

# Package ‘DelayedDataFrame’

January 20, 2023

**Title** Delayed operation on DataFrame using standard DataFrame metaphor

**Version** 1.15.0

**Description** Based on the standard DataFrame metaphor, we are trying to implement the feature of delayed operation on the DelayedDataFrame, with a slot of lazyIndex, which saves the mapping indexes for each column of DelayedDataFrame. Methods like show, validity check, [/[ subsetting, rbind/cbind are implemented for DelayedDataFrame to be operated around lazyIndex. The listData slot stays untouched until a realization call e.g., DataFrame constructor OR as.list() is invoked.

**biocViews** Infrastructure, DataRepresentation

**Depends** R (>= 3.6), S4Vectors (>= 0.23.19), DelayedArray (>= 0.7.5)

**License** GPL-3

**Encoding** UTF-8

**URL** <https://github.com/Bioconductor/DelayedDataFrame>

**BugReports** <https://github.com/Bioconductor/DelayedDataFrame/issues>

**Imports** methods, stats, BiocGenerics

**RoxygenNote** 7.0.2

**Suggests** testthat, knitr, rmarkdown, SeqArray, GDSArray

**Collate** LazyIndex-class.R DelayedDataFrame-class.R  
DelayedDataFrame-method.R

**VignetteBuilder** knitr

**git\_url** <https://git.bioconductor.org/packages/DelayedDataFrame>

**git\_branch** master

**git\_last\_commit** 397720d

**git\_last\_commit\_date** 2022-11-01

**Date/Publication** 2023-01-20

**Author** Qian Liu [aut, cre],  
Hervé Pagès [aut],  
Martin Morgan [aut]

**Maintainer** Qian Liu <Qian.Liu@roswellpark.org>

**R topics documented:**

as.list,DelayedDataFrame-method . . . . .	2
DelayedDataFrame . . . . .	3
LazyIndex-class . . . . .	5

<b>Index</b>	<b>6</b>
--------------	----------

---

as.list,DelayedDataFrame-method  
*DelayedDataFrame related methods.*

---

**Description**

as.list, rbind would incur realization of the lazyIndex slot in DelayedDataFrame object.  
 cbind for DelayedDataFrame inherits the lazyIndex's if inputs have any DelayedDataFrame objects. Otherwise, return a new DelayedDataFrame with NULL lazyIndexes.

**Usage**

```
## S4 method for signature 'DelayedDataFrame'
as.list(x, use.names = TRUE)

## S4 method for signature 'DelayedDataFrame'
names(x)

## S4 method for signature 'DelayedDataFrame'
cbind(..., deparse.level = 1)

## S4 method for signature 'DelayedDataFrame'
bindROWS(
  x,
  objects = list(),
  use.names = TRUE,
  ignore.mcols = FALSE,
  check = TRUE
)

## S4 method for signature 'DelayedDataFrame,ANY'
extractROWS(x, i)

## S4 method for signature 'DelayedDataFrame'
extractCOLS(x, i)

## S4 method for signature 'DelayedDataFrame'
replaceCOLS(x, i, value)

## S4 method for signature 'DelayedDataFrame'
```

```
mergeROWS(x, i, value)
```

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

### Arguments

<code>x</code>	<code>as.list,DelayedDataFrame</code> : a <code>DelayedDataFrame</code> object. OR, <code>[,DelayedDataFrame</code> : <code>DelayedDataFrame</code> object to be subsetted.
<code>use.names</code>	<code>as.list,DelayedDataFrame</code> : whether to use the colnames of <code>DelayedDataFrame</code> as the names for the returned list. OR, <code>bindROWS,DelayedDataFrame</code> : whether to use rownames of the input arguments. Default is <code>TRUE</code> .
<code>...</code>	<code>cbind,DelayedDataFrame</code> : One or more vector-like or matrix-like objects. These can be given as named arguments. OR, <code>[,DelayedDataFrame</code> : other arguments to pass.
<code>deparse.level</code>	See <code>'?base::cbind'</code> for a description of this argument.
<code>objects</code>	the <code>DelayedDataFrame</code> objects to be passed into <code>bindROWS</code> .
<code>ignore.mcols</code>	Logical. This argument is ignored for <code>bindROWS,DelayedDataFrame</code> .
<code>check</code>	Logical. This argument is ignored for <code>bindROWS,DelayedDataFrame</code> .
<code>i</code>	row subscript
<code>value</code>	the new values in the <code>i, j</code> subscripts of <code>DelayedDataFrame</code> object.
<code>j</code>	col subscript
<code>drop</code>	if drop with reduced dimension, default is <code>TRUE</code> .

### Value

colnames of `DelayedDataFrame`

---

<code>DelayedDataFrame</code>	<i>DelayedDataFrame-class</i>
-------------------------------	-------------------------------

---

### Description

The `DelayedDataFrame` class extends the `DataFrame` class and supports the storage of any type of object (with `'length'` and `'['` methods) as columns.

the `lazyIndex` slot getter and setter for `DelayedDataFrame` object.

the coercion method between `DataFrame` and `DelayedDataFrame` objects.

**Usage**

```
DelayedDataFrame(..., row.names = NULL, check.names = TRUE)

## S4 method for signature 'DelayedDataFrame'
lazyIndex(x)

.from_DataFrame_to_DelayedDataFrame(from)

.from_DelayedDataFrame_to_DFrame(from, to = "DFrame", strict = TRUE)

lazyIndex(x) <- value

## S4 replacement method for signature 'DelayedDataFrame'
lazyIndex(x) <- value
```

**Arguments**

...	the arguments to pass into construction of a new DelayedDataFrame.
row.names	the rownames for the newly constructed DelayedDataFrame object.
check.names	logical. If 'TRUE' then the names of the variables in the DelayedDataFrame are checked to ensure that they are syntactically valid variable names and are not duplicated. If necessary they are adjusted (by 'make.names') so that they are.
x	the DelayedDataFrame object.
from	the object to be converted.
to	the class of object to be returned by coercion.
strict	Logical. Whether to force return a DataFrame.
value	the new value of lazyIndex slot for DelayedDataFrame object.

**Details**

The DelayedDataFrame inherits from DataFrame and behaves very similarly in terms of construction, subsetting, splitting, combining, etc. The most notable exception is that The additional slot of lazyIndex, enables DelayedArray (with different back-ends) columns to share indexes when possible.

Please be very careful to use this replace method for lazyIndex slot. Because it only replace the lazyIndex slot, but not necessarily the nrow and rownames slots. If you want to have synchronized subsetting for all slots, the [ method should be used.

**Value**

lazyIndex<-: the DelayedDataFrame object with new value of lazyIndex slot.

**Examples**

```
DDF <- DelayedDataFrame(letters, LETTERS)
DDF1 <- DDF[1:10,]
DDF1
```

```
lazyIndex(DDF1)
as(DDF1, "DataFrame")
```

---

LazyIndex-class      *The LazyIndex class and methods.*

---

### Description

The LazyIndex class is designed to carry mapping indexes for DelayedDataFrame columns. So that some operations (e.g., subsetting) on DelayedDataFrame are delayed until a realization call is incurred. (e.g., as.list(), DataFrame(), ...)

LazyIndex constructor.

the subsetting method for LazyIndex object.

### Usage

```
LazyIndex(listData = list(), index = integer())
```

```
## S4 method for signature 'LazyIndex'
cbind(..., deparse.level = 1)
```

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

### Arguments

listData	the list data for all mapping indexes that are used in corresponding DelayedDataFrame object.
index	the position of mapping indexes in listData for each column of the corresponding DelayedDataFrame object.
...	LazyIndex objects.
deparse.level	See ?base::cbind for a description of this argument.
x	LazyIndex object.
i	row subscript for LazyIndex, which will subset the listData slot.
j	column subscript for LazyIndex, which will subset the index slot.
drop	Logical. Whether to drop the dimension if any of the dimensions has length 1. Default is TRUE.

### Details

the cbind, LazyIndex method is defined to bind the LazyIndexes column-wise when cbind, DelayedDataFrame function is called.

### Value

a LazyIndex object.

# Index

.DelayedDataFrame (DelayedDataFrame), 3  
.LazyIndex (LazyIndex-class), 5  
.from\_DataFrame\_to\_DelayedDataFrame  
  (DelayedDataFrame), 3  
.from\_DelayedDataFrame\_to\_DFrame  
  (DelayedDataFrame), 3  
[,DelayedDataFrame,ANY,ANY,ANY-method  
  (as.list,DelayedDataFrame-method),  
  2  
[,LazyIndex,ANY,ANY,ANY-method  
  (LazyIndex-class), 5  
[,LazyIndex-method (LazyIndex-class), 5  
as.list,DelayedDataFrame-method, 2  
bindROWS,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2  
cbind,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2  
cbind,LazyIndex-method  
  (LazyIndex-class), 5  
coerce (DelayedDataFrame), 3  
coerce,ANY,DelayedDataFrame-method  
  (DelayedDataFrame), 3  
coerce,DataFrame,DelayedDataFrame-method  
  (DelayedDataFrame), 3  
coerce,DelayedDataFrame,DataFrame-method  
  (DelayedDataFrame), 3  
coerce,DelayedDataFrame,DFrame-method  
  (DelayedDataFrame), 3  
coerce,DFrame,DelayedDataFrame-method  
  (DelayedDataFrame), 3  
DelayedDataFrame, 3  
DelayedDataFrame-class  
  (DelayedDataFrame), 3  
extractCOLS,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2  
extractROWS,DelayedDataFrame,ANY-method  
  (as.list,DelayedDataFrame-method),  
  2  
extractROWS,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2  
LazyIndex (LazyIndex-class), 5  
lazyIndex (DelayedDataFrame), 3  
lazyIndex,DelayedDataFrame  
  (DelayedDataFrame), 3  
lazyIndex,DelayedDataFrame-method  
  (DelayedDataFrame), 3  
LazyIndex-class, 5  
lazyIndex<- (DelayedDataFrame), 3  
lazyIndex<- , (DelayedDataFrame), 3  
lazyIndex<- ,DelayedDataFrame-method  
  (DelayedDataFrame), 3  
mergeROWS,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2  
names,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2  
replaceCOLS,DelayedDataFrame-method  
  (as.list,DelayedDataFrame-method),  
  2