

Package ‘beachmat.hdf5’

April 24, 2025

Version 1.7.0

Date 2024-11-08

Title beachmat bindings for HDF5-backed matrices

Description Extends beachmat to support initialization of tatami matrices from HDF5-backed arrays. This allows C++ code in downstream packages to directly call the HDF5 C/C++ library to access array data, without the need for block processing via DelayedArray. Some utilities are also provided for direct creation of an in-memory tatami matrix from a HDF5 file.

Encoding UTF-8

Imports methods, beachmat, HDF5Array, DelayedArray, Rcpp

Suggests testthat, BiocStyle, knitr, rmarkdown, rhdf5, Matrix

LinkingTo Rcpp, assorthead, beachmat, Rhdf5lib

biocViews DataRepresentation, DataImport, Infrastructure

License GPL-3

NeedsCompilation yes

VignetteBuilder knitr

SystemRequirements C++17, GNU make

RoxygenNote 7.3.2

git_url <https://git.bioconductor.org/packages/beachmat.hdf5>

git_branch devel

git_last_commit 5f639f4

git_last_commit_date 2025-04-15

Repository Bioconductor 3.22

Date/Publication 2025-04-24

Author Aaron Lun [aut, cre]

Maintainer Aaron Lun <infinite.monkeys.with.keyboards@gmail.com>

Contents

initializeCpp	2
initializeOptions	3
loadIntoMemory	4

Index	5
--------------	----------

initializeCpp	<i>Initialize HDF5-backed matrices.</i>
---------------	---

Description

Initialize C++ representations of HDF5-backed matrices based on their **HDF5Array** representations.

Usage

```
## S4 method for signature 'H5SparseMatrixSeed'
initializeCpp(
  x,
  ...,
  hdf5.cache.size = getAutoBlockSize(),
  hdf5.realize = initializeOptions("realize"),
  memorize = hdf5.realize,
  hdf5.realize.force.integer = initializeOptions("realize.force.integer")
)

## S4 method for signature 'HDF5ArraySeed'
initializeCpp(
  x,
  ...,
  hdf5.cache.size = getAutoBlockSize(),
  hdf5.realize = initializeOptions("realize"),
  memorize = hdf5.realize,
  hdf5.realize.force.integer = initializeOptions("realize.force.integer")
)
```

Arguments

<code>x</code>	A HDF5Array seed object.
<code>...</code>	Further arguments, ignored.
<code>hdf5.cache.size</code>	Integer scalar specifying the size of the cache in bytes during data extraction from a HDF5 matrix. Larger values reduce disk I/O during random access to the matrix, at the cost of increased memory usage.
<code>hdf5.realize</code>	See the realize option in initializeOptions .
<code>memorize</code>	Deprecated, use <code>hdf5.realize</code> instead.
<code>hdf5.realize.force.integer</code>	See the <code>force.integer</code> option in initializeOptions .

Value

An external pointer that can be used in any **tatami**-compatible function.

Author(s)

Aaron Lun

Examples

```
library(HDF5Array)
y <- matrix(runif(1000), ncol=20, nrow=50)
z <- as(y, "HDF5Array")
ptr <- initializeCpp(z)
```

initializeOptions	<i>Options for HDF5 matrices</i>
-------------------	----------------------------------

Description

Options for initializing HDF5 matrices in [initializeCpp](#).

Usage

```
initializeOptions(option, value)
```

Arguments

option	String specifying the name of the option.
value	Value of the option.

Details

The following options are supported:

- `realize`, a logical scalar specifying whether to load the matrix data from HDF5 into memory with [loadIntoMemory](#), and then cache it for future calls with [checkMemoryCache](#). This avoids time-consuming disk I/O when performing multiple passes through the matrix, at the expense of increased memory usage.
- `realize.force.integer`, a logical scalar indicating whether values should be coerced into integers when loading the matrix into memory with [loadIntoMemory](#).

Value

If value is missing, the current setting of option is returned.

If value is supplied, it is used to set the option, and the previous value of the option is invisibly returned.

Author(s)

Aaron Lun

Examples

```
initializeOptions("realize.force.integer")
old <- initializeOptions("realize.force.integer", TRUE) # setting to a new value
initializeOptions("realize.force.integer") # new option takes affect
initializeOptions("realize.force.integer", old) # setting it back
```

loadIntoMemory	<i>Load a HDF5 matrix into memory</i>
----------------	---------------------------------------

Description

Load a HDF5-backed matrix into memory as an external pointer to a **tatami**-compatible representation. This differs from the (default) behavior of `initializeCpp`, which only loads slices of the matrix on request.

Usage

```
loadIntoMemory(x, force.integer = FALSE)
```

Arguments

<code>x</code>	A HDF5Array -derived matrix or seed object.
<code>force.integer</code>	Whether to force floating-point values to be integers to reduce memory consumption.

Value

An external pointer that can be used in **tatami**-based functions.

Author(s)

Aaron Lun

Examples

```
library(HDF5Array)
y <- matrix(runif(1000), ncol=20, nrow=50)
z <- as(y, "HDF5Array")
ptr <- loadIntoMemory(z)
```

Index

checkMemoryCache, [3](#)

initializeCpp, [2](#), [3](#), [4](#)

initializeCpp,H5SparseMatrixSeed-method
(initializeCpp), [2](#)

initializeCpp,HDF5ArraySeed-method
(initializeCpp), [2](#)

initializeOptions, [2](#), [3](#)

loadIntoMemory, [3](#), [4](#)