Package ‘GDSArray’

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Title Representing GDS files as array-like objects

Version 1.23.3

Description GDS files are widely used to represent genotyping or sequence data. The GDSArray package implements the `GDSArray` class to represent nodes in GDS files in a matrix-like representation that allows easy manipulation (e.g., subsetting, mathematical transformation) in _R_. The data remains on disk until needed, so that very large files can be processed.

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Depends R (>= 3.5), gdsfmt, methods, BiocGenerics, DelayedArray (>= 0.5.32)

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BugReports https://github.com/Bioconductor/GDSArray/issues

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Contents

acquireGDS 2
extract_array 3
GDSFile-class 4
seed,GDSArray-method 5

Index **7**

`acquireGDS` *Acquire the GDS file connection in R in the* `gds.class` *class.*

Description

Acquire a (possibly cached) `gds.class` object given it's path.

Usage

```
acquireGDS(path, type = NULL, ...)

releaseGDS(path, type = NULL, ...)
```

Arguments

`path`	String containing a path to a GDS file.
`type`	String containing the GDS file type. Case insensitive. Can be "seqgds" for a GDS file with sequencing data, or "snpgds" for a GDS file with SNP data. This argument was added for the `VariantExperiment` package for certain functionalities. By default is NULL, which returns a regular `gds.class`.
`other`	arguments to be passed to `openfn.gds()` inside `acquireGDS`.

Details

`acquireConn` will cache the `gds.class` object in the current R session to avoid repeated initialization. This improves efficiency for repeated calls. The cached `gds.class` object for any given `path` can be deleted by calling `releaseGDS` for the same `path`.

Value

For `acquireGDS`, by default returns a regular `gds.class` object, which are identical to that returned by `gdsfmt::openfn.gds(path)`. If `type` is not NULL, a `SeqVarGDSClass` that is identical to `SeqArray::seqOPen(path)`, or `SNPGDSFileClass` that is identical to `SNPRelate::snpgdsOpen(path)`. Both are inherited from `gds.class` but with additional checking and methods.

For `releaseGDS`, any existing `gds.class` object for the `path` is disconnected and cleared from cache, and `NULL` is invisibly returned. This is equivalent to that returned by `gdsfmt::closefn.gds()` except it take `path` as input. If `path=NULL`, all cached connections are removed.

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Examples

```
fn <- gdsExampleFileName()
gdscon <- acquireGDS(fn)
acquireGDS(fn)  ## just re-uses the cache
acquireGDS(fn, type = "seqgds") ## construct a new GDS connection
releaseGDS(fn)  ## clears the cache
```

---

extract_array — *GDSArray constructor and coercion methods.*

Description

`extract_array`: the function to extract data from a `GDS` file, by taking `GDSArraySeed` as input. This function is required by the `DelayedArray` for the seed contract.

`GDSArray`: The function to convert a gds file into the GDSArray data structure.

`GDSArray` example data

Usage

```
## S4 method for signature 'GDSArraySeed'
extract_array(x, index)

GDSArray(gdsfile, varname)

gdsExampleFileName(type = c("seqgds", "snpgds"))
```

Arguments

`x`	the GDSArraySeed object
`index`	An unnamed list of subscripts as positive integer vectors, one vector per dimension in `x`. Empty and missing subscripts (represented by `integer(0)` and `NULL` list elements, respectively) are allowed. The subscripts can contain duplicated indices. They cannot contain NAs or non-positive values.
`gdsfile`	Can be a GDSArraySeed, a character string of gds file name, or an "gds.class" R object.
`varname`	A character string specifying the gds array node to be read into GDSArray.
`type`	the type of gds file, available are "seqgds" for `SeqVarGDSClass` and "snpgds" for `SNPGDSFileClass`.

Value

GDSArray class object.

Examples

```
fn <- gdsExampleFileName("snpgds")
allnodes <- gdsnodes(fn)  ## print all available gds nodes in fn.
allnodes
GDSArray(fn, "genotype")
GDSArray(fn, "sample.annot/pop.group")

fn1 <- gdsExampleFileName("seqgds")
allnodes1 <- gdsnodes(fn1)  ## print all available gds nodes in fn1.
allnodes1
## GDSArray(fn1, "genotype/data")
GDSArray(fn1, "variant.id")
GDSArray(fn1, "sample.annotation/family")
GDSArray(fn1, "annotation/format/DP/data")
GDSArray(fn1, "annotation/info/DP")
gdsExampleFileName("snpgds")
gdsExampleFileName("seqgds")
```

GDSFile-class *GDSFile constructor and methods.*

Description

GDSFile: GDSFile is a light-weight class to represent a GDS file. It has the '$' completion method to complete any possible gds nodes. If the slot of 'current_path' in 'GDSFile' object represent a valid gds node, it will return the 'GDSArray' of that node directly. Otherwise, it will return the 'GDSFile' object with an updated 'current_path'.

GDSFile: the GDSFile class constructor.

gdsfn: filename slot getter for GDSFile object.

gdsfn<-: filename slot setter for GDSFile object.

gdsnodes: to get the available gds nodes from a gds file name or a GDSFile object.

Usage

```
GDSFile(file, current_path = "")

## S4 method for signature 'GDSFile'
gdsfn(object)

gdsfn(object) <- value

## S4 method for signature 'GDSFile'
x$name
```

```
## S4 method for signature 'ANY'
gdsnodes(x, node)
```

Arguments

file	the GDS file path.
current_path	the current path to the closest gds node.
object	GDSFile object.
value	the new gds file path
x	a character string for the GDS file name or a GDSFile object.
name	the name of gds node
node	the node name of a gds file or GDSFile object.

Value

gdsfn: the file path of corresponding GDSfile object.

$: a GDSFile with updated @current_path, or GDSArray object if the current_path is a valid gds node.

gdsnodes: a character vector of all available gds nodes within the related GDS file and the specified node.

Examples

```
fn <- gdsExampleFileName("seqgds")
gf <- GDSFile(fn)
gdsfn(gf)
fn <- gdsExampleFileName("seqgds")
gdsnodes(fn)
gdsnodes(fn, "annotation/info")
fn1 <- gdsExampleFileName("snpgds")
gdsnodes(fn1)
gdsnodes(fn1, "sample.annot")
gf <- GDSFile(fn)
gdsnodes(gf)
gdsnodes(gf, "genotype")
gdsfn(gf)
```

---

seed,GDSArray-method *GDSArraySeed or GDSArray related methods, slot getters and setters.*

Description

dim, dimnames: dimension and dimnames of object contained in the GDS file.

seed: the GDSArraySeed getter for GDSArray object.

seed<-: the GDSArraySeed setter for GDSArray object.

gdsfn: on-disk location of GDS file represented by this object.

Usage

```
## S4 method for signature 'GDSArray'
seed(x)

## S4 replacement method for signature 'GDSArray'
seed(x) <- value

gdsfn(object)

## S4 method for signature 'GDSArraySeed'
gdsfn(object)

## S4 method for signature 'GDSArray'
gdsfn(object)

## S4 method for signature 'DelayedArray'
gdsfn(object)
```

Arguments

x	the GDSArray and GDSArraySeed objects.
value	the new GDSArraySeed for the GDSArray object.
object	GDSArray, GDSMatrix, GDSArraySeed, GDSFile or SummarizedExperiment object.

Value

dim: the integer vector of dimensions for GDSArray or GDSArraySeed objects.

dimnames: the unnamed list of dimension names for GDSArray and GDSArraySeed objects.

seed: the GDSArraySeed of GDSArray object.

gdsfn: the character string for the gds file path.

Examples

```
fn <- gdsExampleFileName("snpgds")
ga <- GDSArray(fn, "sample.annot/pop.group")
dim(ga)
dimnames(ga)
type(ga)
seed(ga)
dim(seed(ga))
gdsfn(ga)
```

Index

$,GDSFile-method *(GDSFile-class)*, 4

acquireGDS, 2

coerce *(extract_array)*, 3
coerce,ANY,GDSMatrix-method *(extract_array)*, 3
coerce,GDSArray,GDSMatrix-method *(extract_array)*, 3
coerce,GDSMatrix,GDSArray-method *(extract_array)*, 3

extract_array, 3
extract_array,GDSArraySeed-method *(extract_array)*, 3

GDSArray *(extract_array)*, 3
GDSArray-class *(extract_array)*, 3
GDSArray-data *(extract_array)*, 3
GDSArray-method *(extract_array)*, 3
gdsExampleFileName *(extract_array)*, 3
GDSFile *(GDSFile-class)*, 4
GDSFile,gdsfn-method *(GDSFile-class)*, 4
GDSFile-class, 4
GDSFile-constructor *(GDSFile-class)*, 4
GDSFile-method *(GDSFile-class)*, 4
gdsfn *(seed,GDSArray-method)*, 5
gdsfn,DelayedArray-method *(seed,GDSArray-method)*, 5
gdsfn,GDSArray-method *(seed,GDSArray-method)*, 5
gdsfn,GDSArraySeed-method *(seed,GDSArray-method)*, 5
gdsfn,GDSFile-method *(GDSFile-class)*, 4
gdsfn<- *(GDSFile-class)*, 4
GDSMatrix *(extract_array)*, 3
GDSMatrix-class *(extract_array)*, 3
gdsnodes *(GDSFile-class)*, 4
gdsnodes,ANY-method *(GDSFile-class)*, 4
gdsnodes,GDSFile-method *(GDSFile-class)*, 4

matrixClass,GDSArray-method *(extract_array)*, 3

releaseGDS *(acquireGDS)*, 2

seed,GDSArray-method, 5
seed<-,GDSArray-method *(seed,GDSArray-method)*, 5