

# Package ‘rhdf5’

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**Type** Package

**Title** R Interface to HDF5

**Version** 2.28.0

**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.

**License** Artistic-2.0

**URL** <https://github.com/grimbough/rhdf5>

**BugReports** <https://github.com/grimbough/rhdf5/issues>

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---

h5closeAll

*Close all open HDF5 handles*


---

**Description**

Occasionally references to HDF5 files, groups, datasets etc can be created and not closed correctly. This function identifies all open handles and closes them. It replaces the functionality previously supplied by [H5close](#).

**Usage**

```
h5closeAll()
```

**Author(s)**

Mike Smith

**Examples**

```
## create an empty file and then re-open it
h5createFile("ex_h5closeAll.h5")
H5Fopen("ex_h5closeAll.h5")

## list all open identifiers
h5listIdentifier()

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

---

h5const

*HDF5 library constants.*

---

**Description**

Access to HDF5 constants.

**Usage**

```
h5const      (type = "")
h5default    (type = "")
h5constType ()
```

**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

## References

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

## See Also

[rhdf5](#)

## Examples

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

---

h5createAttribute	<i>Create HDF5 attribute</i>
-------------------	------------------------------

---

## 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,
                  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 <a href="#">H5IdComponent</a> representing a H5 object identifier (file, group, dataset). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> , <a href="#">H5Dcreate</a> , <a href="#">H5Dopen</a> to create an object of this kind.
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 <a href="#">H5IdComponent</a> representig an H5 location identifier. See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> to create an object of this kind. The file argument is not required, if the argument obj is of type <a href="#">H5IdComponent</a> .
attr	Name of the attribute to be created.
dims	The dimension of the attribute.
maxdims	The maximum extension of the attribute.
storage.mode	The storage mode of the data to be written. Can be obtained by <code>storage.mode(mydata)</code> .
H5type	Advanced programmers can specify the datatype of the dataset within the file. See <code>h5const("H5T")</code> 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 has to be specified. HDF5 then stores the string as fixed length character vectors. Together with compression, this should be efficient.
native	An object of class <code>logical</code> . 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

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

---

h5createDataset

*Create HDF5 dataset*

---

## Description

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

## Usage

```
h5createDataset (file, dataset,
  dims, maxdims = dims,
  storage.mode = "double", H5type = NULL,
  size = NULL, chunk = dims, level = 6,
  fillValue, showWarnings, 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 <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> 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.
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 <a href="#">H5Sunlimited()</a> to indicate an extensible dimension.
storage.mode	The storage mode of the data to be written. Can be obtained by <code>storage.mode(mydata)</code> .
H5type	Advanced programmers can specify the datatype of the dataset within the file. See <code>h5const("H5T")</code> for a list of available datatypes. If H5type is specified the argument <code>storage.mode</code> is ignored. It is recommended to use <code>storage.mode</code>
size	For <code>storage.mode='character'</code> the maximum string length has to be specified. Note that HDF5 automatically adds a null terminator to strings, thus the value provided here should be the length of the longest string plus one. HDF5 then stores the string as fixed length character vectors. Together with compression, this should be efficient.
chunk	The chunk size used to store the dataset. It is an integer vector of the same length as <code>dims</code> . This argument is usually set together with a compression property (argument <code>level</code> ).
level	The compression level used. An integer value between 0 (no compression) and 9 (highest and slowest compression).
fillValue	Standard value for filling the dataset. The storage.mode of value has to be convertible to the dataset type by HDF5.
showWarnings	Deprecated. Use <a href="#">suppressMessages</a> and <a href="#">suppressWarnings</a> to limit messages printed to screen.
native	An object of class <code>logical</code> . If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .

**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.

**Value**

Returns TRUE is dataset was created successfully and FALSE otherwise.

**Author(s)**

Bernd Fischer

## References

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

## See Also

[h5createFile](#), [h5createGroup](#), [h5read](#), [h5write](#), [rhdf5](#)

## Examples

```
h5createFile("ex_createDataset.h5")

# create dataset with compression
h5createDataset("ex_createDataset.h5", "A", c(5,8), storage.mode = "integer", chunk=c(5,1), level=7)

# create dataset without compression
h5createDataset("ex_createDataset.h5", "B", c(5,8), storage.mode = "integer")
h5createDataset("ex_createDataset.h5", "C", c(5,8), storage.mode = "double")

# create a dataset of strings & define size to include null terminator
ex_strings <- c('long', 'longer', 'longest')
h5createDataset("ex_createDataset.h5", "D",
  storage.mode = "character", chunk = 3, level = 6,
  dims = length(ex_strings), size = max(nchar(ex_strings)) + 1)

# write data to dataset
h5write(matrix(1:40,nr=5,nc=8), file="ex_createDataset.h5", name="A")
# write second column
h5write(matrix(1:5,nr=5,nc=1), file="ex_createDataset.h5", name="B", index=list(NULL,2))
# write character vector
h5write(ex_strings, file = "ex_createDataset.h5", name = "D")

h5dump("ex_createDataset.h5")
```

---

h5createFile

*Create HDF5 file*

---

## 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 TRUE if file was created successfully and FALSE otherwise.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[h5createGroup](#), [h5createDataset](#), [h5read](#), [h5write](#), [rhdf5](#)

**Examples**

```
h5createFile("ex_createFile.h5")

# create groups
h5createGroup("ex_createFile.h5", "foo")
h5createGroup("ex_createFile.h5", "foo/foobaa")

h5ls("ex_createFile.h5")
```

---

h5createGroup	<i>Create HDF5 group</i>
---------------	--------------------------

---

**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 <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> 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 group do not exists.

**Details**

Creates a new group within an HDF5 file.

**Value**

Returns TRUE if group was created successfully and FALSE otherwise.



**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[h5createFile](#), [h5createDataset](#), [h5read](#), [h5write](#), [rhdf5](#)

**Examples**

```
h5createFile("ex_createGroup.h5")

# create groups
h5createGroup("ex_createGroup.h5", "foo")
h5createGroup("ex_createGroup.h5", "foo/foobaa")

h5ls("ex_createGroup.h5")
```

---

h5delete

*Delete contents of 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	The names of the object to be deleted.

**Author(s)**

Mike Smith

---

h5errorHandling	<i>handling of HDF5 error messages</i>
-----------------	--

---

**Description**

Sets the options for handling HDF5 error messages.

**Usage**

```
h5errorHandling (type="normal")
```

**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.
------	---

**Details**

Sets the options for HDF5 error handling.

**Value**

Returns 0 if options are set successfully.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#)

**Examples**

```
h5errorHandling("normal")
```

---

H5IdComponent-class    *Class "H5IdComponent"*

---

### Description

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

### Objects from the Class

Objects can be created by calls of [H5Fcreate](#), [H5Fopen](#), / [H5Gcreate](#), [H5Gopen](#), / [H5Dcreate](#), [H5Dopen](#), \ [H5Dget\\_space](#), [H5Screate\\_simple](#), \ [H5Acreate](#), [H5Aopen](#).

### Slots

**ID:** Object of class "integer". Contains the handle of C-type hid\_t.

**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.

### Methods

**show** signature(object = "H5IdComponent"): Shows the filename.

### Author(s)

Bernd Fischer

### References

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

### See Also

[rhdf5](#)

### Examples

```
showClass("H5IdComponent")
```

---

h5listIdentifier      *list all valid H5 identifier.*

---

### Description

A list of all valid H5 identifier. 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

### References

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

### See Also

[rhdf5](#)

### Examples

```
h5createFile("ex_list_identifier.h5")  
  
# create groups  
h5createGroup("ex_list_identifier.h5", "foo")  
  
h5listIdentifier()  
h5validObjects()
```

---

h5ls	<i>List the content of an HDF5 file.</i>
------	--

---

## Description

Lists the content of an HDF5 file.

## Usage

```
h5ls (file,
      recursive = TRUE,
      all = FALSE,
      datasetinfo = TRUE,
      index_type = h5default("H5_INDEX"),
      order = h5default("H5_ITER"), native = FALSE)
h5dump (file,
        recursive = TRUE,
        load = TRUE,
        all = FALSE,
        index_type = h5default("H5_INDEX"),
        order = h5default("H5_ITER"), ..., 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 <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> 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 <code>h5const("H5_INDEX")</code> for possible arguments.
order	See <code>h5const("H5_ITER")</code> for possible arguments.
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 <code>load=FALSE</code> and load the datasets successively.
native	An object of class <code>logical</code> . If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .
...	Arguments passed to <a href="#">h5read</a>

**Details**

h5ls lists the content of an HDF5 file including group structure and datasets. It returns the content as a data.frame. You can use h5dump(file="myfile.h5", load=FALSE) to obtain the dataset information in a hierarchical list structure. Usually the datasets are loaded individually with h5read, but you have the possibility to load the complete content of an HDF5 file with h5dump

**Value**

h5ls returns a data.frame with the file content.

h5dump 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

**References**

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

**See Also**

[h5read](#), [h5write](#), [rhdf5](#)

**Examples**

```
h5createFile("ex_ls_dump.h5")

# create groups
h5createGroup("ex_ls_dump.h5", "foo")
h5createGroup("ex_ls_dump.h5", "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, "ex_ls_dump.h5", "foo/B")

# list content of hdf5 file
h5ls("ex_ls_dump.h5", all=TRUE)
h5dump("ex_ls_dump.h5")
```

---

h5save

*Saves a series of 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. For advanced programmers it is possible to provide an object of class <code>H5IdComponent</code> representing a H5 location identifier (file or group). See <code>H5Fcreate</code> , <code>H5Fopen</code> , <code>H5Gcreate</code> , <code>H5Gopen</code> 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 <code>logical</code> . If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .

**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

**References**

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

**See Also**

`h5ls`, `h5write`, `rhdf5`

**Examples**

```
A = 1:7; B = 1:18; D = seq(0,1,by=0.1)
h5save(A, B, D, file="ex_save.h5")
h5dump("ex_save.h5")
```

---

h5set\_extent

*Set a new dataset extension*

---

**Description**

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

**Usage**

```
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 <code>H5IdComponent</code> representing a H5 location identifier (file or group). See <code>H5Fcreate</code> , <code>H5Fopen</code> , <code>H5Gcreate</code> , <code>H5Gopen</code> to create an object of this kind.
dataset	The name of the dataset in the HDF5 file, or an object of class <code>H5IdComponent</code> representing a H5 dataset identifier. See <code>H5Dcreate</code> , or <code>H5Dopen</code> 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-programm (e.g. <code>HDFView</code> ), 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 <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .

**Value**

Returns 0 if the dimension of the dataset was changed successfully and a negative value otherwise.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#)

**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")]
```

---

h5testFileLocking

*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-existent 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.

**Details**

`h5testFileLocking` will create a temporary file and then attempt to apply a file lock using the appropriate function within the HDF5 library. The success or failure of the locking is then recorded and the temporary file removed. Even relatively low level functions such as `H5Fcreate` will fail inelegantly if file locking fails.

`h5disableFileLocking` will set the environment variable `RHDF5_USE_FILE_LOCKING=FALSE`, which is the recommended way to disable this behaviour if file locking is not supported. This will only persist within the current R session. You can set the environment variable outside of R if this is a more general issue on your system.

`h5enableFileLocking` will unset the `RHDF5_USE_FILE_LOCKING`.

More discussion of HDF5's use of file locking can be found online e.g. <https://forum.hdfgroup.org/t/hdf5-1-10-0-and-flock/3761/4> or <https://forum.hdfgroup.org/t/hdf5-files-on-nfs/3985/5>

**Value**

`h5testFileLocking` returns TRUE if a file can be successfully locked at the specified location, or FALSE otherwise.

`h5disableFileLocking` and `h5enableFileLocking` set are called for the side effect of setting or unsetting the environment variable `HDF5_USE_FILE_LOCKING` and do not return anything.

**Author(s)**

Mike Smith

**Examples**

```
## either a file name or directory can be tested
file <- tempfile()
dir <- tempdir()

h5testFileLocking(dir)
h5testFileLocking(file)

## we can check for file locking, and disable if needed
if( !h5testFileLocking(dir) ) {
  h5disableFileLocking()
}
```

---

h5version	<i>rhdf5 and libhdf5 version numbers</i>
-----------	--

---

**Description**

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

**Usage**

```
h5version()
```

**Value**

A list of major, minor and release number.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#)

**Examples**

```
h5version()
```

---

h5write	<i>Reads and write object in HDF5 files</i>
---------	---

---

**Description**

Reads and writes objects in HDF5 files. This function can be used to read and write either full arrays/vectors or subarrays (hyperslabs) within 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,
                ..., native = FALSE)
h5readAttributes (file, name, native = FALSE)
h5write         (obj, file, name, ...)
h5write.default (obj, file, name,
```

```

                                createnewfile = TRUE,
                                write.attributes = FALSE, ...,
                                native = FALSE)
h5writeDataset                  (obj, h5loc, name, ...)
h5writeDataset.data.frame      (obj, h5loc, name, level=7, chunk,
                                DataFrameAsCompound = TRUE)
h5writeDataset.list            (obj, h5loc, name, level=7)
h5writeDataset.matrix          (... )
h5writeDataset.integer         (... )
h5writeDataset.double          (... )
h5writeDataset.logical         (... )
h5writeDataset.character       (... )
h5writeDataset.array           (obj, h5loc, name, index = NULL,
                                start=NULL, stride=NULL, block=NULL, count=NULL,
                                size=NULL, level=7)

h5writeAttribute               (attr, h5obj, name, ...)
h5writeAttribute.matrix        (... )
h5writeAttribute.integer       (... )
h5writeAttribute.double        (... )
h5writeAttribute.logical       (... )
h5writeAttribute.character     (... )
h5writeAttribute.array         (attr, h5obj, name, size)

```

### Arguments

obj	The R object to be written.
attr	The R object to be written as an HDF5 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 <code>H5IdComponent</code> representing a H5 location identifier (file or group). See <code>H5Fcreate</code> , <code>H5Fopen</code> , <code>H5Gcreate</code> , <code>H5Gopen</code> to create an object of this kind.
h5loc	An object of class <code>H5IdComponent</code> representing a H5 location identifier (file or group). See <code>H5Fcreate</code> , <code>H5Fopen</code> , <code>H5Gcreate</code> , <code>H5Gopen</code> to create an object of this kind.
h5obj	An object of class <code>H5IdComponent</code> representing a H5 object identifier (file, group, or dataset). See <code>H5Fcreate</code> , <code>H5Fopen</code> , <code>H5Gcreate</code> , <code>H5Gopen</code> , <code>H5Dcreate</code> , or <code>H5Dopen</code> to create an object of this kind.
name	The name of the dataset in the HDF5 file. The name of the attribute for <code>hwriteAttribute</code> .
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 <code>NULL</code> 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 <code>index</code> is not <code>NULL</code> .
stride	The stride of the hypercube. Read the introduction <a href="http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html">http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html</a> before using this argument. R behaves like Fortran in this example. This argument is ignored, if <code>index</code> is not <code>NULL</code> .
block	The block size of the hyperslab. Read the introduction <a href="http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html">http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html</a> before using this argument. R behaves like Fortran in this example. This argument is ignored, if <code>index</code> is not <code>NULL</code> .

count	The number of blocks to be written. This argument is ignored, if index is not NULL.
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 <a href="#">h5createDataset</a> to create an dataset.
chunk	Specifies the number of items to be include in an HDF5 chunk. When writing a <code>data.frame</code> this represents the number of rows to be included in a chunk. If left unspecified the defaults is the smaller of: the total number of rows or the number of rows that fit within 4GB of memory.
native	An object of class <code>logical</code> . If TRUE, array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .
compoundAsDataFrame	If true, a compound datatype will be coerced to a <code>data.frame</code> . 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.
DataFrameAsCompound	If true, a <code>data.frame</code> will be saved as a compound data type. Otherwise it is saved like a list. The advantage of saving a <code>data.frame</code> 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, <code>DataFrameAsCompound=FALSE</code> is recommended.
callGeneric	If TRUE a generic function <code>h5read.classname</code> 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 <code>h5read</code> depending on the class attribute. Note that <code>h5read</code> is not a S3 generic function. Dispatching is done based on the HDF5 attribute after the standard <code>h5read</code> function.
size	The length of string data type. Variable lengt strings are not yet supported.
createnewfile	If TRUE, a new file will be created if necessary.
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.
write.attributes	(logical) If TRUE, all R-attributes attached to the object <code>obj</code> are written to the HDF5 file.
...	Further arguments passed to <a href="#">H5Dread</a> .

## Details

Read/writes an R object from/to an HDF5 file. If neither 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 read/write subarrays, so called hyperslabs from/to 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/phycont.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.

`h5readAttributes` returns a list of all HDF5 attributes of object name.

`h5write` returns 0 if successful.

### Author(s)

Bernd Fischer

### References

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

### See Also

[h5ls](#), [h5createFile](#), [h5createDataset](#), [rhdf5](#)

### Examples

```
h5createFile("ex_hdf5file.h5")

# write a matrix
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
attr(B, "scale") <- "liter"
h5write(B, "ex_hdf5file.h5", "B")

# read a matrix
E = h5read("ex_hdf5file.h5", "B")

# write and read submatrix
h5createDataset("ex_hdf5file.h5", "S", c(5,8), storage.mode = "integer", chunk=c(5,1), level=7)
h5write(matrix(1:5,nr=5,nc=1), file="ex_hdf5file.h5", name="S", index=list(NULL,1))
h5read("ex_hdf5file.h5", "S")
h5read("ex_hdf5file.h5", "S", index=list(NULL,2:3))

# list content of hdf5 file
h5ls("ex_hdf5file.h5")
```

---

HDF5 Attribute Interface

*HDF5 Attribute Interface*


---

**Description**

These functions create and manipulate attributes and information about attributes.

**Usage**

```

H5Acreate      (h5obj, name, dtype_id, h5space)
H5Aclose      (h5attribute)
H5Adelete     (h5obj, name)
H5Aexists     (h5obj, name)
H5Aget_name   (h5attribute)
H5Aget_space  (h5attribute)
H5Aget_type   (h5attribute)
H5Aopen       (h5obj, name)
H5Aopen_by_idx (h5obj, n, objname = ".", index_type = h5default("H5_INDEX"),
                order = h5default("H5_ITER"))
H5Aopen_by_name (h5obj, objname = ".", name)
H5Aread       (h5attribute, buf = NULL)
H5Awrite      (h5attribute, buf)

```

**Arguments**

h5obj	An object of class <a href="#">H5IdComponent</a> representing a H5 object identifier (file, group, or dataset). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> , <a href="#">H5Dcreate</a> , or <a href="#">H5Dopen</a> to create an object of this kind.
name	The name of the attribute (character).
dtype_id	A character name of a datatype. See <code>h5const("H5T")</code> for possible datatypes. Can also be an integer representing an HDF5 datatype. Only simple datatypes are allowed for attributes.
h5space	An object of class <a href="#">H5IdComponent</a> representing a H5 dataspace. See <a href="#">H5Dget_space</a> , <a href="#">H5Screate_simple</a> , <a href="#">H5Screate</a> to create an object of this kind.
h5attribute	An object of class <a href="#">H5IdComponent</a> representing a H5 attribute as created by <a href="#">H5Acreate</a> or <a href="#">H5Aopen</a>
n	Opens attribute number n in the given order and index. The first attribute is opened with n=0.
objname	The name of the object the attribute belongs to.
index_type	See <code>h5const("H5_INDEX")</code> for possible arguments.
order	See <code>h5const("H5_ITER")</code> for possible arguments.
buf	Reading and writing buffer containing the data to written/read. When using the buffer for reading, the buffer size has to fit the size of the memory space <code>h5spaceMem</code> . No extra memory will be allocated for the data. A pointer to the same data is returned.

## Details

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Attributes> for further details.

## Value

H5Acreate, H5Aopen, H5Aopen\_by\_name, H5Aopen\_by\_idx return an object of class `H5IdComponent` representing a H5 attribute identifier.

H5Aget\_space returns an object of class `H5IdComponent` representing a H5 dataspace identifier.

H5Aread returns an array with the read data.

The other functions return the standard return value from their respective C-functions.

## Author(s)

Bernd Fischer

## References

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

## See Also

[rhdf5](#)

## Examples

```
# create a file and write something
h5createFile("ex_H5A.h5")
h5write(1:15, "ex_H5A.h5", "A")

# write an attribute 'unit' to 'A'
fid <- H5Fopen("ex_H5A.h5")
did <- H5Dopen(fid, "A")
sid <- H5Screate_simple(c(1,1))
tid <- H5Tcopy("H5T_C_S1")

H5Tset_size(tid, 10L)
aid <- H5Acreate(did, "unit", tid, sid)
aid
H5Awrite(aid, "liter")
H5Aclose(aid)
H5Sclose(sid)
H5Aexists(did, "unit")
H5Dclose(did)
H5Fclose(fid)
h5dump("ex_H5A.h5")
```

---

**HDF5 Dataset Access Property List Interface***HDF5 Dataset Access Property List Interface*

---

**Description**

The functions, macros, and subroutines listed here are used to manipulate dataset access property list objects in various ways, including to reset property values. With the use of property lists, HDF5 functions have been implemented and can be used in applications with many fewer parameters than would be required without property lists.

**Usage**

H5Pset\_chunk\_cache ( h5plist, rdcc\_nslots, rdcc\_nbytes, rdcc\_w0 )

**Arguments**

h5plist	An object of class <a href="#">H5IdComponent</a> representing a H5 property list identifier of class H5P_DATASET_ACCESS. See <a href="#">H5Pcreate</a> or <a href="#">H5Pcopy</a> to create an object of this kind.
rdcc_nslots	An integer. The number of chunk slots in the raw data chunk cache for this dataset.
rdcc_nbytes	An integer. The total size of the raw data chunk cache for this dataset.
rdcc_w0	double. The chunk preemption policy for this dataset.

**Details**

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Dataset+Access+Properties> for further details. See [H5P](#) for documentation of more functions to manipulate property lists of other property list classes.

**Value**

The functions return the standard return value from their respective C-functions.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#), [H5P](#)



**Examples**

```
pid <- H5Pcreate("H5P_DATASET_ACCESS")
H5Pset_chunk_cache( pid, 100, 10000, 0.5)
H5Pclose(pid)
```

---

HDF5 Dataset Create Property List Interface

*HDF5 Dataset Create Property List Interface*


---

**Description**

The functions, macros, and subroutines listed here are used to manipulate dataset creation property list objects in various ways, including to reset property values. With the use of property lists, HDF5 functions have been implemented and can be used in applications with many fewer parameters than would be required without property lists.

**Usage**

H5Pset_layout	( h5plist, layout = h5default("H5D") )
H5Pget_layout	( h5plist )
H5Pset_chunk	( h5plist, dim )
H5Pget_chunk	( h5plist )
H5Pset_deflate	( h5plist, level )
H5Pset_fill_value	( h5plist, value )
H5Pfill_value_defined	( h5plist )
H5Pset_fill_time	( h5plist, fill_time = h5default("H5D_FILL_TIME") )
H5Pget_fill_time	( h5plist )
H5Pset_alloc_time	( h5plist, alloc_time = h5default("H5D_ALLOC_TIME") )
H5Pget_alloc_time	( h5plist )

**Arguments**

h5plist	An object of class <a href="#">H5IdComponent</a> representing a H5 property list identifier of class H5P_DATASET_CREATE. See <a href="#">H5Pcreate</a> or <a href="#">H5Pcopy</a> to create an object of this kind.
layout	A character name of a dataset layout type. See <code>h5const("H5D")</code> for possible property list types. Can also be an integer representing an HDF5 dataset layout type.
dim	The chunk size used to store the dataset. It is an integer vector of the same length as the dataset dims.
level	The compression level used. An integer value between 0 (no compression) and 9 (highest and slowest compression).
value	Standard value for filling the dataset. The storage.mode of value has to be convertible to the dataset type by HDF5.
fill_time	A character name of a H5D_FILL_TIME type. See <code>h5const("H5D_FILL_TIME")</code> for possible values. Can also be an integer representing an HDF5 H5D_FILL_TIME type.
alloc_time	A character name of a H5D_ALLOC_TIME type. See <code>h5const("H5D_ALLOC_TIME")</code> for possible property list types. Can also be an integer representing an HDF5 H5D_ALLOC_TIME type.

**Details**

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Dataset+Creation+Properties> for further details. See [H5P](#) for documentation of more functions to manipulate property lists of other property list classes.

**Value**

The functions return the standard return value from their respective C-functions.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#), [H5P](#)

**Examples**

```
pid <- H5Pcreate("H5P_DATASET_CREATE")
H5Pset_fill_time( pid, "H5D_FILL_TIME_ALLOC" )
H5Pset_chunk(pid, c(1000,1,1))
H5Pset_deflate(pid, 6)

H5Pget_layout( pid )
H5Pfill_value_defined( pid )
H5Pget_fill_time( pid )
```

```

H5Pget_alloc_time( pid )
H5Pget_chunk( pid)

H5Pclose(pid)

```

---

HDF5 Dataset Interface

*HDF5 Dataset Interface*


---

## Description

These functions create and manipulate dataset objects, and set and retrieve their constant or persistent properties.

## Usage

```

H5Dcreate      (h5loc, name, dtype_id, h5space, lcpl=NULL, dcpl=NULL, dapl=NULL)
H5Dopen       (h5loc, name, dapl=NULL)
H5Dclose      (h5dataset)
H5Dget_space  (h5dataset)
H5Dget_type   (h5dataset)
H5Dget_create_plist (h5dataset)
H5Dget_storage_size (h5dataset)
H5Dread       (h5dataset, h5spaceFile = NULL, h5spaceMem = NULL,
              buf = NULL, compoundAsDataFrame = TRUE,
              bit64conversion, drop = FALSE)
H5Dwrite      (h5dataset, buf, h5spaceMem = NULL, h5spaceFile = NULL)
H5Dset_extent (h5dataset, size)

```

## 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 (character).

**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.

**h5dataset** An object of class [H5IdComponent](#) representing a H5 dataset. See [H5Dcreate](#), [H5Dopen](#) to create an object of this kind.

**h5spaceFile, h5spaceMem** An object of class [H5IdComponent](#) representing a H5 dataspace. See [H5Dget\\_space](#), [H5Screate\\_simple](#), [H5Screate](#) 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	Reading and writing buffer containing the data to written/read. When using the buffer for reading, 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	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. 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 risc 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.
drop	(logical) If TRUE, the HDF5 object is read as a vector with NULL dim attributes.
size	An integer vector with the new dimension of the dataset. Calling this function is only valid for chunked datasets.
lcp1	An object of class <code>H5IdComponent</code> representing a H5 link creation property list. See <code>H5Pcreate</code> , <code>H5Pcopy</code> to create an object of this kind.
dcpl	An object of class <code>H5IdComponent</code> representing a H5 dataset creation property list. See <code>H5Pcreate</code> , <code>H5Pcopy</code> to create an object of this kind.
dapl	An object of class <code>H5IdComponent</code> representing a H5 dataset access property list. See <code>H5Pcreate</code> , <code>H5Pcopy</code> to create an object of this kind.

### Details

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Datasets> for further details.

### Value

H5Dcreate and H5Dopen return an object of class `H5IdComponent` representing a H5 dataset identifier.

H5Dget\_space returns an object of class `H5IdComponent` representing a H5 dataspace identifier.

H5Dread returns an array with the read data.

The other functions return the standard return value from their respective C-functions.

### Author(s)

Bernd Fischer

### References

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

**See Also**[rhdf5](#)**Examples**

```
# write a dataset
fid <- H5Fcreate("ex_H5D.h5")
fid
sid <- H5Screate_simple(c(10,5,3))
sid
did <- H5Dcreate(fid, "A", "H5T_STD_I32LE", sid)
did
H5Dwrite(did, 1L:150L, h5spaceMem = sid, h5spaceFile = sid)
H5Dclose(did)
H5Sclose(sid)
H5Fclose(fid)

# read a dataset
fid <- H5Fopen("ex_H5D.h5")
fid
did <- H5Dopen(fid, "A")
did
sid <- H5Dget_space(did)
sid
B <- H5Dread(did)
B
H5Dclose(did)
H5Sclose(sid)
H5Fclose(fid)

# write a subarray
fid <- H5Fopen("ex_H5D.h5")
fid
did <- H5Dopen(fid, "A")
did
sid <- H5Dget_space(did)
sid
H5Sselect_index(sid, list(1:3,2:4,2))
sidmem <- H5Screate_simple(c(3,3,1))
sidmem
A = array(-801:-809,dim=c(3,3,1))
H5Dwrite(did, A, h5spaceMem = sidmem, h5spaceFile = sid)
H5Dread(did)
H5Sclose(sid)
H5Dclose(did)
H5Sclose(sidmem)
H5Fclose(fid)
```

---

HDF5 Dataspace Interface

*HDF5 Dataspace Interface*

---

**Description**

These functions create and manipulate the dataspace in which to store the elements of a dataset.

**Usage**

```

H5Screate          (type = h5default("H5S"), native = FALSE)
H5Screate_simple  (dims, maxdims, native = FALSE)
H5Scopy           (h5space)
H5Sclose          (h5space)
H5Sis_simple      (h5space)
H5Sget_simple_extent_dims (h5space)
H5Sset_extent_simple (h5space, dims, maxdims)
H5Sselect_hyperslab (h5space, op = h5default("H5S_SELECT"),
                    start = NULL, stride = NULL, count = NULL,
                    block = NULL)
H5Sselect_index   (h5space, index)
H5Sunlimited       ()

```

**Arguments**

type	See <code>h5const("H5S")</code> for possible types.
dims	Dimension of the dataspace. This argument is similar to the <code>dim</code> attribute of an array. When viewing the HDF5 dataset with an C-program (e.g. <code>HDFView</code> ), 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 <code>dims</code> .
native	An object of class <code>logical</code> . If <code>TRUE</code> , array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .
h5space	An object of class <code>H5IdComponent</code> representing a H5 dataspace identifier. See <code>H5Dget_space</code> , <code>H5Screate_simple</code> , <code>H5Screate</code> to create an object of this kind.
index	A list of integer indices. The length of the list corresponds to the number of dimensions of the HDF5 array.
op	See <code>h5const("H5S_SELECT")</code> for possible arguments.
start	The start coordinate of a hyperslab (similar to subsetting in R). Counting is R-style 1-based.
stride	The stride of the hypercube. Read the introduction <a href="http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html">http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html</a> before using this argument. R behaves like Fortran in this example.
count	The number of blocks to be written.
block	The block size of the hyperslab. Read the introduction <a href="http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html">http://ftp.hdfgroup.org/HDF5/Tutor/phypecont.html</a> before using this argument. R behaves like Fortran in this example.

**Details**

Interface to the HDF5 C-library `libhdf5`. See <https://portal.hdfgroup.org/display/HDF5/Dataspaces> for further details.

As an introduction to use hyperslabs see these tutorials: 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.

H5Sselect\_index is not part of the standard HDF5 C interface. It performs an iterative call to H5select\_points by iterating through the given index positions. This function avoids a for loop in R. If a list element is NULL, all elements of the respective dimension are considered.

## Value

H5Screate, H5Screate\_simple, and H5Scopy return an object of class `H5IdComponent` representing a dataspace.

H5Sis\_simple returns a boolean.

H5Sget\_simple\_extent\_dims returns an integer vector.

H5Sunlimited is a simple macro to return the constant H5S\_UNLIMITED that can be provided to the maxdims arguments of H5Screate\_simple to create an extensible dataspace.

The other functions return the standard return value from their respective C-functions.

## Author(s)

Bernd Fischer

## References

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

## See Also

[rhdf5](#)

## Examples

```
sid <- H5Screate_simple(c(10,5,3))
sid
H5Sis_simple(sid)
H5Sget_simple_extent_dims(sid)

# select a subarray (called hyperslab in the hdf5 community).
# The next h5write can use this to write a subarray
H5Sselect_index(sid, list(1:3,2:4,2))

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

---

HDF5 Datatype Interface

*HDF5 Datatype Interface*

---

## Description

These functions create and manipulate the datatype which describes elements of a dataset.

## Usage

```
H5Tcopy      (dtype_id = h5default(type = "H5T"))
H5Tset_size (dtype_id = h5default(type = "H5T"), size)
```

## Arguments

<code>dtype_id</code>	A character name of a datatype. See <code>h5const("H5T")</code> for possible datatypes. Can also be an integer representing an HDF5 datatype.
<code>size</code>	The total size in bytes.

## Details

Interface to the HDF5 C-library `libhdf5`. See <https://portal.hdfgroup.org/display/HDF5/Datatypes> for further details.

## Value

The functions return the standard return value from their respective C-functions.

## Author(s)

Bernd Fischer

## References

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

## See Also

[rhdf5](#)

## Examples

```
# create character datatype with string length 10
tid <- H5Tcopy("H5T_C_S1")
H5Tset_size(tid, 10L)

# List all predefined types implemented in the R-interface
h5const("H5T")

# List all available type classes (not all of them are implemented)
h5const("H5T_CLASS")
```



## Description

These functions are designed to provide file-level access to HDF5 files.

## Usage

```

H5Fcreate      (name, flags = h5default("H5F_ACC"), fcp1 = NULL,
               fap1 = NULL, native = FALSE)
H5Fopen       (name, flags = h5default("H5F_ACC_RD"), native = FALSE)
H5Fclose      (h5file)
H5Fflush      (h5file, scope = h5default("H5F_SCOPE"))
H5Fis_hdf5    (name, showWarnings = TRUE)
H5Fget_filesize (h5file)
H5Fget_name    (h5obj)
H5Fget_create_plist (h5file)
H5Fget_access_plist (h5file)

```

## Arguments

name	The filename of the HDF5 file.
flags	See <code>h5const("H5F_ACC")</code> for possible arguments.
fcp1	An object of class <code>H5IdComponent</code> representing a H5 file creation property list. See <code>H5Pcreate</code> , <code>H5Pcopy</code> to create an object of this kind.
fap1	An object of class <code>H5IdComponent</code> representing a H5 file access property list. See <code>H5Pcreate</code> , <code>H5Pcopy</code> to create an object of this kind.
native	An object of class <code>logical</code> . If <code>TRUE</code> , array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .
h5file	An object of class <code>H5IdComponent</code> representing a H5 file identifier as created by <code>H5Fcreate</code> or <code>H5Fopen</code> .
scope	See <code>h5const("H5F_ACC_RD")</code> for possible arguments.
showWarnings	If <code>TRUE</code> (default), a warning is given if an open HDF5 handle exists for this file.
h5obj	An object of class <code>H5IdComponent</code> representing a H5 object identifier (file, group, or dataset). See <code>H5Fcreate</code> , <code>H5Fopen</code> , <code>H5Gcreate</code> , <code>H5Gopen</code> , <code>H5Dcreate</code> , or <code>H5Dopen</code> to create an object of this kind.

## Details

Interface to the HDF5 C-library `libhdf5`. See <https://portal.hdfgroup.org/display/HDF5/Files> for further details.

**Value**

H5Fcreate and H5Fopen return an object of class [H5IdComponent](#) representing a H5 file identifier.

H5Fis\_hdf5 returns TRUE, if the file is an HDF5 file, or FALSE otherwise. In the case the file doesn't exist, NA is returned.

The other functions return the standard return value from their respective C-functions.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#)

**Examples**

```
fid <- H5Fcreate("ex_H5F.h5")
fid
H5Fclose(fid)
fid2 <- H5Fopen("ex_H5F.h5")
fid2
H5Fclose(fid2)
```

---

HDF5 General Library Functions

*HDF5 General Library Functions*

---

**Description**

These low level functions provide general general library functions for HDF5.

**Usage**

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

**Details**

These low level functions provide general general library functions for HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Library> for further details.

**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

**References**<https://portal.hdfgroup.org/display/HDF5>**See Also**[h5version](#), [rhdf5](#)**Examples**

```
# test for file locking
if( !h5testFileLocking( tempdir() ) ) {
    h5disableFileLocking()
}

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

---

HDF5 Group Interface    *HDF5 Group Interface*


---

**Description**

The Group interface functions create and manipulate groups of objects in an HDF5 file.

**Usage**

```
H5Gcreate      (h5loc, name)
H5Gcreate_anon (h5loc)
H5Gopen       (h5loc, name)
H5Gclose      (h5group)
H5Gget_info   (h5loc)
H5Gget_info_by_idx (h5loc, n, group_name = ".",
                    index_type = h5default("H5_INDEX"),
                    order = h5default("H5_ITER"))
H5Gget_info_by_name (h5loc, group_name)
```

**Arguments**

h5loc	An object of class <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> to create an object of this kind.
name	Name of the group.
h5group	An object of class <a href="#">H5IdComponent</a> representing a H5 group identifier. See <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> to create an object of this kind.

n	Position in the index of the group for which information is retrieved (Counting is 1-based).
group_name	An additional group name specifying the group for which information is sought. It is interpreted relative to h5loc.
index_type	See <code>h5const("H5_INDEX")</code> for possible arguments.
order	See <code>h5const("H5_ITER")</code> for possible arguments.

### Details

Interface to the HDF5 C-library `libhdf5`. See <https://portal.hdfgroup.org/display/HDF5/Groups> for further details.

### Value

`H5Gcreate`, `H5Gcreate_anon`, and `H5Gopen` return an object of class `H5IdComponent` representing a H5 group identifier.

`H5Gget_info`, `H5Gget_info_by_idx`, and `H5Gget_info_by_name` return a list with the group information.

The other functions return the standard return value from their respective C-functions.

### Author(s)

Bernd Fischer

### References

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

### See Also

[rhdf5](#)

### Examples

```
fid <- H5Fcreate("ex_H5G.h5")
gid <- H5Gcreate(fid, "foo")
gid
H5Gget_info(gid)
H5Gclose(gid)

H5Gget_info_by_idx(fid,1)
H5Gget_info_by_name(fid,"foo")

H5Fclose(fid)
```

---

HDF5 Identifier Interface

*HDF5 Identifier Interface*

---

## Description

These functions provides tools for working with object identifiers and object names.

## Usage

```
H5Iget_type(h5identifier)
H5Iget_name(h5obj)
H5Iis_valid(h5identifier)
```

## Arguments

h5identifier	An object of class <a href="#">H5IdComponent</a> representing a H5 identifier (file, group, dataset, dataspace, datatype, attribute). See e.g. <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> , <a href="#">H5Dcreate</a> , <a href="#">H5Dopen</a> to create an object of this kind.
h5obj	An object of class <a href="#">H5IdComponent</a> representing a H5 object identifier (file, group, or dataset). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> , <a href="#">H5Dcreate</a> , or <a href="#">H5Dopen</a> to create an object of this kind.

## Details

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Identifiers> for further details.

## Value

H5Iget\_type returns the type of the H5 identifier, H5Iget\_name the name of the object, and H5Iis\_valid checks if the object is a valid H5 identifier.

## Author(s)

Bernd Fischer

## References

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

## See Also

[rhdf5](#)

**Examples**

```
# create an hdf5 file and write something
h5createFile("ex_H5I.h5")
h5createGroup("ex_H5I.h5", "foo")
B = array(seq(0.1,2.0,by=0.1),dim=c(5,2,2))
h5write(B, "ex_H5I.h5", "foo/B")

# reopen file and dataset and get object info
fid <- H5Fopen("ex_H5I.h5")
oid = H5Oopen(fid, "foo")
H5Iget_type(oid)
H5Oclose(oid)
H5Fclose(fid)
```

---

HDF5 Link Create Property List Interface

*HDF5 Link Create Property List Interface*


---

**Description**

The functions, macros, and subroutines listed here are used to manipulate link creation property list objects in various ways, including to reset property values. With the use of property lists, HDF5 functions have been implemented and can be used in applications with many fewer parameters than would be required without property lists.

**Usage**

```
H5Pset_char_encoding          ( h5plist, encoding = h5default("H5T_CSET"))
H5Pget_char_encoding          ( h5plist )
H5Pset_create_intermediate_group ( h5plist, crt_intermed_group )
H5Pget_create_intermediate_group ( h5plist )
```

**Arguments**

h5plist	An object of class <code>H5IdComponent</code> representing a H5 property list identifier of class <code>H5P_LINK_CREATE</code> . See <code>H5Pcreate</code> or <code>H5Pcopy</code> to create an object of this kind.
encoding	A character name of an encoding type. See <code>h5const("H5T_CSET")</code> for possible property list types. Can also be an integer representing an HDF5 encoding type.
crt_intermed_group	Logical. If TRUE intermediate groups are created.

**Details**

Interface to the HDF5 C-library `libhdf5`. See <https://portal.hdfgroup.org/display/HDF5/Attribute+and+Link+Creation+Properties> for further details. See `H5P` for documentation of more functions to manipulate property lists of other property list classes.

**Value**

The functions return the standard return value from their respective C-functions.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#), [H5P](#)

**Examples**

```
pid <- H5Pcreate("H5P_LINK_CREATE")
H5Pset_char_encoding( pid, "H5T_CSET_ASCII")
H5Pget_char_encoding( pid)
H5Pset_create_intermediate_group(pid, TRUE)
H5Pget_create_intermediate_group(pid)
H5Pclose(pid)
```

---

HDF5 Link Interface     *HDF5 Link Interface*

---

**Description**

The Link interface, H5L, functions create and manipulate links in an HDF5 group. This interface includes functions that enable the creation and use of user-defined link classes.

**Usage**

```
H5Lcreate_external (target_file_name, target_obj_name, link_loc, link_name)
H5Lexists          (h5loc, name)
H5Lget_info        (h5loc, name)
H5Ldelete          (h5loc, name)
```

**Arguments**

target_file_name	the relative or absolute target file name containing the target object.
target_obj_name	the absolute path and name of the target object within the target file.
link_loc	An object of class <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group) where the new link is placed.
link_name	The name of the new link.
h5loc	An object of class <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> to create an object of this kind.
name	The name of the link to be checked.

## Details

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Links> for further details.

If name consists of a relative path containing group names, the function H5Lexists checks recursively if the link exists which is a different behaviour to the C-function.

## Value

H5Lexists returns boolean TRUE if the link exists and FALSE otherwise.

H5Lget\_info returns a list with the entries of the C-structure H5L\_info\_t.

## Author(s)

Bernd Fischer, Mike Smith

## References

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

## See Also

[rhdf5](#)

## Examples

```
# create an hdf5 file and a group
h5createFile("ex_H5L.h5")
h5createGroup("ex_H5L.h5", "foo")

# reopen file and get link info
fid <- H5Fopen("ex_H5L.h5")
H5Lexists(fid, "foo")
H5Lexists(fid, "baa")
H5Lget_info(fid, "foo")

H5Ldelete(fid, "foo")
H5Lexists(fid, "foo")

H5Fclose(fid)
```

## Description

The Object interface, H5O, functions manipulate objects in an HDF5 file. This interface is designed to be used in conjunction with the Links interface (H5L).



## Usage

```
H5Open (h5loc, name)
H5Close (h5obj)
H5Get_num_attrs(h5obj)
H5Get_num_attrs_by_name(h5loc, name)
```

## Arguments

h5obj	An object of class <a href="#">H5IdComponent</a> representing a H5 object identifier (file, group, or dataset). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> , <a href="#">H5Dcreate</a> , or <a href="#">H5Dopen</a> to create an object of this kind.
h5loc	An object of class <a href="#">H5IdComponent</a> representing a H5 location identifier (file or group). See <a href="#">H5Fcreate</a> , <a href="#">H5Fopen</a> , <a href="#">H5Gcreate</a> , <a href="#">H5Gopen</a> to create an object of this kind.
name	The name of the link to be checked.

## Details

Interface to the HDF5 C-library libhdf5. See <https://portal.hdfgroup.org/display/HDF5/Objects> for further details.

## Value

H5Open opens an object (a file, group, or dataset) and returns an object of class [H5IdComponent](#). H5Close closed the object again. H5Get\_num\_attrs and H5Get\_num\_attrs\_by\_name return the number of attributes of an object.

## Author(s)

Bernd Fischer

## References

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

## See Also

[rhdf5](#)

## Examples

```
# create an hdf5 file and write something
h5createFile("ex_H50.h5")
h5createGroup("ex_H50.h5", "foo")
B = array(seq(0.1, 2.0, by=0.1), dim=c(5, 2, 2))
h5write(B, "ex_H50.h5", "foo/B")

# reopen file and dataset and get object info
fid <- H5Fopen("ex_H50.h5")
oid = H5Oopen(fid, "foo")
H5Oget_num_attrs(oid)
H5Oclose(oid)
H5Fclose(fid)
```

---

HDF5 Property List Interface

*HDF5 Property List Interface*


---

**Description**

The functions, macros, and subroutines listed here are used to manipulate property list objects in various ways, including to reset property values. With the use of property lists, HDF5 functions have been implemented and can be used in applications with many fewer parameters than would be required without property lists.

**Usage**

```

H5Pcreate          (type = h5default("H5P"), native = FALSE)
H5Pcopy           (h5plist)
H5Pget_class      (h5plist)
H5Pclose          (h5plist)
H5Pclose_class    (h5plistclass)
H5Pequal          (h5plistclass1, h5plistclass2)
H5Pset_libver_bounds (h5plist,
                    libver_low = "H5F_LIBVER_EARLIEST",
                    libver_high = "H5F_LIBVER_LATEST")
H5Pget_libver_bounds (h5plist)

```

**Arguments**

type	A character name of a property list type. See <code>h5const("H5P")</code> for possible property list types. Can also be an integer representing an HDF5 property list type.
native	An object of class <code>logical</code> . If <code>TRUE</code> , array-like objects are treated as stored in HDF5 row-major rather than R column-major orientation. Using <code>native = TRUE</code> increases HDF5 file portability between programming languages. A file written with <code>native = TRUE</code> should also be read with <code>native = TRUE</code> .
h5plist	An object of class <code>H5IdComponent</code> representing a H5 property list identifier. See <code>H5Pcreate</code> or <code>H5Pcopy</code> to create an object of this kind.
h5plistclass, h5plistclass1, h5plistclass2	An object of class <code>H5IdComponent</code> representing a H5 property list class identifier. See <code>H5Pget_class</code> to create an object of this kind.
libver_low	A character value representing the lower bound on the library version for reading or writing the HDF5 file. See <code>h5const("H5F_LIBVER")</code> for possible arguments. Default is <code>"H5F_LIBVER_EARLIEST"</code>
libver_high	A character value representing the higher bound on the library version for reading or writing the HDF5 file. See <code>h5const("H5F_LIBVER")</code> for possible arguments. Default is <code>"H5F_LIBVER_LATEST"</code>

**Details**

Interface to the HDF5 C-library `libhdf5`. See <https://portal.hdfgroup.org/display/HDF5/Property+Lists> for further details.

**Value**

H5Pcreate and H5Pcopy return an object of class `H5IdComponent` representing a H5 property list identifier.

H5Pget\_class returns an object of class `H5IdComponent` representing a H5 property list class identifier.

The other functions return the standard return value from their respective C-functions.

**Author(s)**

Bernd Fischer

**References**

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

**See Also**

[rhdf5](#), [H5P\\_DATASET\\_CREATE](#)

**Examples**

```
pid <- H5Pcreate()
pid2 <- H5Pcopy(pid)
pclid <- H5Pget_class(pid)
H5Pclose_class(pclid)
H5Pclose(pid)
H5Pclose(pid2)
```

---

rhdf5

*Package overview*

---

**Description**

rhdf5 is an interface to the HDF5 library. The R-package contains the complete HDF5 library, thus no further installation of external packages is necessary.

There are a number of high level R functions that provide a convenient way of accessing HDF5 file as well as R interfaces to a number of functions in the C-library.

**Package content**

HDF5 file, group, dataset creation

- [h5createFile](#)
- [h5createGroup](#)
- [h5createDataset](#)

HDF5 file content listing

- [h5ls](#)
- [h5dump](#)

### Reading and writing data

- [h5read](#), [h5write](#)
- [h5dump](#), [h5save](#)

### HDF5 constants

- [h5const](#), [h5default](#), [h5constType](#)

### HDF5 version number

- [h5version](#)

### Low level interface to HDF5 C-library (for expert users only!):

- general HDF5 functions ([H5open](#) / [H5close](#) / [H5garbage\\_collect](#) / [H5get\\_libversion](#))
- HDF5 File Interface ([H5Fcreate](#), [H5Fopen](#) / [H5Fclose](#) / [H5Fflush](#))
- HDF5 Group Interface ([H5Gcreate](#), [H5Gcreate\\_anon](#), [H5Gopen](#) / [H5Gclose](#) / [H5Gget\\_info](#), [H5Gget\\_info\\_by\\_idx](#), [H5Gget\\_info\\_by\\_name](#))
- HDF5 Link Interface ([H5Lexists](#), [H5Lget\\_info](#))
- HDF5 Object Interface ([H5Oopen](#), [H5Oclose](#), [H5Oget\\_num\\_attrs](#), [H5Oget\\_num\\_attrs\\_by\\_name](#))
- HDF5 Identifier Interface ([H5Iget\\_type](#), [H5Iget\\_name](#), [H5Iis\\_valid](#))
- HDF5 Dataset Interface ([H5Dcreate](#), [H5Dopen](#) / [H5Dclose](#) / [H5Dget\\_space](#) / [H5Dread](#), [H5Dwrite](#))
- HDF5 Attribute Interface ([H5Acreate](#), [H5Aopen](#), [H5Aopen\\_by\\_idx](#), [H5Aopen\\_by\\_name](#) / [H5Aclose](#), [H5Adelete](#) / [H5Aexists](#) / [H5Aget\\_name](#), [H5Aget\\_space](#), [H5Aget\\_type](#) / [H5Aread](#), [H5Awrite](#))
- HDF5 Dataspace Interface ([H5Screate](#), [H5Screate\\_simple](#), [H5Scopy](#) / [H5Sclose](#) / [H5Sis\\_simple](#), [H5Sget\\_simple\\_extent\\_dims](#) / [H5Sselect\\_hyperslab](#))
- HDF5 Datatype Interface ([H5Tcopy](#), [H5Tset\\_size](#))

### Authors

R-interface by

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The package contains the HDF5 library (<https://portal.hdfgroup.org/display/HDF5>).

### Examples

```
h5createFile("ex_hdf5file.h5")

# create groups
h5createGroup("ex_hdf5file.h5", "foo")
h5createGroup("ex_hdf5file.h5", "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, "ex_hdf5file.h5", "foo/B")

# read a matrix
E = h5read("ex_hdf5file.h5", "foo/B")

# list content of hdf5 file
```

```

h5ls("ex_hdf5file.h5")

# write and read submatrix
h5createDataset("ex_hdf5file.h5", "foo/S", c(5,8), storage.mode = "integer", chunk=c(5,1), level=7)
h5write(matrix(1:5,nr=5,nc=1), file="ex_hdf5file.h5", name="foo/S", index=list(NULL,1))
h5read("ex_hdf5file.h5", "foo/S")
h5read("ex_hdf5file.h5", "foo/S", index=list(2:3,2:3))

```

[-methods

*Methods for Function [ in Package **rhdf5*****Description**

Methods for function [ in package **rhdf5**.

**Methods**

signature(x = "H5IdComponent") 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.

[&lt;--methods

*Methods for Function [<- in Package **rhdf5*****Description**

Methods for function [<- in package **rhdf5**.

**Methods**

signature(x = "H5IdComponent") 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 h5createDataset().

\$-methods

*Methods for Function \$ in Package **rhdf5*****Description**

Methods for function \$ in package **rhdf5**.

**Methods**

signature(x = "H5IdComponent") Reads the HDF5 object e2 in the HDF5 location e1. e1 can either be a file handle as returned by H5Fopen() or a group handle as e.g. returned by h5f\$g1 or h5f\$'g1/g2's.

---

 \$<--methods

 ~~ *Methods for Function \$<- in Package rhdf5* ~~
 

---

### Description

Methods for function \$<- in package **rhdf5**.

### Methods

`signature(x = "H5IdComponent")` Writes the assigned object to to the HDF5 file at location `e1`. `e1` can either be a file handle as returned by `H5Fopen()` or a group handle as e.g. returned by `h5f$g1` or `h5f$'/g1/g2'`'s. 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 `h5createDataset` first.

---

 &-methods

*Methods for Function & in Package rhdf5*


---

### Description

Methods for function & in package **rhdf5**.

### Methods

`signature(e1 = "H5IdComponent", e2 = "ANY")` Returns a group handle or dataset handle for the group or dataset `e2` in the HDF5 location `e1`. `e1` can either be a file handle as returned by `H5Fopen()` or a group handle as e.g. returned by `h5f$g1` or `h5f$'/g1/g2'`'s.

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