Package 'beachmat.hdf5'

April 27, 2025

Version 1.6.0

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 RELEASE_3_21

git_last_commit 4d7dcf7

git_last_commit_date 2025-04-15

Repository Bioconductor 3.21

Date/Publication 2025-04-27

Author Aaron Lun [aut, cre]

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

Contents

initializeCpp 2
initializeOptions 3
loadIntoMemory 4

Index **6**

`initializeCpp` *Initialize HDF5-backed matrices.*

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

`x`	A **HDF5Array** seed object.
`...`	Further arguments, ignored.
`hdf5.cache.size`	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.
`hdf5.realize`	See the `realize` option in `initializeOptions`.

`memorize`	Deprecated, use `hdf5.realize` instead.
`hdf5.realize.force.integer`	See the `force.integer` 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 *Options for HDF5 matrices*

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 *Load a HDF5 matrix into memory*

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

`x`	A **HDF5Array**-derived matrix or seed object.
`force.integer`	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*, 3

loadIntoMemory, *3*, 4