
```

**Arguments**

- **h5dataset**: Object of class `H5IdComponent` representing an open HDF5 dataset
**H5Dcreate**

Create a new HDF5 dataset

**Description**

Create a new HDF5 dataset

**Usage**

```r
H5Dcreate(
  h5loc,
  name,
  dtype_id,
  h5space,
  lcpl = NULL,
  dcpl = NULL,
  dapl = NULL
)
```

**Arguments**

- **h5loc**: An object of class `H5IdComponent` representing a H5 location identifier (file or group). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()` to create an object of this kind.
- **name**: Name of the dataset.
- **dtype_id**: A character name of a datatype. See `h5const("H5T")` for possible datatypes. Can also be an integer representing an HDF5 datatype.
- **h5space**: An object of class `H5IdComponent` representing a H5 dataspace. See `H5Dget_space()`, `H5Screate_simple()`, `H5Screate()` to create an object of this kind.
- **lcpl, dcpl, dapl**: An objects of class `H5IdComponent` representing HDF5 property lists. Specially these should respectively be: a link creation property list, a dataset creation property list, a dataset access property list.

**Value**

An object of class `H5IdComponent` representing the opened dataset.
H5Dget_create_plist  
Return a copy of the dataset creation property list for a dataset

Description

Return a copy of the dataset creation property list for a dataset

Usage

H5Dget_create_plist(h5dataset)

Arguments

h5dataset  
Object of class H5IdComponent representing an open HDF5 dataset

H5Dget_space  
Return a copy of the HDF5 dataspace for a dataset

Description

Return a copy of the HDF5 dataspace for a dataset

Usage

H5Dget_space(h5dataset)

Arguments

h5dataset  
Object of class H5IdComponent representing an open HDF5 dataset

Value

Returns an object of class H5IdComponent representing a HDF5 dataspace identifier
**H5Dget_storage_size**

*Find the amount of storage allocated for a dataset*

**Description**

H5Dget_storage_size returns the amount of storage, in bytes, allocated in an HDF5 file to hold a given dataset. This is the amount of space required on-disk, which not typically a good indicator of the amount of memory that will be required to read the complete dataset.

**Usage**

H5Dget_storage_size(h5dataset)

**Arguments**

- **h5dataset**: Object of class H5IdComponent representing an open HDF5 dataset

**Value**

Returns an integer giving the number of bytes allocated in the file to the dataset.

---

**H5Dget_type**

*Return a copy of the HDF5 datatype for a dataset*

**Description**

Return a copy of the HDF5 datatype for a dataset

**Usage**

H5Dget_type(h5dataset)

**Arguments**

- **h5dataset**: Object of class H5IdComponent representing an open HDF5 dataset
Open an existing HDF5 dataset

Description
Open an existing HDF5 dataset

Usage
H5Dopen(h5loc, name, dapl = NULL)

Arguments
- h5loc: An object of class H5IdComponent representing a H5 location identifier (file or group).
- name: Name of the dataset to open.
- dapl: An object of class H5IdComponent representing a H5 dataset access property list.

Value
An object of class H5IdComponent representing the opened dataset. To prevent memory leaks this must be closed with a call to H5Dclose() when no longer needed.

Examples
h5file <- tempfile(fileext = ".h5")
h5createFile( h5file )
h5createDataset( h5file, dataset = "A", dims = 10)

fid <- H5Fopen( h5file )
did <- H5Dopen( h5loc = fid, name = "A")
did

## rember to close open handles
H5Dclose( did )
H5Fclose( fid )
**H5Dread**

*Read from an HDF5 dataset*

---

**Description**

H5Dread() reads a (partial) dataset from an HDF5 file into the R session.

**Usage**

H5Dread(
  h5dataset,  
  h5spaceFile = NULL,  
  h5spaceMem = NULL,  
  buf = NULL,  
  compoundAsDataFrame = TRUE,  
  bit64conversion,  
  drop = FALSE)

**Arguments**

- **h5dataset**: Object of class H5IdComponent representing an open HDF5 dataset.
- **h5spaceFile**: An object of class H5IdComponent representing a HDF5 dataspace. See H5Dget_space(), H5Sc create_simple(), H5Sc create() to create an object of this kind.
- **h5spaceMem**: An object of class H5IdComponent representing a HDF5 dataspace. See H5Dget_space(), H5Sc create_simple(), H5Sc create() to create an object of this kind. The dimensions of the dataset in the file and in memory. The dimensions in file and in memory are interpreted in an R-like manner. The first dimension is the fastest changing dimension. When reading the file with a C-program (e.g. HDFView) the order of dimensions will invert, because in C the fastest changing dimension is the last one.
- **buf**: Buffer to hold the read data. The buffer size has to fit the size of the memory space h5spaceMem. No extra memory will be allocated for the data. A pointer to the same data is returned.
- **compoundAsDataFrame**: Logical vector of length 1. If TRUE, a compound datatype will be coerced to a data.frame. This is not possible, if the dataset is multi-dimensional. Otherwise the compound datatype will be returned as a list. Nested compound data types will be returned as a nested list.
- **bit64conversion**: Defines how 64-bit integers are converted. (See the details section for more information on these options.)
- **drop**: Logical vector of length 1. If TRUE, the HDF5 object is read as a vector with NULL dim attributes. Default is FALSE.
Details

Internally, R does not support 64-bit integers. All integers in R are 32-bit integers. By setting bit64conversion='int', a coercing to 32-bit integers is enforced, with the risk of data loss, but with the insurance that numbers are represented as integers. bit64conversion='double' coerces the 64-bit integers to floating point numbers. doubles can represent integers with up to 54-bits, but they are not represented as integer values anymore. For larger numbers there is again a data loss. bit64conversion='bit64' is recommended way of coercing. It represents the 64-bit integers as objects of class 'integer64' as defined in the package 'bit64'. Make sure that you have installed 'bit64'. The datatype 'integer64' is not part of base R, but defined in an external package. This can produce unexpected behaviour when working with the data.

H5Dset_extent

Description

Change the dimensions of an HDF5 dataset

Usage

H5Dset_extent(h5dataset, size)

Arguments

h5dataset Object of class H5IdComponent representing an open HDF5 dataset.

size An integer vector with the new dimension of the dataset.

Details

This function can only be applied to datasets that meet the following criteria:

- A chunked dataset with unlimited dimensions
- A chunked dataset with fixed dimensions if the new dimension sizes are less than the maximum sizes set with maxdims

Value

A logical vector of length 1. Value will be TRUE if the operation was sucessful and FALSE otherwise.

Author(s)

Bernd Fischer, Mike Smith
**H5Dwrite**

**Write data to dataset**

**Description**

Write data to dataset

**Usage**

```r
H5Dwrite(h5dataset, buf, h5type = NULL, h5spaceMem = NULL, h5spaceFile = NULL)
```

**Arguments**

- **h5dataset**: Object of class `H5IdComponent` representing an open HDF5 dataset.
- **buf**: The R object containing the data to be written to the dataset.
- **h5type**: Datatype of the HDF5 dataset to be written. If left as `NULL` it will use the datatype of the R object supplied to `buf`.
- **h5spaceMem, h5spaceFile**: `H5IdComponent` objects representing the memory and file dataspaces respectively. If these are left `NULL` dataspaces that match the size and shape of `h5dataset` will be used.

**H5D_extras**

Additional functions for finding details of dataset chunking.

**Description**

Additional functions for finding details of dataset chunking.

**Usage**

```r
H5Dchunk_dims(h5dataset)
H5Dischunked(h5dataset)
```

**Arguments**

- **h5dataset**: Object of class `H5IdComponent` representing an open HDF5 dataset.

**Details**

These functions do not map directly to the HDF5 C API but follow the same style and are included as potentially useful additions.

- `H5Dischunked` tests whether a dataset is chunked.
- `H5Dchunk_dims` will return the dimensions of the dataset chunks.
H5Fcreate

Create an HDF5 file

Description

Create an HDF5 file

Usage

H5Fcreate(
    name,
    flags = h5default("H5F_ACC"),
    fcpl = NULL,
    fapl = NULL,
    native = FALSE
)

H5Fclose

Close access to an HDF5 file

Description

Close access to an HDF5 file

Usage

H5Fclose(h5file)

Arguments

h5file H5IdComponent representing an HDF5 file ID. Typically created via H5Fcreate() or H5Fopen().

Author(s)

Mike Smith
**H5Fflush**

Flush all buffers associated with a file to disk

### Arguments

- **name**
  - The name of the HDF5 file to create.
- **flags**
  - See `h5const("H5F_ACC")` for possible arguments.
- **fcpl, fapl**
  - Object of class `H5IdComponent`. This should representing a file creation property list and a file access property list respectively. See `H5Fcreate()` or `H5Pcopy()` to create objects of this kind. Leaving as `NULL` will use the default HDF5 settings which are often sufficient.
- **native**
  - An object of class `logical`. If `TRUE`, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using `native = TRUE` increases HDF5 file portability between programming languages. A file written with `native = TRUE` should also be read with `native = TRUE`.

### Usage

```
H5Fflush(h5file, scope = h5default("H5F_SCOPE"))
```

### Arguments

- **h5file**
  - `H5IdComponent` representing any object associated with the file to be flushed.
- **scope**
  - Specifies whether the scope of the flushing action is global (flushes the entire virtual file) or local (flushes only the specified file). Valid values are `H5F_SCOPE_GLOBAL` and `H5F_SCOPE_LOCAL`.

---

**H5Fget_filesize**

Find the size of an open HDF5 file

### Description

`H5Fget_filesize()` returns the size in bytes of the HDF5 file specified by `h5file`.

### Usage

```
H5Fget_filesize(h5file)
```

### Arguments

- **h5file**
  - `H5IdComponent` representing an HDF5 file ID. Typically created via `H5Fcreate()` or `H5Open()`.
H5Fget_name

Retrieve the name of the file to which an object belongs

Description

Retrieve the name of the file to which an object belongs

Usage

H5Fget_name(h5obj)

Arguments

h5obj An object of class H5IdComponent. Despite this being an H5F function, it works equally well on H5 file, group, dataset and attribute datatypes.

Examples

## use an example file and show its location
h5file <- system.file("testfiles", "h5ex_t_array.h5", package = "rhdf5")
h5file

## open a file handle and confirm we can identify the file it points to
fid <- H5Fopen(h5file)
H5Fget_name(fid)

## H5Fget_name() can be applied to group and dataset handles too
gid <- H5Gopen(fid, name = "/")
did <- H5Dopen(fid, name = "DS1")
H5Fget_name(gid)
H5Fget_name(did)

## tidy up
H5Dclose(did)
H5Gclose(gid)
H5Fclose(fid)

H5Fget_plist

Get property lists associated with an HDF5 file

Description

Get property lists associated with an HDF5 file
Usage

H5Fget_create_plist(h5file)

H5Fget_access_plist(h5file)

Arguments

h5file An object of class H5IdComponent representing a H5 file identifier. Typically produced by H5Fopen() or H5Fcreate().

Description

H5Fis_hdf5() determines whether a file is in the HDF5 format.

Usage

H5Fis_hdf5(name, showWarnings = TRUE)

Arguments

name A character vector of length 1, giving the path to the file to be checked.

showWarnings If the file doesn’t exist an warning is generated. Setting this argument to FALSE will suppress the warning.

Value

Returns TRUE, if the file is an HDF5 file, or FALSE otherwise. In the case the file doesn’t exist, NA is returned.

Description

Open an existing HDF5 file

Usage

H5Fopen(name, flags = h5default("H5F_ACC_RD"), fapl = NULL, native = FALSE)
Arguments

- **name**: The name (or path) of the HDF5 file to be opened.
- **flags**: Character string defining the access mode for opening the file.
- **fapl**: `H5IdComponent` object representing a file access property list. Leaving this argument as `NULL` will use the default HDF5 properties.
- **native**: An object of class `logical`. If `TRUE`, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using `native = TRUE` increases HDF5 file portability between programming languages. A file written with `native = TRUE` should also be opened for reading with `native = TRUE`.

Details

Possible values for the `flags` argument are `H5F_ACC_RDWR` and `H5F_ACC_RDONLY`. Note that HDF5’s "Single Write Multiple Reader (SWMR) mode is not currently supported via `rhdf5`.

---

**H5functions**

**HDF5 General Library Functions**

**Description**

These low level functions provide general library functions for HDF5.

**Usage**

- `H5open()`
- `H5close()`
- `H5garbage_collect()`
- `H5get_libversion()`

**Value**

- `H5open` initializes the HDF5 library.
- `H5close` flushes all data to disk, closes all open identifiers, and cleans up memory.
- `H5garbage_collect` cleans up memory.
- `H5get_libversion` returns the version number of the HDF5 C-library.

**Author(s)**

Bernd Fischer, Mike Smith
Examples

```r
## Not run:
H5open()
H5close()
H5garbage_collect()
H5get_libversion()

## End(Not run)
```

### H5Gclose

**Close a specified group**

**Description**

Close a specified group

**Usage**

```r
H5Gclose(h5group)
```

**Arguments**

- `h5group` An object of class `H5IdComponent` representing a H5 group. Typically created via `H5Gopen()` or `H5Gcreate()`.

### H5Gcreate

**Create a new HDF5 group and link it to a location in a file**

**Description**

`H5Gcreate` is used to a new group and link it into a file.

**Usage**

```r
H5Gcreate(h5loc, name)
```

**Arguments**

- `h5loc` An object of class `H5IdComponent`
- `name` Name of the new group to be created.
**H5Gcreate_anon**  
Create a new HDF5 group without linking it into a file

**Description**
Create a new HDF5 group without linking it into a file

**Usage**

```
H5Gcreate_anon(h5loc)
```

**Arguments**

- `h5loc`: An object of class `H5IdComponent` specifying the file in which the new group is to be created.

**Value**

`H5Gcreate_anon` returns an object of class `H5IdComponent` representing the newly created group. However, at this point, it is still anonymous, and must be linked into the file structure via `H5Olink()`. If this is not done, the group will be deleted from the file when it is closed.

**See Also**

`H5Gcreate()`, `H5Olink()`

---

**H5Gget_info**  
Retrieve information about a group

**Description**
Retrieve information about a group

**Usage**

```
H5Gget_info(h5loc)
```

```
H5Gget_info_by_name(h5loc, group_name)
```

```
H5Gget_info_by_idx(
    h5loc,
    n,
    group_name = ".",
    index_type = h5default("H5_INDEX"),
    order = h5default("H5_ITER")
)
```
**Arguments**

- **h5loc**: An object of class `H5IdComponent` representing a H5 group.
- **group_name**: An additional group name specifying the group for which information is sought. It is interpreted relative to `h5loc`.
- **n**: Position in the index of the group for which information is retrieved.
- **index_type**: See `h5const("H5_INDEX")` for possible arguments.
- **order**: See `h5const("H5_ITER")` for possible arguments.

**Value**

A list with group information

**Examples**

```r
h5file <- system.file("testfiles", "multiple_dtypes.h5", package="rhdf5")
fid <- H5Fopen(h5file)
gid <- H5Gopen(fid, "/foo")
gid
H5Gget_info(gid)
H5Gclose(gid)

## the "get_info_by" functions take the H5 object that contains the
## group(s) of interest. We can retrieve information by index or by name
H5Gget_info_by_idx(fid, 3)
H5Gget_info_by_name(fid,"/foo")

H5Fclose(fid)
```

---

**H5Gopen**

*Open a specified group*

**Description**

Open a specified group

**Usage**

`H5Gopen(h5loc, name)`

**Arguments**

- **h5loc**: An object of class `H5IdComponent` representing a H5 file or group that contains the group to be opened.
- **name**: Name of the group to open.
Value

An object of class H5IdComponent representing the opened group. When access to the group is no longer needed this should be released with H5Gclose() to prevent resource leakage.

See Also

H5Gclose()

H5IdComponent-class  An S4 class representing an H5 object

Description

A class representing a HDF5 identifier handle. HDF5 identifiers represent open files, groups, datasets, dataspaces, attributes, and datatypes.

Usage

## S4 method for signature 'H5IdComponent'
show(object)

## S4 method for signature 'H5IdComponent,character'
e1 & e2

## S4 method for signature 'H5IdComponent'
x$name

## S4 replacement method for signature 'H5IdComponent'
x$name <- value

## S4 method for signature 'H5IdComponent'
x[i, j, ..., drop = TRUE]

## S4 replacement method for signature 'H5IdComponent'
x[i, j, ...] <- value

Arguments

  object  Object of class H5IdComponent
  e1      An H5IdComponent object representing an H5 file or group.
  e2      Character giving the path to an HDF5 group or dataset relative to e1.
  x       Object of class H5IdComponent representing the HDF5 dataset from which to extract element(s) or in which to replace element(s).
  name    Character giving the path to an HDF5 group or dataset relative to x.
  value   Array-like R object containing value to be inserted into the HDF5 dataset.
Indices specifying elements to extract or replace. Indices are numeric vectors or empty (missing) or NULL. Numeric values are coerced to integer as by \texttt{as.integer} (and hence truncated towards zero).

\textbf{drop} \hspace{1cm} If \texttt{TRUE} the result is coerced to the lowest possible dimension (see the examples). This only works for extracting elements, not for the replacement. See \texttt{drop} for further details.

\textbf{Methods (by generic)}

- \texttt{show(H5IdComponent)}: Print details of the object to screen.
- \texttt{e1 \& e2}: Returns a group handle or dataset handle for the group or dataset name in the HDF5 location \texttt{h5loc}. \texttt{h5loc} can either be a file handle as returned by \texttt{H5Fopen} or a group handle as e.g. returned by \texttt{h5f$g1} or \texttt{h5f$'/g1/g2'}.
- \texttt{$}: Reads the HDF5 object name in the HDF5 location \texttt{x}. \texttt{x} can either be a file handle as returned by \texttt{H5Fopen} or a group handle as e.g. returned by \texttt{h5f$g1} or \texttt{h5f$'/g1/g2'}.
- \texttt{`$'(H5IdComponent) <- value}: Writes the assigned object to to the HDF5 file at location \texttt{e1}. \texttt{e1} can either be a file handle as returned by \texttt{H5Fopen} or a group handle as e.g. returned by \texttt{h5f$g1} or \texttt{h5f$'/g1/g2'}. The storage.mode of the assigned object has to be compatible to the datatype of the HDF5 dataset. The dimension of the assigned object have to be identical the dimensions of the HDF5 dataset. To create a new HDF5 dataset with specific properties (e.g. compression level or chunk size), please use the function \texttt{h5createDataset} first.
- \texttt{[}: Subsetting of an HDF5 dataset. The function reads a subset of an HDF5 dataset. The given dimensions have to fit the dimensions of the HDF5 dataset.
- \texttt{`[`(H5IdComponent) <- value}: Subsetting of an HDF5 dataset. The function writes an R data object to a subset of an HDF5 dataset. The given dimensions have to fit the dimensions of the HDF5 dataset. The HDF5 dataset has to be created beforehand, e.g. by \texttt{h5createDataset}.

\textbf{Slots}

- \texttt{ID integer of length 1. Contains the handle of C-type hid_t.}
- \texttt{native An object of class logical. If \texttt{TRUE}, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using \texttt{native = TRUE} increases HDF5 file portability between programming languages. A file written with \texttt{native = TRUE} should also be read with \texttt{native = TRUE}}

---

\textbf{H5Iget_name} \hspace{1cm} \textit{Retrieve the name of an object from a given identifier}

\textbf{Description}

Retrieve the name of an object from a given identifier

\textbf{Usage}

\texttt{H5Iget_name(h5obj)}
Arguments

h5obj  
An object of class H5IdComponent. Can represent a file, group, dataset or attribute.

Description

Possible types returned by the function are:

- H5I_FILE
- H5I_GROUP
- H5I_DATATYPE
- H5I_DATASPACE
- H5I_DATASET
- H5I_ATTR

Usage

H5Iget_type(h5identifier)

Arguments

h5identifier  
Object of class H5IdComponent.

Value

Returns a character vector of length 1 containing the HDF5 type for the supplied identifier.

Examples

h5file <- system.file("testfiles", "h5ex_t_array.h5", package="rhdf5")
 fid <- H5Fopen(h5file)
 gid <- H5Gopen(fid, "/")

# identify the HDF5 types for these identifiers
H5Iget_type(fid)
H5Iget_type(gid)

# tidy up
H5Gclose(gid)
H5Fclose(fid)
**H5Iis_valid**

**Determine whether an identifier is valid**

**Description**

An identifier is no longer valid after it has been closed.

**Usage**

`H5Iis_valid(h5identifier)`

**Arguments**

- `h5identifier` Object of class `H5IdComponent`.

**Value**

A logical of length 1. TRUE is the identifier is valid, FALSE if not.

**Examples**

```r
h5file <- system.file("testfiles", "h5ex_t_array.h5", package="rhdf5")
fid <- H5Fopen(h5file)

## test whether the identifier to the opened file is valid
H5Iis_valid(fid)

## the file ID is no longer valid after it has been closed
H5Fclose(fid)
H5Iis_valid(fid)
```

---

**H5Lcopy**

**Copy a link from one location to another**

**Description**

Copy a link from one location to another

**Usage**

`H5Lcopy(h5loc, name, h5loc_dest, name_dest, lcpl = NULL, lapl = NULL)`
Arguments

- **h5loc**: An object of class `H5IdComponent` representing a H5 location identifier (file or group) where the new link is placed.
- **name**: The name of the link to be copied.
- **h5loc_dest**: An object of class `H5IdComponent` representing the destination file or group where a copied or moved link should be created.
- **name_dest**: The name of the link to be created when copying or moving.
- **lcpl, lapl**: Link creation and link access property lists. If left as NULL the HDF5 defaults will be used.

**H5Lcreate_external**  
Create a link to an object in a different HDF5 file

Description

`H5Lcreate_external()` creates a new external link. An external link is a soft link to an object in a different HDF5 file from the location of the link.

Usage

`H5Lcreate_external(target_file_name, target_obj_name, link_loc, link_name)`

Arguments

- **target_file_name**: Name of the external HDF5 to link to.
- **target_obj_name**: Path to the object in the file specified by `target_file_name` to link to.
- **link_loc**: `H5IdComponent` object giving the location where the new link should be created. Can represent an HDF5 file or group.
- **link_name**: Name (path) of the new link, relative to the location of `link_loc`.

Examples

```r
## The example below creates a new HDF5 file in a temporary director, and then
## links to the group "/foo" found in the file "multiple_dtypes.h5"
## distributed with the package.

h5File1 <- system.file("testfiles", "multiple_dtypes.h5", package="rhdf5")
h5File2 <- tempfile(pattern = "H5L_2_", fileext = ".h5")
h5createFile(h5File2)

## open the new file & create a link to the group "/foo" in the original file
fid <- H5Fopen(h5File2)
H5Lcreate_external(target_file_name = h5File1, target_obj_name = "/foo",
  link_loc = fid, link_name = "/external_link")
```
H5Ldelete

H5Fclose(fid)

## check the new file has a group called "/external_link"
h5ls(h5File2)

### H5Ldelete

**Remove a link from a group**

**Description**

Remove a link from a group

**Usage**

H5Ldelete(h5loc, name)

**Arguments**

- **h5loc**: An object of class `H5IdComponent` representing a H5 location identifier (file or group).
- **name**: The name of the link to be deleted.

**Examples**

```r
h5file <- tempfile(pattern = "_ex_H5L.h5")

# create an hdf5 file and a group
h5createFile( h5file )
h5createGroup(h5file,"/foo")

# reopen file and confirm "/foo" exists but "/baa" does not
fid <- H5Fopen(h5file)
H5Lexists(fid, "/foo")

# remove the link to "/foo" and confirm it no longer exists
H5Ldelete(fid, "/foo")
H5Lexists(fid, "/foo")

H5Fclose(fid)
```
H5Lexists

Confirm existence of a link

Description

Confirm existence of a link

Usage

H5Lexists(h5loc, name)

Arguments

h5loc  An object of class H5IdComponent representing a H5 location identifier (file or group).
name   The name of the link to be checked

H5Lget_info

Find information about a link

Description

H5Lget_info() identifies the type of link specified by the h5loc and name arguments. This is more limited than the equivalent function in the standard HDF5 library.

Usage

H5Lget_info(h5loc, name)

Arguments

h5loc  An object of class H5IdComponent representing a H5 location identifier (file or group).
name   The name of the link to be queried.

Value

A character vector of length 1 giving the type of link. Possible values are: H5L_TYPE_HARD, H5L_TYPE_SOFT, H5L_TYPE_EXTERNAL, H5L_TYPE_ERROR
h5listObjects

List all open HDF5 objects.

Description

A list of all valid HDF5 identifiers. H5 objects should be closed after usage to release resources.

Usage

h5listIdentifier()

h5validObjects(native = FALSE)

Arguments

native  An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE.

Value

h5validObjects returns a list of H5IdComponent objects. h5listIdentifier prints the valid identifiers on screen and returns NULL.

Author(s)

Bernd Fischer, Mike Smith

Examples

h5File <- tempfile("ex_list_identifier.h5")

h5createFile(h5File)

# create groups
h5createGroup(h5File, "foo")

h5listIdentifier()

h5validObjects()
H5Lmove

Move a link within an HDF5 file

Description

Move a link within an HDF5 file

Usage

H5Lmove(h5loc, name, h5loc_dest, name_dest, lcpl = NULL, lapl = NULL)

Arguments

h5loc
An object of class H5IdComponent representing a H5 location identifier (file or group) where the new link is placed.

name
The name of the link to be moved.

h5loc_dest
H5IdComponent object representing the H5 location where the new link should be created.

name_dest
Name of the new link to be created

lcpl, lapl
Link creation and link access property lists to be associated with the new link. Leaving these arguments as NULL will use the HDF5 default property lists.

Examples

```r
## create an HDF5 file with a single group
## that contains a dataset of 10 numbers
h5file <- tempfile(fileext = ".h5")
h5createFile(h5file)
h5createGroup(h5file, "/foo")
h5write(1:10, h5file, name = "/foo/vector1")
## check the structure is what we expect
h5ls(h5file)

## open the file, the group where the dataset currently is
## and the root group
fid <- H5Fopen(name = h5file)
gid1 <- H5Gopen(fid, "/foo")
gid2 <- H5Gopen(fid, "/")
## move the dataset to the root of the file and rename it
H5Lmove(gid1, "vector1", gid2, "vector_new")
h5closeAll()
## check the dataset has moved out of the foo group
h5ls(h5file)

## we can also provide the ID of the HDF5 file
## and use the "name" arguments to move between groups
fid <- H5Fopen(name = h5file)
H5Lmove(fid, "/vector_new", fid, "/foo/vector_newer")
```
h5ls

List the content of an HDF5 file.

Description

List the content of an HDF5 file.

Usage

h5ls(
  file,
  recursive = TRUE,
  all = FALSE,
  datasetinfo = TRUE,
  index_type = h5default("H5_INDEX"),
  order = h5default("H5_ITER"),
  s3 = FALSE,
  s3credentials = NULL,
  native = FALSE
)

Arguments

file The filename (character) of the file in which the dataset will be located. You can also provide an object of class H5IdComponent representing a H5 location identifier (file or group). See H5Fcreate(), H5Fopen(), H5Gcreate(), H5Gopen() to create an object of this kind.

recursive If TRUE, the content of the whole group hierarchy is listed. If FALSE, Only the content of the main group is shown. If a positive integer is provided this indicates the maximum level of the hierarchy that is shown.

all If TRUE, a longer list of information on each entry is provided.

datasetinfo If FALSE, datatype and dimensionality information is not provided. This can speed up the content listing for large files.

index_type See h5const("H5_INDEX") for possible arguments.

order See h5const("H5_ITER") for possible arguments.

s3 Logical value indicating whether the file argument should be treated as a URL to an Amazon S3 bucket, rather than a local file path.

s3credentials A list of length three, providing the credentials for accessing files in a private Amazon S3 bucket.

native An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE.
Value

`h5ls` returns a `data.frame` with the file content.

Author(s)

Bernd Fischer, Mike L. Smith

References

https://portal.hdfgroup.org/display/HDF5

See Also

`h5dump()`

Examples

```r
h5File <- tempfile(pattern = "ex_dump.h5")
h5createFile(h5File)

# create groups
h5createGroup(h5File,"foo")
h5createGroup(h5File,"foo/foobaa")

# write a matrix
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
attr(B, "scale") <- "liter"
h5write(B, h5File,"foo/B")

# list content of hdf5 file
h5ls(h5File,all=TRUE)

# list content of an hdf5 file in a public S3 bucket
h5ls(file = "https://rhdf5-public.s3.eu-central-1.amazonaws.com/h5ex_t_array.h5", s3 = TRUE)
```

---

**H5Oclose**

**Close an HDF5 object**

**Description**

Close an HDF5 object

**Usage**

```r
H5Oclose(h5obj)
```
**Arguments**

- `h5obj`: An object of class `H5IdComponent` representing an open HDF5 object.

**See Also**

- `H5Oopen()`

---

**H5Ocopy**  
*Copies an HDF5 object*

**Description**

Copies an HDF5 object

**Usage**

```r
H5Ocopy(h5loc, name, h5loc_dest, name_dest, obj_cpy_pl = NULL, lcpl = NULL)
```

**Arguments**

- `h5loc`: An object of class `H5IdComponent` representing an open HDF5 object where the source object should be copied from.
- `name`: Character vector of length 1, giving the name of the source object to be copied.
- `h5loc_dest`: An object of class `H5IdComponent` representing an open HDF5 object where the new copy should be created.
- `name_dest`: Character vector of length 1, giving the name of the new object to be created.
- `obj_cpy_pl`, `lcpl`: `H5IdComponent` objects representing object copy and link creation property lists respectively. If left as `NULL` the default values for these will be used.

**Examples**

```r
## Create a temporary copy of an example file check the contents
example_file <- system.file("testfiles", "h5ex_t_array.h5", package="rhdf5")
file.copy(example_file, tempdir())
h5_file <- file.path(tempdir(), "h5ex_t_array.h5")
h5ls(h5_file)

## open the example file and create a new, empty, file
fid1 <- H5Fopen( h5_file )
h5_file2 <- tempfile(fileext = ".h5")
fid2 <- H5Fcreate( h5_file2 )

## We can copy a dataset inside the same file
H5Ocopy(h5loc = fid1, name = "DS1", h5loc_dest = fid1, name_dest = "DS2")
## Or to a different file
H5Ocopy(h5loc = fid1, name = "DS1", h5loc_dest = fid2, name_dest = "DS1_copy")
```
## if we want to create a new group hierarchy we can use a link creation property list
lcpl <- H5Pcreate("H5P_LINK_CREATE")
H5Pset_create_intermediate_group( lcpl, create_groups = TRUE )
H5Ocopy(h5loc = fid1, name = "DS1", h5loc_dest = fid2,
   name_dest = "/foo/baa/DS1_nested", lcpl = lcpl)

## tidy up
H5Pclose(lcpl)
H5Fclose(fid1)
H5Fclose(fid2)

## Check we now have groups DS1 and DS2 in the original file
h5ls( h5_file )
## Check we have a copy of DS1 at the root and nests in the new file
h5ls( h5_file2 )

---

**H5Oget_num_attrs**

Find the number of attributes associated with an HDF5 object

### Description

Find the number of attributes associated with an HDF5 object

### Usage

H5Oget_num_attrs(h5obj)

H5Oget_num_attrs_by_name(h5loc, name)

### Arguments

- **h5obj**: An object of class `H5IdComponent` representing a H5 object identifier (file, group, or dataset).
- **h5loc**: An object of class `H5IdComponent` representing a H5 location identifier (file or group).
- **name**: The name of the object to be checked.

### Details

These functions are not part of the standard HDF5 C API.

### Value

Returns a vector of length 1 containing the number of attributes the specified object has.
H5Olink

Create a hard link to an object in an HDF5 file

Description

Create a hard link to an object in an HDF5 file

Usage

H5Olink(h5obj, h5loc, newLinkName, lcpl = NULL, lapl = NULL)

Arguments

h5obj
An object of class H5IdComponent representing the object to be linked to.

h5loc
An object of class H5IdComponent representing the location at which the object
is to be linked. Can represent a file, group, dataset, datatype or attribute.

newLinkName
Character string giving the name of the new link. This should be relative to
h5loc.

lcpl, lapl
H5IdComponent objects representing link creation and link access property lists
respectively. If left as NULL the default values for these will be used.

See Also

H5Gcreate_anon

Examples

## Create a temporary copy of an example file, and open it
example_file <- system.file("testfiles", "h5ex_t_array.h5", package="rhdf5")
file.copy(example_file, tempdir())
h5_file <- file.path(tempdir(), "h5ex_t_array.h5")
fid <- H5Fopen( h5_file )

## create a new group without a location in the file
gid <- H5Gcreate_anon(fid)

## create link to newly create group
## relative to the file identifier
H5Olink(h5obj = gid, h5loc = fid, newLinkName = "foo")

## tidy up
H5Gclose(gid)
H5Fclose(fid)

## Check we now have a "/foo" group
h5ls( h5_file )
H5Oopen

Open an object in an HDF5 file

Description

Open an object in an HDF5 file

Usage

H5Oopen(h5loc, name)

Arguments

h5loc An object of class H5IdComponent
name Path to the object to be opened. This should be relative to h5loc rather than the file.

Value

An object of class H5IdComponent if the open operation was successful. FALSE otherwise.

See Also

H5Oclose()

Examples

h5File <- tempfile(pattern = "ex_H5O.h5")

# create an hdf5 file and write something
h5createFile(h5File)
h5createGroup(h5File,"foo")
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
h5write(B, h5File,"foo/B")

# reopen file and dataset and get object info
fid <- H5Fopen(h5File)
oid = H5Oopen(fid, "foo")
H5Oget_num_attrs(oid)
H5Oclose(oid)
H5Fclose(fid)
Description

Return information about the filter pipeline applied to a dataset creation property list.

Usage

H5Pall_filters_avail(h5plist)
H5Pget_nfilters(h5plist)
H5Pget_filter(h5plist, idx)

Arguments

h5plist Object of class H5IdComponent representing a dataset creation property list.
idx Integer of length 1. This argument selects which filter to return information about. Indexing is R-style 1-based.

Details

• H5Pall_filters_avail() checks whether all filters required to process a dataset are available to rhdf5. This can be required if reading files created with other HDF5 software.
• H5Pget_nfilters() returns the number of filters in the dataset chunk processing pipeline.
• H5Pget_filter() provides details of a specific filter in the pipeline. This includes the filter name and the parameters provided to it e.g. compression level.

Description

H5Pclose() terminates access to a property list. All property lists should be closed when they no longer need to be accessed. This frees resources used by the property list. Failing to call H5Pclose() can lead to memory leakage over time.

Usage

H5Pclose(h5plist)

Arguments

h5plist H5IdComponent object representing the property list to close.
H5Pcopy

Copy an existing property list to create a new property list

Description

Copy an existing property list to create a new property list

Usage

H5Pcopy(h5plist)

Arguments

h5plist

H5IdComponent object representing the property list to be copied.

H5Pcreate

Create a new HDF5 property list

Description

Create a new HDF5 property list

Usage

H5Pcreate(type = h5default("H5P"), native = FALSE)

Arguments

type

A character name of a property list type. See h5const("H5P") for possible property list types.

native

Defunct! Doesn’t achieve anything for property lists.
H5Pfill_value_defined  Determine whether a property list has a fill value defined

Description
Determine whether a property list has a fill value defined

Usage
H5Pfill_value_defined(h5plist)

Arguments
h5plist  Object of class H5IdComponent representing a dataset creation property list.

Details
Note that the return value for this function is slightly different from the C version. The C API provides three return types and can, in the case that a fill value is defined, differentiate whether the value is the HDF5 library default or has been set by the application.

Value
TRUE if the fill value is defined, FALSE if not. Will return NULL if there is a problem determining the status of the fill value.

H5Pget_class  Return the property list class identifier for a property list

Description
Return the property list class identifier for a property list

Usage
H5Pget_class(h5plist)

Arguments
h5plist  H5IdComponent object representing any type of HDF5 property list.
H5Pget_version

Get version information for objects in a file creation property list

Description
Get version information for objects in a file creation property list

Usage
H5Pget_version(h5plist)

Arguments
h5plist 

H5IdComponent object representing the file creation property list

Value
Named integer vector

H5Pobject_track_times
Set whether to record timestamps for operations performed on an HDF5 object.

Description
Set whether to record timestamps for operations performed on an HDF5 object.

Usage
H5Pset_obj_track_times(h5plist, track_times = TRUE)
H5Pget_obj_track_times(h5plist)

Arguments
h5plist
An H5IdComponent object representing an object creation property list.

track_times
logical specifying whether times associated with an object should be recorded.

Details
Objects created using high-level rhdf5 functions like h5createDataset() will have this setting turned off. This was done to ensure otherwise identical files returned the same md5 hash. This differs from the default setting in HDF5, which is for objects to record the times operations were performed on them.
**H5Pset_blosc**

*Add the BLOSC filter to the chunk processing pipeline.*

**Description**

Add the BLOSC filter to the chunk processing pipeline.

**Usage**

\[
\text{H5Pset\_blosc}(h5plist, h5tid, \text{method} = 1L, \text{level} = 6L, \text{shuffle} = \text{TRUE})
\]

**Arguments**

- **h5plist**: Object of class `H5IdComponent` representing a dataset creation property list.
- **h5tid**: HDF5 data type id
- **method**: Integer defining which of the compression algorithms provided by BLOSC should be used. (See the details section for the mapping between integers and algorithms).
- **level**: Compression level to be used by the selected algorithm.
- **shuffle**: Logical defining whether the bit-shuffle algorithm should be used prior to compression. This makes use of the shuffle implementation provide by BLOSC, rather than the HDF5 version.

---

**H5Pset_bzip2**

*Add the BZIP2 filter to the chunk processing pipeline.*

**Description**

Add the BZIP2 filter to the chunk processing pipeline.

**Usage**

\[
\text{H5Pset\_bzip2}(h5plist, \text{level} = 2L)
\]

**Arguments**

- **h5plist**: Object of class `H5IdComponent` representing a dataset creation property list.
- **level**: Compression level to be used by the selected algorithm.
H5Pset_deflate

Add the deflate compression filter to the chunk processing pipeline.

Description

Valid values for the compression level range from 0 (no compression) to 9 (best compression, slowest speed). Note that applying this function with level = 0 does not mean the filter is removed. It is still part of the filter pipeline, but no compression is performed. The filter will still need to be available on any system that reads a file created with this setting.

Usage

H5Pset_deflate(h5plist, level)

Arguments

- h5plist: Object of class H5IdComponent representing a dataset creation property list.
- level: Integer giving the compression level to use. Valid values are from 0 to 9.

H5Pset_fapl_ros3

Set the read-only S3 virtual file driver

Description

The read-only S3 virtual file driver can be used to read files hosted remotely on Amazon’s S3 storage.

Usage

H5Pset_fapl_ros3(h5plist, s3credentials = NULL)

Arguments

- h5plist: H5IdComponent object representing a file access property list.
- s3credentials: Either NULL or a list of length 3 specifying the AWS access credentials (see details).

Details

To access files in a private Amazon S3 bucket you will need to provide three additional details: The AWS region where the files are hosted, your AWS access key ID, and your AWS secret access key. More information on how to obtain AWS access keys can be found at https://docs.aws.amazon.com/general/latest/gr/aws-sec-cred-types.html#access-keys-and-secret-access-keys. These are provided as a list to the s3credentials argument. If you are accessing public data this argument should be NULL.
Examples

```r
## this doesn’t work on the Bioconductor Mac build machine
## Not run:
pid <- H5Pcreate("H5P_FILE_ACCESS")
H5Pset_fapl_rose3( pid )
H5Pclose(pid)
## End(Not run)
```

---

### H5Pset_filter

Add a filter to the dataset filter pipeline.

**Description**

Add a filter to the dataset filter pipeline.

**Usage**

```r
H5Pset_filter(h5plist, filter_id, is_mandatory = FALSE, cd_values)
```

**Arguments**

- `h5plist`: Object of class `H5IdComponent` representing a dataset creation property list.
- `filter_id`: Integer of length 1, giving the ID of the filter to be used.
- `is_mandatory`: Logical of length 1. Filters can be either optional or mandatory. If this argument is set to `FALSE` the filter won’t be applied to a chunk in the case of failure, but the data will still be written. Setting to `TRUE` will result in a failure when writing the dataset if the filter fails for some reason.
- `cd_values`: Integer vector giving parameters to be supplied to the filter. No guidance is given for the number of values supplied here, it is specific to each filter and the user is expected to know appropriate options for the requested filter.

---

### H5Pset_istore_k

Get and set the 1/2 rank of an indexed storage B-tree

**Description**

Get and set the 1/2 rank of an indexed storage B-tree

**Usage**

```r
H5Pset_istore_k(h5plist, ik)
```

```r
H5Pget_istore_k(h5plist)
```
**Arguments**

- **h5plist**: `H5IdComponent` object representing the file creation property list.
- **ik**: chunked Storage B-tree 1/2 rank

---

**H5Pset_lzf**

*Add the LZF filter to the chunk processing pipeline.*

**Description**

Add the LZF filter to the chunk processing pipeline.

**Usage**

`H5Pset_lzf(h5plist, h5tid)`

**Arguments**

- **h5plist**: Object of class `H5IdComponent` representing a dataset creation property list.
- **h5tid**: HDF5 data type id

---

**H5Pset_nbit**

*Add the N-Bit filter to the chunk processing pipeline.*

**Description**

Add the N-Bit filter to the chunk processing pipeline.

**Usage**

`H5Pset_nbit(h5plist)`

**Arguments**

- **h5plist**: Object of class `H5IdComponent` representing a dataset creation property list.

**Value**

Returns (invisibly) an integer vector of length 1. The only element of this vector will be non-negative if the filter was set successfully and negative otherwise.
**H5Pset_shared_mesg_index**

*Get and set shared object header message index properties*

**Description**

Get and set shared object header message index properties

**Usage**

H5Pset_shared_mesg_index(
    h5plist,
    index_num,
    msg_type_flags = h5default(type = "H5O_SHMESG_FLAG"),
    min_mesg_size
)

H5Pget_shared_mesg_index(h5plist, index_num)

**Arguments**

- **h5plist**: `H5IdComponent` object representing the file creation property list.
- **index_num**: Index being configured. Indices use C-style 0-based counting, so the first index will be numbered 0.
- **msg_type_flags**: Character specifying the types of messages that may be stored in this index. Valid values can be found with `h5const(type = "H5O_SHMESG_FLAG")`
- **min_mesg_size**: Minimum message size

**Value**

H5Pget_shared_mesg_index() returns a list of length 2. The first element is the types of messages that may be stored in the index, the second element is the minimum message size.

---

**H5Pset_shared_mesg_nindexes**

*Get and set the number of object header message indexes*

**Description**

Get and set the number of object header message indexes
Usage

H5Pset_shared_mesg_nindexes(h5plist, nindexes)

H5Pget_shared_mesg_nindexes(h5plist)

Arguments

h5plist       H5IdComponent object representing the file creation property list
nindexes      Number of shared object header message indexes to be available in files

H5Pset_shared_mesg_phase_change

Get and set threshold values for storage of shared object header message indexes

Usage

H5Pset_shared_mesg_phase_change(h5plist, max_list, min_btree)

H5Pget_shared_mesg_phase_change(h5plist)

Arguments

h5plist       H5IdComponent object representing the file creation property list
max_list      Threshold above which storage shifts from list to B-tree
min_btree     Threshold below which storage reverts to list format

H5Pset_shuffle

Add the shuffle filter to the chunk processing pipeline.

Description

Add the shuffle filter to the chunk processing pipeline.

Usage

H5Pset_shuffle(h5plist)

Arguments

h5plist       Object of class H5IdComponent representing a dataset creation property list.
**Value**

Returns (invisibly) an integer vector of length 1. The only element of this vector will be non-negative if the filter was set successfully and negative otherwise.

---

**H5Pset_sizes**

Get and set the sizes of offsets and lengths used in an HDF5 file

**Description**

Get and set the sizes of offsets and lengths used in an HDF5 file

**Usage**

```
H5Pset_sizes(h5plist, sizeof_addr, sizeof_size)
H5Pget_sizes(h5plist)
```

**Arguments**

- **h5plist** | H5IdComponent object representing the file creation property list
- **sizeof_addr** | Offset size in bytes
- **sizeof_size** | Length size in bytes

---

**H5Pset_sym_k**

Get and set the size of the symbol table B-tree 1/2 rank and the leaf node 1/2 size

**Description**

Get and set the size of the symbol table B-tree 1/2 rank and the leaf node 1/2 size

**Usage**

```
H5Pset_sym_k(h5plist, ik, lk)
H5Pget_sym_k(h5plist)
```

**Arguments**

- **h5plist** | H5IdComponent object representing the file creation property list
- **ik** | Symbol table B-tree 1/2 rank
- **lk** | Symbol table leaf node 1/2 size
H5Pset_szip

*Add the SZIP compression filter to the chunk processing pipeline.*

**Description**

Add the SZIP compression filter to the chunk processing pipeline.

**Usage**

```c
H5Pset_szip(h5plist, options_mask, pixels_per_block)
```

**Arguments**

- `h5plist` Object of class `H5IdComponent` representing a dataset creation property list.
- `options_mask`, `pixels_per_block` Integer vectors of length 1, setting parameters of the SZIP algorithm. See https://portal.hdfgroup.org/display/HDF5/H5P_SET_SZIP for more details.

**References**

https://portal.hdfgroup.org/display/HDF5/Szip+Compression+in+HDF+Products

---

H5Pset_userblock

*Get and set the user block size*

**Description**

Get and set the user block size

**Usage**

```c
H5Pset_userblock(h5plist, size)
H5Pget_userblock(h5plist)
```

**Arguments**

- `h5plist` `H5IdComponent` object representing the file creation property list
- `size` of the user block in bytes
**Description**

Get and set the size of the chunks used to store a chunked layout dataset

**Usage**

```
H5Pset_chunk(h5plist, dim)
H5Pget_chunk(h5plist)
```

**Arguments**

- `h5plist`: An object of class `H5IdComponent` representing a dataset creation property list.
- `dim`: The chunk size used to store the dataset. This argument should be an integer vector of the same length as the number of dimensions of the dataset the dataset creation property list will be applied to.

**Details**

Note that a necessary side effect of running this function is that the layout of the dataset will be changed to `H5D_CHUNKED` if it is not already set to this.

**See Also**

`H5Pset_layout()`

**H5P_chunk_cache**

*Set parameters for the raw data chunk cache*

**Description**

Set parameters for the raw data chunk cache

**Usage**

```
H5Pset_chunk_cache(h5plist, rdcc_nslots, rdcc_nbytes, rdcc_w0)
```
Arguments

- **h5plist**: Object of class `H5IdComponent` representing a dataset access property list.
- **rdcc_nslots**: Integer defining the number of chunk slots in the raw data chunk cache for this dataset.
- **rdcc_nbytes**: Integer setting the total size of the raw data chunk cache for this dataset in bytes. In most cases increasing this number will improve performance, as long as you have enough free memory. The default size is 1 MB.
- **rdcc_w0**: Numeric value defining the chunk preemption policy. Must be between 0 and 1 inclusive.

Description

Get and set whether to create missing intermediate groups

Usage

```r
H5Pset_create_intermediate_group(h5plist, create_groups = TRUE)
H5Pget_create_intermediate_group(h5plist)
```

Arguments

- **h5plist**: An object of class `H5IdComponent` representing a link creation property list.
- **create_groups**: A logical of length 1 specifying whether missing groups should be created when a new object is created. Default is `TRUE`.

Examples

```r
pid <- H5Pcreate("H5P_LINK_CREATE")

# by default intermediate groups are not created
H5Pget_create_intermediate_group( pid )

# Change the setting so groups will be created
H5Pget_create_intermediate_group( pid )

# tidy up
H5Pclose(pid)
```
**H5P_fill_time**

*Set the time when fill values are written to a dataset*

**Description**

Set the time when fill values are written to a dataset

**Usage**

```
H5Pset_fill_time(h5plist, fill_time = h5default("H5D_FILL_TIME"))
H5Pget_fill_time(h5plist)
```

**Arguments**

- **h5plist**: An object of class `H5IdComponent` representing a dataset creation property list.
- **fill_time**: When the fill values should be written. Possible options can be listed with `h5const("H5D_FILL_TIME")`.

---

**H5P_fill_value**

*Set the fill value for an HDF5 dataset*

**Description**

`H5Pset_fill_value` sets the fill value for a dataset in the dataset creation property list.

**Usage**

```
H5Pset_fill_value(h5plist, value)
```

**Arguments**

- **h5plist**: An object of class `H5IdComponent` representing a dataset creation property list.
- **value**: The default fill value of the dataset. A vector of length 1.

**See Also**

`H5P_fill_time,H5Pfill_value_defined`
**H5P_layout**

*Get and set the type of storage used to store the raw data for a dataset*

**Description**

Possible options for the `layout` argument are:

- `H5D_COMPACT`
- `H5D_CONTIGUOUS`
- `H5D_CHUNKED`
- `H5D_VIRTUAL`

**Usage**

```r
H5Pset_layout(h5plist, layout = h5default("H5D"))
H5Pget_layout(h5plist)
```

**Arguments**

- `h5plist` An object of class `H5IdComponent` representing a dataset creation property list.
- `layout` A character giving the name of a dataset layout type.

**Details**

The names of the layout types can also be obtained via `h5const("H5D")`.

---

**H5P_libver_bounds**

*Control the range of HDF5 library versions that will be compatible with a file.*

**Description**

Control the range of HDF5 library versions that will be compatible with a file.

**Usage**

```r
H5Pset_libver_bounds(
  h5plist,
  libver_low = "H5F_LIBVER_EARLIEST",
  libver_high = "H5F_LIBVER_LATEST"
)
H5Pget_libver_bounds(h5plist)
```
Arguments

- **h5plist**: `H5IdComponent` object representing a file access property list.
- **libver_low, libver_high**: Define the earliest and latest versions of the HDF5 library that will be used when writing object in the file.

Description

The H5R functions can be used for creating or working with references to specific objects and data regions in an HDF5 file.

Author(s)

Mike Smith

Examples

```r
library(rhdf5)

## first we'll create a file with a group named "foo" and a 1-dimensional dataset named "baa" inside that group.
file_name <- tempfile(fileext = ".h5")
h5createFile(file_name)
h5createGroup(file = file_name, group = "/foo")
h5write(1:100, file=file_name, name="/foo/baa")

fid <- H5Fopen(file_name)
ref_to_group <- H5Rcreate(fid, name="/foo")
ref_to_dataset <- H5Rcreate(fid, name="/foo/baa")
two.refs <- c(ref_to_group, ref_to_dataset)
two.refs

## the size of this dataspace is the number of object references we want to store
sid <- H5Screate_simple(2)
tid <- H5Tcopy(dtype_id = "H5T_STD_REF_OBJ")
did <- H5Dcreate(fid, name="object_refs", dtype_id = tid, h5space = sid)
H5Dwrite(did, two.refs)
H5Dclose(did)
H5Sclose(sid)
H5Fclose(fid)
```
H5Rcreate

Create a reference

Description

Creates a reference to an object or dataset selection inside an HDF5 file.

Usage

H5Rcreate(h5loc, name, ref_type = "H5R_OBJECT", h5space = NULL)

Arguments

h5loc An H5IdComponent object representing the location to be pointed to by the created reference.
name Character string giving the name of the object to be referenced, relative to the location given by h5loc.
ref_type The type of reference to create. Accepts either H5R_OBJECT or H5R_DATASET_REGION.
h5space An object of class H5IdComponent representing a dataspace with a selection set. This argument is only used if creating a reference to a dataset region, and will be ignored otherwise.

Value

An H5Ref object storing the reference.

H5Rdereference

Open a reference object.

Description

Given a reference and the file to which that reference applies, H5Rdereference() will open the reference object and return an identifier.

Usage

H5Rdereference(ref, h5loc)

Arguments

ref H5ref object containing the reference to be opened.
h5loc An H5IdComponent object representing the file containing the referenced object.
**Details**

If `ref` contains more than one reference, only the first reference will be used. It must be subset with `[]` if one of the other stored references should be opened.

**Value**

An object of class `H5IdComponent` representing the opened object referenced by `ref`. This should be closed with the appropriate function e.g. `H5Dclose()`, `H5Oclose()`, etc. when no longer needed.

---

**H5Ref-class**

An S4 class representing H5 references.

**Description**

A class representing one or more HDF5 references.

**Usage**

```
## S4 method for signature 'H5Ref'
show(object)

## S4 method for signature 'H5Ref'
length(x)

## S4 method for signature 'H5Ref'
c(x, ...)

## S4 method for signature 'H5Ref'
x[i]
```

**Arguments**

- `object`: Object of class `H5Ref`
- `x`: An `H5Ref` object.
- `...`: Additional `H5Ref` objects to be combined with `x`.
- `i`: Integer vector giving the indices of references to select.

**Details**

The length of the `val` slot is dependent on both the number and type of references stored in the object. `H5R_OBJECT` references are stored in 8 bytes, while `H5R_DATASET_REGION` references require 12 bytes. The length of `val` will then be a multiple of 8 or 12 respectively. This also means that references of different types cannot be combined in a single object.
Methods (by generic)

- `show(H5Ref)`: Print details of the object to screen.
- `length(H5Ref)`: Return the number of references stored in an H5Ref object.
- `c(H5Ref)`: Combine two or more H5Ref objects. Objects must all contain the same type of reference, either H5R_OBJECT or H5R_DATASET_REFERENCE.
- `[]`: Subset an H5Ref object.

Slots

- `val` raw vector containing the byte-level representation of each reference.
- `type` integer of length 1, which maps to either H5R_OBJECT or H5R_DATASET_REGION.

---

H5Rget_name

<table>
<thead>
<tr>
<th>Description</th>
<th>Return the name of the object that a reference points to</th>
</tr>
</thead>
</table>

Usage

`H5Rget_name(ref, h5loc)`

Arguments

- `ref` H5ref object containing the reference to be queried.
- `h5loc` An H5IdComponent object representing the file containing the referenced object.

Value

Character string of length 1 giving the name of the referenced object.

---

H5Rget_obj_type

<table>
<thead>
<tr>
<th>Description</th>
<th>Identify the type of object that a reference points to</th>
</tr>
</thead>
</table>

Usage

`H5Rget_obj_type(ref, h5loc)`
Arguments

<table>
<thead>
<tr>
<th>ref</th>
<th>H5Ref object containing the reference to be queried.</th>
</tr>
</thead>
<tbody>
<tr>
<td>h5loc</td>
<td>An H5IdComponent object representing the file containing the referenced object.</td>
</tr>
</tbody>
</table>

Value

Character string of length 1 identifying the object type. Valid return values are: "GROUP", "DATASET", and "NAMED_DATATYPE".

---

**H5Rget_region**

*Return selection for a reference to dataset region*

**Description**

Given a dataset region reference, this function will return the dataspace and selection required to read the data points indicated by the reference.

**Usage**

```c
H5Rget_region(ref, h5loc)
```

**Arguments**

<table>
<thead>
<tr>
<th>ref</th>
<th>An object of class H5Ref. This function is only valid for reference of type H5R_DATASET_REGION, and not H5R_OBJECT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>h5loc</td>
<td>An H5IdComponent object representing the file containing the referenced object.</td>
</tr>
</tbody>
</table>

**Value**

An object of class H5IdComponent representing the dataspace of the dataset that ref points to. The dataspace will have the selection set that matches the selection pointed to by ref. This should be closed using `H5Sclose()` when no longer required.

---

**H5Sclose**

*Close and release a dataspace*

**Description**

Close and release a dataspace

**Usage**

```c
H5Sclose(h5space)
```
**Arguments**

- **h5space**: Object of class `H5IdComponent` representing the dataspace to be closed.

**See Also**

- `H5Screate()`

---

**H5Scombine_hyperslab**  
*Perform operation between an existing selection and an another hyperslab definition.*

---

**Description**

Combines a hyperslab selection specified by `start`, `stride`, `count` and `block` arguments with the current selection for the dataspace represented by `h5space`.

**Usage**

```r
H5Scombine_hyperslab(
  h5space,
  op = h5default("H5S_SELECT"),
  start = NULL,
  stride = NULL,
  count = NULL,
  block = NULL
)
```

**Arguments**

- **h5space**: `H5IdComponent` object representing a dataspace.
- **op**: Character string defined the operation used to join the two dataspaces. See `h5const("H5S_SELECT")` for the list of available options.
- **start**, **stride**, **count**, **block**: Integer vectors, each with length equal to the rank of the dataspace. These parameters define the new hyperslab to select.

**Value**

An `H5IdComponent` object representing a new dataspace with the generated selection.

**See Also**

- `H5Scombine_select()`, `H5Sselect_hyperslab()`
Examples

```r
## create a 1 dimensional dataspace
sid_1 <- H5Screate_simple(dims = 20)

## select a single block of 5 points in sid_1
## this is equivalent to [11:16] in R syntax
H5Sselect_hyperslab(sid_1, start = 11, stride = 1,
                     block = 5, count = 1)#

## combine the existing selection with a new
## selection consisting of 2 blocks each of 1 point
## equivalent to [c(3,5)] in R syntax
sid_2 <- H5Scombine_hyperslab(sid_1, op = "H5S_SELECT_OR",
                              start = 3, stride = 2,
                              block = 1, count = 2)

## confirm we have selected 5 in our original dataspace
## and 7 points in the newly created dataspace
H5Sget_select_npoints(sid_1)
H5Sget_select_npoints(sid_2)

## tidy up
H5Sclose(sid_1)
H5Sclose(sid_2)
```

---

**H5Scombine_select** Combine two selections

**Description**

Combine two selections

**Usage**

```r
H5Scombine_select(h5space1, op = h5default("H5S_SELECT"), h5space2)
```

**Arguments**

- `h5space1`, `h5space2`  
  `H5IdComponent` objects representing a dataspace.

- `op`  
  Character string defining the operation used to join the two dataspaces. See `h5const("H5S_SELECT")` for the list of available options.

**Value**

Returns an `H5IdComponent` object representing a new dataspace. The new dataspace will have the same extent as `h5space1` with the hyperslab selection being the result of combining the selections of `h5space1` and `h5space2`. 
Create a copy of a dataspace

Description

H5Scopy creates an exact copy of a given dataspace.

Usage

H5Scopy(h5space)
**H5Screate**

Create a new dataspace of a specified type

**Description**

Create a new dataspace of a specified type

**Usage**

```r
H5Screate(type = h5default("H5S"), native = FALSE)
```

**Arguments**

- **type**
  
  The type of dataspace to create. See `h5const("H5S")` for possible types.

- **native**
  
  An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using `native = TRUE` increases HDF5 file portability between programming languages. A file written with `native = TRUE` should also be read with `native = TRUE`.

**Value**

Returns an object of class `H5IdComponent` representing a dataspace.

**See Also**

- `H5Screate_simple`
**H5Screate_simple**  
*Create a simple dataspace*

**Description**

Create a simple dataspace

**Usage**

```
H5Screate_simple(dims, maxdims, native = FALSE)
```

**Arguments**

- **dims**: An integer vector defining the initial dimensions of the dataspace. The length of `dims` determines the rank of the dataspace.
- **maxdims**: An integer vector with the same length length as `dims`. Specifies the upper limit on the size of the dataspace dimensions. Only needs to be specified if this is different from the values given to `dims`.
- **native**: An object of class `logical`. If `TRUE`, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using `native = TRUE` increases HDF5 file portability between programming languages. A file written with `native = TRUE` should also be read with `native = TRUE`.

**Value**

Returns an object of class `H5IdComponent` representing a dataspace.

**See Also**

- `H5Screate`

---

**H5Sget_select_npoints**  
*Find the number of elements in a dataspace selection*

**Description**

Find the number of elements in a dataspace selection

**Usage**

```
H5Sget_select_npoints(h5space)
```

**Arguments**

- **h5space**: `H5IdComponent` object representing a dataspace.
**H5Sget_simple_extent_dims**

*Find the size of a dataspace*

**Description**
Find the size of a dataspace

**Usage**
```c
H5Sget_simple_extent_dims(h5space)
```

**Arguments**
- `h5space`  
  H5IdComponent object representing a dataspace.

---

**H5Sis_simple**

*Determine whether a dataspace is a simple dataspace*

**Description**
In HDF5 a dataspace is considered "simple" if it represents a regular N-dimensional array of points. Currently (HDF 1.10.7) all dataspaces are simple. Support for complex dataspaces is planned for future HDF versions.

**Usage**
```c
H5Sis_simple(h5space)
```

**Arguments**
- `h5space`  
  H5IdComponent object representing a dataspace.

---

**H5Sselect_all**

*Set the selection region of a dataspace to include all elements*

**Description**
Set the selection region of a dataspace to include all elements

**Usage**
```c
H5Sselect_all(h5space)
```

**Arguments**
- `h5space`  
  H5IdComponent object representing a dataspace.
H5Sselect_hyperslab

Perform operation between an existing selection and an another hyperslab definition.

Description

Combines a hyperslab selection specified by start, stride, count and block arguments with the current selection for the dataspace represented by h5space.

Usage

H5Sselect_hyperslab(
  h5space,
  op = h5default("H5S_SELECT"),
  start = NULL,
  stride = NULL,
  count = NULL,
  block = NULL
)

Arguments

h5space       H5IdComponent object representing a dataspace.
op           Character string defined the operation used to join the two dataspaces. See h5const("H5S_SELECT") for the list of available options.
start, stride, count, block
            Integer vectors, each with length equal to the rank of the dataspace. These parameters define the new hyperslab to select.

Details

H5Sselect_hyperslab is similar to, but subtly different from, H5Scombine_hyperslab(). The former modifies the selection of the dataspace provided in the h5space argument, while the later returns a new dataspace with the combined selection.

Examples

## create a 1 dimensional dataspace
sid_1 <- H5Screate_simple(dims = 20)

## select a single block of 5 points in sid_1
## this is equivalent to [11:16] in R syntax
H5Sselect_hyperslab(sid_1, start = 11, stride = 1,
                     block = 5, count = 1)

## confirm we have selected 5 in our original dataspace
H5Sget_select_npoints(sid_1)
## H5Sselect_index

Select elements of a dataspace using R-style indexing

### Description

Combines a hyperslab selection specified by start, stride, count and block arguments with the current selection for the dataspace represented by h5space.

### Usage

H5Sselect_index(h5space, index)

### Arguments

- **h5space**: H5IdComponent object representing a dataspace.
- **index**: A list of integer indices. The length of the list corresponds to the number of dimensions of the HDF5 array. If a list element is NULL, all elements of the respective dimension are selected.

### Details

H5Sselect_hyperslab is similar to, but subtly different from, H5Scombine_hyperslab(). The former modifies the selection of the dataspace provided in the h5space argument, while the later returns a new dataspace with the combined selection.

### Examples

```r
## create a 1 dimensional dataspace
sid <- H5Screate_simple(c(10, 5, 3))

## Select elements that lie in the rows 1-3, columns 2-4, and the entire 3rd dimension
H5Sselect_index(sid, list(1:3, 2:4, NULL))

## We can check the number of selected points.
H5Sget_select_npoints(sid)
```

```c
H5Sselect_hyperslab(sid, op = "H5S_SELECT_OR",
    start = 3, stride = 2,
    block = 1, count = 2)
```
H5Sselect_valid

## This should be 27 (3 * 3 * 3)
H5Sget_select_npoints(sid)

## always close dataspaces after usage to free resources
H5Sclose(sid)

---

**H5Sselect_none**  
*Set the selection region of a dataspace to include no elements*

**Description**

Set the selection region of a dataspace to include no elements

**Usage**

H5Sselect_none(h5space)

**Arguments**

- **h5space**  
  H5IdComponent object representing a dataspace.

---

**H5Sselect_valid**  
*Check that a selection is valid*

**Description**

Check that a selection is valid

**Usage**

H5Sselect_valid(h5space)

**Arguments**

- **h5space**  
  H5IdComponent object representing a dataspace.
**H5Sset_extent_simple**  
*Set the size of a dataspace*

**Description**

Set the size of a dataspace

**Usage**

\[
\text{H5Sset_extent_simple}(h5\text{space}, \text{dims}, \text{maxdims})
\]

**Arguments**

- **h5space**: H5IdComponent object representing a dataspace.
- **dims**: Dimension of the dataspace. This argument is similar to the dim attribute of an array. When viewing the HDF5 dataset with an C-program (e.g. HDFView), the dimensions appear in inverted order, because the fastest changing dimension in R is the first one, and in C its the last one.
- **maxdims**: Maximum extension of the dimension of the dataset in the file. If not provided, it is set to \(\text{dims}\).

**H5Sunlimited**  
*Retrieve value for H5S\_UNLIMITED constant*

**Description**

The value for H5S\_UNLIMITED can be provided to the maxdims argument of H5Screate\_simple to indicate that the maximum size of the corresponding dimension is unlimited.

**Usage**

\[
\text{H5Sunlimited}()
\]

**See Also**

H5Screate\_simple
**H5Tcopy**  
*Copy an existing datatype*

Description

Copy an existing datatype

Usage

```python
H5Tcopy(dtype_id = h5default(type = "H5T"))
```

Arguments

dtype_id  
Datatype to copy. Can either be a character specifying a predefined HDF5 datatype (see h5const("H5T") for valid options) or the ID of an already created datatype.

**H5Tis_variable_str**  
*Determine whether a datatype is a variable length string*

Description

Determine whether a datatype is a variable length string

Usage

```python
H5Tis_variable_str(dtype_id)
```

Arguments

dtype_id  
ID of HDF5 datatype to query.
**H5T_cset**

*Retrieve or set the character set to be used in a string datatype.*

**Description**

Retrieve or set the character set to be used in a string datatype.

**Usage**

```python
H5Tset_cset(dtype_id, cset = "ASCII")

H5Tget_cset(dtype_id)
```

**Arguments**

- `dtype_id` : ID of HDF5 datatype to query or modify.
- `cset` : Encoding to use for string types. Valid options are 'ASCII' and 'UTF-8'.

---

**H5T_enum**

*Create or modify an HDF5 enum datatype*

**Description**

Create or modify an HDF5 enum datatype

**Usage**

```python
H5Tenum_create(dtype_id = "H5T_NATIVE_INT")

H5Tenum_insert(dtype_id, name, value)
```

**Arguments**

- `dtype_id` : ID of HDF5 datatype to work with. For H5Tenum_create, this is the identifier of the base datatype, and must be an integer e.g. H5T_NATIVE_INT. For H5Tenum_insert this will be a datatype identifier created by H5Tenum_create.
- `name` : The name of a the new enum member. This is analogous to a "level" in an R factor.
- `value` : The value of the new member. Must be compatible with the base datatype defined by `dtype_id`.

**Value**

- H5Tinsert_enum() returns an character representing the H5 identifier of the new datatype. *H5Tset_precision() is called for its side-effect of modifying the existing datatype. It will invisibly return TRUE if this is successful FALSE if not.*
Examples

tid <- H5Tenum_create(dtype_id = "H5T_NATIVE_UCHAR")
H5Tenum_insert(tid, name = "TRUE", value = 1L)
H5Tenum_insert(tid, name = "FALSE", value = 0L)

H5T_precision

Retrieve or set the precision of an HDF5 datatype

Description

Retrieve or set the precision of an HDF5 datatype

Usage

H5Tset_precision(dtype_id, precision)

H5Tget_precision(dtype_id)

Arguments

dtype_id ID of HDF5 datatype to set precision of.
precision The number of bytes of precision for the datatype.

Value

- H5Tget_precision() returns an integer giving the number of significant bits used by the given datatype.
- H5Tset_precision() is call for its side-effect of modifying the precision of a datatype. It will invisibly return TRUE if this is successful and will stop with an error if the operation fails.

H5T_size

Retrieve or set the type of padding used by string datatype

Description

Retrieve or set the type of padding used by string datatype

Usage

H5Tset_size(dtype_id = h5default(type = "H5T"), size)

H5Tget_size(dtype_id)

Arguments

dtype_id ID of HDF5 datatype to query or modify.
size The new datatype size in bytes.
**H5T_strpad**

*Retrieve or set the type of padding used by string datatype*

---

**Description**

Retrieve or set the type of padding used by string datatype

**Usage**

```r
H5Tset_strpad(dtype_id, strpad = "NULLPAD")
H5Tget_strpad(dtype_id)
```

**Arguments**

- `dtype_id`: ID of HDF5 datatype to query or modify.
- `strpad`: Character vector of length 1 specifying the type of padding to use. Valid options are `NULLTERM`, `NULLPAD` and `SPACEPAD`.

---

**h5version**

*Print the rhdf5 and libhdf5 version numbers*

---

**Description**

Returns the version number of the Bioconductor package rhdf5 and the C-library libhdf5.

**Usage**

```r
h5version()
```

**Value**

A list of major, minor and release number.

**Author(s)**

Bernd Fischer, Mike L. Smith

**Examples**

```r
h5version()
```
**h5_createAttribute**

---

**H5Zfilter_avail**  
*Determine whether a filter is available on this system*

---

**Description**

Determine whether a filter is available on this system

**Usage**

```
H5Zfilter_avail(filter_id)
```

**Arguments**

- `filter_id`  
  Integer representing the ID of the filter to be checked.

---

**h5_createAttribute**  
*Create HDF5 attribute*

---

**Description**

R function to create an HDF5 attribute and defining its dimensionality.

**Usage**

```
h5createAttribute(
  obj,  
  attr,  
  dims,  
  maxdims = dims,  
  file,  
  storage.mode = "double",  
  H5type = NULL,  
  size = NULL,  
  encoding = NULL,  
  cset = NULL,  
  native = FALSE
)
```

**Arguments**

- `obj`  
  The name (character) of the object the attribute will be attached to. For advanced programmers it is possible to provide an object of class `H5IdComponent` representing a H5 object identifier (file, group, dataset). See `H5fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()`, `H5Dcreate()`, `H5Dopen()` to create an object of this kind.
attr   Name of the attribute to be created.

dims   The dimensions of the attribute as a numeric vector. If NULL, a scalar dataspace will be created instead.

maxdims   The maximum extension of the attribute.

file   The filename (character) of the file in which the dataset will be located. For advanced programmers it is possible to provide an object of class H5IdComponent representing an H5 location identifier. See H5Fcreate(), H5Fopen(), H5Gcreate(), H5Gopen() to create an object of this kind. The file argument is not required, if the argument obj is of type H5IdComponent.

storage.mode   The storage mode of the data to be written. Can be obtained by storage.mode(mydata).

H5type   Advanced programmers can specify the datatype of the dataset within the file. See h5const("H5T") for a list of available datatypes. If H5type is specified the argument storage.mode is ignored. It is recommended to use storage.mode

size   The maximum string length when storage.mode='character’. If this is specified, HDF5 stores each string of attr as fixed length character arrays. Together with compression, this should be efficient.

If this argument is set to NULL, HDF5 will instead store variable-length strings.

encoding   The encoding of the string data type i.e. when storage.mode = 'character'. Valid options are "ASCII" and "UTF-8".

cset   Deprecated in favour of the encoding argument.

native   An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE

Details

Creates a new attribute and attaches it to an existing HDF5 object. The function will fail, if the file doesn’t exist or if there exists already another attribute with the same name for this object.

You can use h5writeAttribute() immediately. It will create the attribute for you.

Value

Returns TRUE is attribute was created successfully and FALSE otherwise.

Author(s)

Bernd Fischer

References

https://portal.hdfgroup.org/display/HDF5

See Also

h5createFile(), h5createGroup(), h5createDataset(), h5read(), h5write(), rhdf5
Examples

```r
h5File <- tempfile(pattern = "ex_createAttribute.h5")
h5createFile(h5File)
h5write(1:1, h5File, "A")
fid <- H5Fopen(h5File)
did <- H5Dopen(fid, "A")
h5createAttribute(did, "time", c(1,10))
H5Dclose(did)
H5Fclose(fid)
```

---

**h5_createDataset**

*Create HDF5 dataset*

**Description**

R function to create an HDF5 dataset and defining its dimensionality and compression behaviour.

**Usage**

```r
h5createDataset(
  file,
  dataset,
  dims,
  maxdims = dims,
  storage.mode = "double",
  H5type = NULL,
  size = NULL,
  encoding = NULL,
  chunk = dims,
  fillValue,
  level = 6,
  filter = "gzip",
  shuffle = TRUE,
  native = FALSE
)
```

**Arguments**

- `file` The filename (character) of the file in which the dataset will be located. For advanced programmers it is possible to provide an object of class `H5IdComponent` representing a H5 location identifier (file or group). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()` to create an object of this kind.

- `dataset` Name of the dataset to be created. The name can contain group names, e.g. 'group/dataset', but the function will fail, if the group does not yet exist.
**h5_createDataset**

- **dims**: The dimensions of the array as they will appear in the file. Note, the dimensions will appear in inverted order when viewing the file with a C-programm (e.g. HDFView), because the fastest changing dimension in R is the first one, whereas the fastest changing dimension in C is the last one.

- **maxdims**: The maximum extension of the array. Use H5SUnlimited() to indicate an extensible dimension.

- **storage.mode**: The storage mode of the data to be written. Can be obtained by storage.mode(mydata).

- **H5type**: Advanced programmers can specify the datatype of the dataset within the file. See h5const("H5T") for a list of available datatypes. If H5type is specified the argument storage.mode is ignored. It is recommended to use storage.mode.

- **size**: For storage.mode="character" the maximum string length to use. The default value of NULL will result in using variable length strings. See the details for more information on this option.

- **encoding**: The encoding of the string data type. Valid options are "ASCII" or "UTF-8".

- **chunk**: The chunk size used to store the dataset. It is an integer vector of the same length as dims. This argument is usually set together with a compression property (argument level).

- **fillValue**: Standard value for filling the dataset. The storage.mode of value has to be convertible to the dataset type by HDF5.

- **level**: The compression level used. An integer value between 0 (no compression) and 9 (highest and slowest compression).

- **filter**: Character defining which compression filter should be applied to the chunks of the dataset. See the Details section for more information on the options that can be provided here.

- **shuffle**: Logical defining whether the byte-shuffle algorithm should be applied to data prior to compression.

- **native**: An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE.

**Details**

Creates a new dataset in an existing HDF5 file. The function will fail if the file doesn’t exist or if there exists already another dataset with the same name within the specified file.

The size argument is only used when storage.mode = "character". When storing strings HDF5 can use either a fixed or variable length datatype. Setting size to a positive integer will use fixed length strings where size defines the length. rhdf5 writes null padded strings by default and so to avoid data loss the value provided here should be the length of the longest string. Setting size = NULL will use variable length strings. The choice is probably dependent on the nature of the strings you’re writing. The principle difference is that a dataset of variable length strings will not be compressed by HDF5 but each individual string only uses the space it requires, whereas in a fixed length dataset each string is of length uses size, but the whole dataset can be compressed. This explored more in the examples below.
The filter argument can take several options matching to compression filters distributed in either with the HDF5 library in `Rhdf5lib` or via the `rhdf5filters` package. The plugins available and the corresponding values for selecting them are shown below:

**zlib**: Ubiquitous deflate compression algorithm used in GZIP or ZIP files. All three options below achieve the same result.
- "GZIP"
- "ZLIB"
- "DEFLATE"

**szip**: Compression algorithm maintained by the HDF5 group.
- "SZIP"

**bzip2**
- "BZIP2"

**BLOSC meta compressor**: As a meta-compressor BLOSC wraps several different compression algorithms. Each of these can be selected:
- "BLOSC_BLOSCLZ"
- "BLOSC_LZ4"
- "BLOSC_LZ4HC"
- "BLOSC_SNAPPY"
- "BLOSC_ZLIB"
- "BLOSC_ZSTD"

**lzf**
- "LZF"

**Disable**: It is possible to write chunks without any compression applied.
- "NONE"

**Value**
Returns (invisibly) TRUE if dataset was created successfully and FALSE otherwise.

**Author(s)**
Bernd Fischer, Mike L. Smith

**See Also**
`h5createFile()`, `h5createGroup()`, `h5read()`, `h5write()`

**Examples**
```r
h5File <- tempfile(pattern = "_ex_createDataset.h5")
h5createFile(h5File)

# create dataset with compression
h5createDataset(h5File, "A", c(5,8), storage.mode = "integer", chunk=c(5,1), level=6)

# create dataset without compression
h5createDataset(h5File, "B", c(5,8), storage.mode = "integer")

# create dataset with bzip2 compression
h5createDataset(h5File, "D", c(5,8), storage.mode = "integer",
               chunk=c(5,1), filter = "BZIP2", level=6)
```
# create a dataset of strings & define size based on longest string
ex_strings <- c('long', 'longer', 'longest')

h5createDataset(h5File, "E",
    storage.mode = "character", chunk = 3, level = 6,
    dims = length(ex_strings), size = max(nchar(ex_strings)))

# write data to dataset
h5write(matrix(1:40, nr=5, nc=8), file=h5File, name="A")
# write second column
h5write(matrix(1:5, nr=5, nc=1), file=h5File, name="B", index=list(NULL, 2))
# write character vector
h5write(ex_strings, file = h5File, name = "E")

h5dump( h5File )

## Investigating fixed vs variable length string datasets

## create 1000 random strings with length between 50 and 100 characters
words <- ceiling(runif(n = 1000, min = 50, max = 100)) |> 
vapply(FUN = \(x\) {
    paste(sample(letters, size = x, replace = TRUE), collapse = "")
},
FUN.VALUE = character(1))

## create two HDF5 files
f1 <- tempfile()
f2 <- tempfile()
h5createFile(f1)
h5createFile(f2)

## create two string datasets
## the first is variable length strings, the second fixed at the length of our longest word
h5createDataset(f1, "strings", dims = length(words), storage.mode = "character",
    size = NULL, chunk = 25)
h5createDataset(f2, "strings", dims = length(words), storage.mode = "character",
    size = max(nchar(words)), chunk = 25)

## Write the data
h5write(words, f1, "strings")
h5write(words, f2, "strings")

## Check file sizes.
## In this example the fixed length string dataset is normally much smaller
file.size(f1)
file.size(f2)
**Description**

R function to create an empty HDF5 file.

**Usage**

h5createFile(file)

**Arguments**

file    The filename of the HDF5 file.

**Details**

Creates an empty HDF5 file.

**Value**

Returns (invisibly) TRUE if file was created successfully and FALSE otherwise.

**Author(s)**

Bernd Fischer

**See Also**

h5createGroup(), h5createDataset(), h5read(), h5write(), rhdf5

**Examples**

h5File <- tempfile(pattern = "ex_createFile.h5")

h5createFile(h5File)

# create groups
h5createGroup(h5File,"foo")
h5createGroup(h5File,"foo/foobaa")

h5ls(h5File)
Description

Creates a group within an HDF5 file.

Usage

h5createGroup(file, group)

Arguments

file The filename (character) of the file in which the dataset will be located. For advanced programmers it is possible to provide an object of class H5IdComponent representing a H5 location identifier (file or group). See H5Fcreate(), H5Fopen(), H5Gcreate(), H5Gopen() to create an object of this kind.

group The name of the new group. The name can contain a hierarchy of groupnames, e.g. "/group1/group2/newgroup", but the function will fail if the top level groups do not exist.

Details

Creates a new group within an HDF5 file.

Value

Returns TRUE is group was created successfully and FALSE otherwise.

Author(s)

Bernd Fischer

See Also

h5createFile(), h5createDataset(), h5read(), h5write()

Examples

h5File <- tempfile(pattern = "ex_createGroup.h5")
h5createFile(h5File)

# create groups
h5createGroup(h5File, "foo")
h5createGroup(h5File, "foo/foobaa")

h5ls(h5File)
h5_delete  
Delete objects within a HDF5 file

Description
Deletes the specified group or dataset from within an HDF5 file.

Usage
h5delete(file, name)

Arguments
file  The filename (character) of the file in which the object is located.
name  For h5delete the name of the object to be deleted. For h5deleteAttribute the name of the object to which the attribute belongs.

Author(s)
Mike Smith

h5_deleteAttribute  
Delete attribute

Description
Deletes an attribute associated with a group or dataset within an HDF5 file.

Usage
h5deleteAttribute(file, name, attribute)

Arguments
file  The filename (character) of the file in which the object is located.
name  The name of the object to which the attribute belongs.
attribute  Name of the attribute to be deleted.

Author(s)
Mike Smith
**h5_dump**

Dump the content of an HDF5 file.

### Description

Dump the content of an HDF5 file.

### Usage

```r
h5dump(
  file,
  recursive = TRUE,
  load = TRUE,
  all = FALSE,
  index_type = h5default("H5_INDEX"),
  order = h5default("H5_ITER"),
  s3 = FALSE,
  s3credentials = NULL,
  ...
)
```

### Arguments

- **file**: The filename (character) of the file in which the dataset will be located. You can also provide an object of class `H5IdComponent` representing a H5 location identifier (file or group). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()` to create an object of this kind.

- **recursive**: If TRUE, the content of the whole group hierarchy is listed. If FALSE, only the content of the main group is shown. If a positive integer is provided this indicates the maximum level of the hierarchy that is shown.

- **load**: If TRUE the datasets are read in, not only the header information. Note, that this can cause memory problems for very large files. In this case choose load=FALSE and load the datasets successively.

- **all**: If TRUE, a longer list of information on each entry is provided.

- **index_type**: See `h5const("H5_INDEX")` for possible arguments.

- **order**: See `h5const("H5_ITER")` for possible arguments.

- **s3**: Logical value indicating whether the file argument should be treated as a URL to an Amazon S3 bucket, rather than a local file path.

- **s3credentials**: A list of length three, providing the credentials for accessing files in a private Amazon S3 bucket.

- **...**: Arguments passed to `h5read()`.

- **native**: An object of class `logical`. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE.
Value

Returns a hierarchical list structure representing the HDF5 group hierarchy. It either returns the datasets within the list structure (load=TRUE) or it returns a data.frame for each dataset with the dataset header information (load=FALSE).

Author(s)

Bernd Fischer, Mike L. Smith

See Also

h5ls()

Examples

```r
h5File <- tempfile(pattern = "ex_dump.h5")
h5createFile(h5File)

# create groups
h5createGroup(h5File, "foo")
h5createGroup(h5File, "foo/foobaa")

# write a matrix
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
attr(B, "scale") <- "liter"
h5write(B, h5File, "foo/B")

# list content of hdf5 file
h5dump(h5File)

# list content of an hdf5 file in a public S3 bucket
h5dump(file = "https://rhdf5-public.s3.eu-central-1.amazonaws.com/h5ex_t_array.h5", s3 = TRUE)
```

h5_errorHandling

Set how HDF5 error messages are displayed

Description

Sets the options for handling HDF5 error messages in the R sessions.

Usage

h5errorHandling(type = "normal")
h5_FileLocking

Arguments

| type | 'normal' (default) shows a one line error message in R. 'verbose' shows the whole HDF5 error message. 'suppress' suppresses the HDF5 error messages completely. |

Value

Returns 0 if options are set successfully.

Author(s)

Bernd Fischer

See Also

rhdf5

Examples

h5errorHandling("normal")

h5_FileLocking Test and set file locking for HDF5

Description

HDF5 1.10 uses file locking by default. On some file systems this is not available, and the HDF5 library will throw an error if the user attempts to create or access a file located on such a file system. These functions help identify if file locking is available without throwing an error, and allow the locking to be disabled for the duration of the R session if needed.

Usage

h5testFileLocking(location)

h5disableFileLocking()

h5enableFileLocking()

Arguments

| location | The name of a directory or file to test. If an existing directory is provided a temporary file will be created in this folder. If non-existant location is provided a file with the name will be created, tested for file locking, and then removed. Providing an existing file will result in an error. |
h5_read

Reads and write object in HDF5 files

Description

Reads objects in HDF5 files. This function can be used to read either full arrays/vectors or subarrays (hyperslabs) from an existing dataset.
Usage

h5read(
  file,
  name,
  index = NULL,
  start = NULL,
  stride = NULL,
  block = NULL,
  count = NULL,
  compoundAsDataFrame = TRUE,
  callGeneric = TRUE,
  read.attributes = FALSE,
  drop = FALSE,
  ...
)

Arguments

file The filename (character) of the file in which the dataset is be located. It is possible to provide an object of class H5IdComponent representing a H5 location identifier (file or group). See H5Fcreate, H5Fopen, H5Gcreate, H5Gopen to create an object of this kind.

name The name of the dataset in the HDF5 file.

index List of indices for subsetting. The length of the list has to agree with the dimensional extension of the HDF5 array. Each list element is an integer vector of indices. A list element equal to NULL choses all indices in this dimension. Counting is R-style 1-based.

start The start coordinate of a hyperslab (similar to subsetting in R). Counting is R-style 1-based. This argument is ignored, if index is not NULL.

stride The stride of the hypercube. Read the introduction http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html before using this argument. R behaves like Fortran in this example. This argument is ignored, if index is not NULL.

block The block size of the hyperslab. Read the introduction http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html before using this argument. R behaves like Fortran in this example. This argument is ignored, if index is not NULL.

count The number of blocks to be read. This argument is ignored, if index is not NULL.

compoundAsDataFrame If true, a compound datatype will coerced to a data.frame. This is not possible, if the dataset is multi-dimensional. Otherwise the compound datatype will be returned as a list. Nested compound data types will be returned as a nested list.
callGeneric
If TRUE a generic function h5read.classname will be called if it exists depending on the dataset's class attribute within the HDF5 file. This function can be used to convert the standard output of h5read depending on the class attribute. Note that h5read is not a S3 generic function. Dispatching is done based on the HDF5 attribute after the standard h5read function.

read.attributes
(logical) If TRUE, the HDF5 attributes are read and attached to the respective R object.

drop
(logical) If TRUE, the HDF5 object is read as a vector with NULL dim attributes.

... Further arguments passed to H5Dread.

native
An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE

s3
Logical value indicating whether the file argument should be treated as a URL to an Amazon S3 bucket, rather than a local file path.

s3credentials
A list of length three, providing the credentials for accessing files in a private Amazon S3 bucket.

Details
Read an R object from an HDF5 file. If none of the arguments start, stride, block, count are specified, the dataset has the same dimension in the HDF5 file and in memory. If the dataset already exists in the HDF5 file, one can read subarrays, so called hyperslabs from the HDF5 file. The arguments start, stride, block, count define the subset of the dataset in the HDF5 file that is to be read/written. See these introductions to hyperslabs: https://support.hdfgroup.org/HDF5/Tutor/selectsimple.html, https://support.hdfgroup.org/HDF5/Tutor/select.html and http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html. Please note that in R the first dimension is the fastest changing dimension.

When viewing the HDF5 datasets with any C-program (e.g. HDFView), the order of dimensions is inverted. In the R interface counting starts with 1, whereas in the C-programs (e.g. HDFView) counting starts with 0.

Value
h5read returns an array with the data read.

Author(s)
Bernd Fischer, Mike Smith

See Also
h5ls
Examples

```r
h5File <- tempfile(pattern = "ex_hdf5file.h5")
h5createFile(h5File)

# write a matrix
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
h5write(B, h5File, "B")

# read a matrix
E = h5read(h5File,"B")

# write and read submatrix
h5createDataset(h5File, "S", c(5,8), storage.mode = "integer", chunk=c(5,1), level=7)
h5write(matrix(1:5,nr=5,nc=1), file=h5File, name="S", index=list(NULL,1))
h5read(h5File, "S")
h5read(h5File, "S", index=list(NULL,2:3))

# Read a subset of an hdf5 file in a public S3 bucket
h5read("https://rhdf5-public.s3.eu-central-1.amazonaws.com/rhdf5ex_t_float_3d.h5",
       s3 = TRUE, name = "a1", index = list(NULL, 3, NULL))
```

---

**h5_readAttributes**  
*Read all attributes from a given location in an HDF5 file*

**Description**

Read all attributes from a given location in an HDF5 file

**Usage**

```r
h5readAttributes(file, name, native = FALSE, ...)
```

**Arguments**

- `file`: Character vector of length 1, giving the path to the HDF5 file.
- `name`: Path within the HDF5 file to the object whose attributes should be read.
- `native`: An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation.
- `...`: Further arguments passed to `H5Aread`.

**Value**

A named list of the same length as the number of attributes attached to the specific object. The names of the list entries correspond to the attribute names. If no attributes are found an empty list is returned.
**h5_save**

_Saves a one or more objects to an HDF5 file._

### Description

Saves a number of R objects to an HDF5 file.

### Usage

`h5save(..., file, name = NULL, createnewfile = TRUE, native = FALSE)`

### Arguments

- `...` The objects to be saved.
- `file` The filename (character) of the file in which the dataset will be located. It is also possible to provide an object of class `H5IdComponent` representing a H5 location identifier (file or group). See `H5Fcreate()`, `H5Fopen()`, `H5Gcreate()`, `H5Gopen()` to create an object of this kind.
- `name` A character vector of names for the datasets. The length of the name vector should match the number of objects.
- `createnewfile` If `TRUE`, a new file will be created if necessary.
- `native` An object of class `logical`. If `TRUE`, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using `native = TRUE` increases HDF5 file portability between programming languages. A file written with `native = TRUE` should also be read with `native = TRUE`.

### Details

The objects will be saved to the HDF5 file. If the file does not exist, it will be created. The data can be read again by either `h5dump()` or individually for each dataset by `h5read()`.

### Value

Nothing returned.

### Author(s)

Bernd Fischer

### See Also

`h5ls()`, `h5write()`
Examples

```r
A = 1:7; B = 1:18; D = seq(0,1,by=0.1)

h5File <- tempfile(pattern = "ex_save.h5")
h5save(A, B, D, file = h5File)
h5dump(h5File)
```

---

### Description

Set a new dataset extension to an existing dataset in an HDF5 file

### Usage

```r
h5set_extent(file, dataset, dims, native = FALSE)
```

### Arguments

- **file**: The filename (character) of the file in which the dataset will be located. For advanced programmers it is possible to provide an object of class `H5IdComponent` representing a H5 location identifier (file or group). See `H5Fcreate`, `H5Fopen`, `H5Gcreate`, `H5Gopen` to create an object of this kind.
- **dataset**: The name of the dataset in the HDF5 file, or an object of class `H5IdComponent` representing a H5 dataset identifier. See `H5Dcreate`, or `H5Dopen` to create an object of this kind.
- **dims**: The dimensions of the array as they will appear in the file. Note, the dimensions will appear in inverted order when viewing the file with a C program (e.g. HDFView), because the fastest changing dimension in R is the first one, whereas the fastest changing dimension in C is the last one.
- **native**: An object of class logical. If `TRUE`, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using `native = TRUE` increases HDF5 file portability between programming languages. A file written with `native = TRUE` should also be read with `native = TRUE`.

### Value

Returns `TRUE` if the dimension of the dataset was changed successfully and `FALSE` otherwise.

### Author(s)

Bernd Fischer, Mike Smith
Examples

tmpfile <- tempfile()
h5createFile(file=tmpfile)
h5createDataset(tmpfile, "A", c(10,12), c(20,24))
h5ls(tmpfile, all=TRUE)[c("dim", "maxdim")]
h5set_extent(tmpfile, "A", c(20,24))
h5ls(tmpfile, all=TRUE)[c("dim", "maxdim")]

h5_write

Write object to an HDF5 file.

Description

Writes an R object to an HDF5 file. This function can be used to write either full arrays/vectors or subarrays (hyperslabs) within an existing dataset.

Usage

h5write(obj, file, name, ...)

## Default S3 method:

h5write(
  obj,
  file,
  name,
  createnewfile = TRUE,
  write.attributes = FALSE,
  ...,
  native = FALSE
)

h5writeDataset(obj, h5loc, name, ...)

## S3 method for class 'data.frame'

h5writeDataset(obj, h5loc, name, level = 6, chunk, DataFrameAsCompound = TRUE)

## S3 method for class 'array'

h5writeDataset(
  obj,
  h5loc,
  name,
  index = NULL,
  start = NULL,
  stride = NULL,
  block = NULL,
  count = NULL,
Arguments

obj The R object to be written.

file The filename (character) of the file in which the dataset will be located. For advanced programmers it is possible to provide an object of class H5IdComponent representing a H5 location identifier (file or group). See H5Fcreate, H5Fopen, H5Gcreate, H5Gopen to create an object of this kind.

name The name of the dataset in the HDF5 file.

... Further arguments passed to H5Dwrite.

createnewfile If TRUE, a new file will be created if necessary.

write.attributes (logical) If TRUE, all R-attributes attached to the object obj are written to the HDF5 file.

native An object of class logical. If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using native = TRUE increases HDF5 file portability between programming languages. A file written with native = TRUE should also be read with native = TRUE.

h5loc An object of class H5IdComponent representing a H5 location identifier (file or group). See H5Fcreate, H5Fopen, H5Gcreate, H5Gopen to create an object of this kind.

level The compression level. An integer value between 0 (no compression) and 9 (highest and slowest compression). Only used, if the dataset does not yet exist. See h5createDataset() to create an dataset.

chunk Specifies the number of items to be include in an HDF5 chunk. If left unspecified the defaults is the smaller of: the total number of elements or the number of elements that fit within 4GB of memory. If DataFrameAsCompound=FALSE each row of the data.frame can be consider an "element".

DataFrameAsCompound If true, a data.frame will be saved as a compound data type. Otherwise it is saved like a list. The advantage of saving a data.frame as a compound data type is that it can be read as a table from python or with a struct-type from C. The disadvantage is that the data has to be rearranged on disk and thus can slow down I/O. If fast reading is required, DataFrameAsCompound=FALSE is recommended.

index List of indices for subsetting. The length of the list has to agree with the dimensional extension of the HDF5 array. Each list element is an integer vector of indices. A list element equal to NULL chooses all indices in this dimension. Counting is R-style 1-based.

start The start coordinate of a hyperslab (similar to subsetting in R). Counting is R-style 1-based. This argument is ignored, if index is not NULL.
h5_write

stride
The stride of the hypercube. Read the introduction http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html before using this argument. R behaves like Fortran in this example. This argument is ignored, if index is not NULL.

block
The block size of the hyperslab. Read the introduction http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html before using this argument. R behaves like Fortran in this example. This argument is ignored, if index is not NULL.

count
The number of blocks to be written. This argument is ignored, if index is not NULL.

size
The length of the fixed-width string data type, when obj is a character vector. If NULL, this is set to the length of the largest string.

variableLengthString
Whether character vectors should be written as variable-length strings into the attributes. If TRUE, size is ignored.

encoding
The encoding of the string data type. Valid options are "ASCII" or "UTF-8".

Details
Writes an R object to an HDF5 file. If none of the arguments start, stride, block, count is specified, the dataset has the same dimension in the HDF5 file and in memory. If the dataset already exists in the HDF5 file, one can write subarrays, (so called hyperslabs) to the HDF5 file. The arguments start, stride, block, count define the subset of the dataset in the HDF5 file that is to be written to. See these introductions to hyperslabs: https://support.hdfgroup.org/HDF5/Tutor/selectsimple.html, https://support.hdfgroup.org/HDF5/Tutor/select.html and http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html. Please note that in R the first dimension is the fastest changing dimension.

When viewing the HDF5 datasets with any C-program (e.g. HDFView), the order of dimensions is inverted. In the R interface counting starts with 1, whereas in the C-programs (e.g. HDFView) counting starts with 0.

Value
h5write returns 0 if successful.

Author(s)
Bernd Fischer, Mike Smith

References
https://portal.hdfgroup.org/display/HDF5

See Also
h5ls, h5createFile, h5createDataset, rhdf5
Examples

```r
h5File <- tempfile(fileext = ".h5")
h5createFile( h5File )

# write a matrix
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
attr(B, "scale") <- "liter"
h5write(B, h5File,"B")

# write a submatrix
h5createDataset(h5File, "S", c(5,8), storage.mode = "integer", chunk=c(5,1), level=7)
h5write(matrix(1:5,nr=5,nc=1), file=h5File, name="S", index=list(NULL,1))
```

---

### h5_writeAttribute

**Write an R object as an HDF5 attribute**

**Description**

Write an R object as an HDF5 attribute

**Usage**

```r
h5writeAttribute(  
  attr,  
  h5obj,  
  name,  
  encoding = NULL,  
  cset = NULL,  
  variableLengthString = FALSE,  
  asScalar = FALSE  
)
```

```r
## S3 method for class 'array'
h5writeAttribute(  
  attr,  
  h5obj,  
  name,  
  encoding = NULL,  
  cset = NULL,  
  variableLengthString = FALSE,  
  asScalar = FALSE  
)
```

**Arguments**

- `attr` The R object to be written as an HDF5 attribute.
An object of class `H5IdComponent` representing a H5 object identifier (file, group, or dataset). See `H5Fcreate`, `H5Fopen`, `H5Gcreate`, `H5Gopen`, `H5Dcreate`, or `H5Dopen` to create an object of this kind.

The name of the attribute to be written.

The encoding of the string data type. Valid options are "ASCII" and "UTF-8".

Deprecated in favour of the `encoding` argument.

Whether character vectors should be written as variable-length strings into the attributes.

Whether length-1 `attr` should be written into a scalar dataspace.

The rhdf5 package provides two categories of functions:

- **h5 functions** are high-level R functions that provide a convenient way of accessing HDF5 files
- **H5 functions** mirror much of the the HDF5 C API
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