

# Package ‘DelayedDataFrame’

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

**Version** 1.25.0

**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

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

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

**VignetteBuilder** knitr

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

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## 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`

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

<code>...</code>	the arguments to pass into construction of a new <code>DelayedDataFrame</code> .
<code>row.names</code>	the rownames for the newly constructed <code>DelayedDataFrame</code> object.
<code>check.names</code>	logical. If 'TRUE' then the names of the variables in the <code>DelayedDataFrame</code> 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.
<code>x</code>	the <code>DelayedDataFrame</code> object.
<code>from</code>	the object to be converted.
<code>to</code>	the class of object to be returned by coercion.
<code>strict</code>	Logical. Whether to force return a <code>DataFrame</code> .
<code>value</code>	the new value of <code>lazyIndex</code> slot for <code>DelayedDataFrame</code> 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")
```

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LazyIndex-class

*The LazyIndex class and methods.*

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**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**

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

**Details**

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

**Value**

a `LazyIndex` object.

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