

# Package ‘BufferedMatrix’

January 17, 2025

**Version** 1.71.1

**Title** A matrix data storage object held in temporary files

**Author** Ben Bolstad <bmb@bmbolstad.com>

**Maintainer** Ben Bolstad <bmb@bmbolstad.com>

**Depends** R (>= 2.6.0), methods

**Description** A tabular style data object where most data is stored outside main memory. A buffer is used to speed up access to data.

**License** LGPL (>= 2)

**URL** <https://github.com/bmbolstad/BufferedMatrix>

**Collate** allGenerics.R BufferedMatrix.R as.BufferedMatrix.R  
createBufferedMatrix.R

**LazyLoad** yes

**biocViews** Infrastructure

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

**git\_branch** devel

**git\_last\_commit** 824836d

**git\_last\_commit\_date** 2024-12-14

**Repository** Bioconductor 3.21

**Date/Publication** 2025-01-17

## Contents

as.BufferedMatrix . . . . .	2
BufferedMatrix-class . . . . .	2
createBufferedMatrix . . . . .	5

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

---

`as.BufferedMatrix`      *Check or Coerce object to BufferedMatrix*

---

### Description

'`as.BufferedMatrix`' will coerce the supplied object into a `BufferedMatrix`. '`is.BufferedMatrix`' checks whether the supplied argument is a `BufferedMatrix`.

### Usage

```
as.BufferedMatrix(x, bufferrows=1, buffercols=1,directory=getwd())
is.BufferedMatrix(x)
```

### Arguments

<code>x</code>	an R object
<code>bufferrows</code>	number of rows to be buffered if the row buffer is activated
<code>buffercols</code>	number of columns to be buffered
<code>directory</code>	path to directory where temporary files should be stored

### Details

These functions are useful for converting between R `matrix` objects and `BufferedMatrix` objects.

### Author(s)

B. M. Bolstad <bmb@bmbolstad.com>

---

`BufferedMatrix-class`      *Class BufferedMatrix*

---

### Description

This is a class representation of a buffered matrix (of numeric data). In this case data is primarily stored outside main memory in temporary files.

### Objects from the Class

Objects can be created using the function `createBufferedMatrix`

### Slots

`rawBufferedMatrix`: a pointer to an external structure used to access and store the matrix data.  
`rownames`: rownames for the matrix.  
`colnames`: colnames for the matrix.

**Methods**

**ncol** signature(object = "BufferedMatrix"): Returns the number of columns in the matrix

**nrow** signature(object = "BufferedMatrix"): Returns the number of rows in the matrix

**dim** signature(object = "BufferedMatrix"): Returns the dimensions of the matrix

**buffer.dim** signature(object = "BufferedMatrix"): Returns the number of columns and the number of rows to be stored in the buffer

**set.buffer.dim** signature(object = "BufferedMatrix"): Set the buffer size or resize it

[ signature(object = "BufferedMatrix"): matrix accessor

[<- signature(object = "BufferedMatrix"): matrix replacer

**show** signature(object = "BufferedMatrix"): prints basic information about the BufferedMatrix out to screen

**is.RowMode** signature(object = "BufferedMatrix"): returns TRUE if the row buffer is active and FALSE otherwise.

**is.ColMode** signature(object = "BufferedMatrix"): returns TRUE if the row buffer is inactive and FALSE otherwise.

**RowMode** signature(object = "BufferedMatrix"): Activate the row buffer.

**ColMode** signature(object = "BufferedMatrix"): Deactivate the row buffer

**duplicate** signature(object = "BufferedMatrix"): Make a copy of the BufferedMatrix

**prefix** signature(object = "BufferedMatrix"): return the initial part of the string used for temporary files

**directory** signature(object = "BufferedMatrix"): return the location where temporary files are stored

**filenames** signature(object = "BufferedMatrix"): return the fully pathed filenames for each column in the matrix

**ewApply** signature(object = "BufferedMatrix"): apply a function elementwise

**exp** signature(object = "BufferedMatrix"): Compute the exponential elementwise of the matrix

**sqrt** signature(object = "BufferedMatrix"): Compute the square-root elementwise of the matrix

**pow** signature(object = "BufferedMatrix"): Compute  $x^{\text{power}}$  elementwise of the matrix

**log** signature(object = "BufferedMatrix"): Compute logarithm elementwise of the matrix

**colMax** signature(object = "BufferedMatrix"): Returns a vector containing maximums by column

**rowMax** signature(object = "BufferedMatrix"): Returns a vector containing maximums by row

**colMeans** signature(object = "BufferedMatrix"): Returns a vector containing means by column

**rowMeans** signature(object = "BufferedMatrix"): Returns a vector containing means by row

**colMin** signature(object = "BufferedMatrix"): Returns a vector containing minimums by column

**rowMin** signature(object = "BufferedMatrix"): Returns a vector containing minimums by row

**colVars** signature(object = "BufferedMatrix"): Returns a vector containing sample variances by column

**rowVars** signature(object = "BufferedMatrix"): Returns a vector containing sample variances by row

**colSd** signature(object = "BufferedMatrix"): Returns a vector containing sample standard deviations by column

**rowSd** signature(object = "BufferedMatrix"): Returns a vector containing sample standard deviations by row

**colSums** signature(object = "BufferedMatrix"): Returns a vector containing sum by column

**rowSums** signature(object = "BufferedMatrix"): Returns a vector containing sum by row

**colMedians** signature(object = "BufferedMatrix"): Returns a vector containing medians by column

**rowMedians** signature(object = "BufferedMatrix"): Returns a vector containing medians by row. Best only used when the matrix is in RowMode (otherwise it is extremely slow)

**Max** signature(object = "BufferedMatrix"): Returns the maximum of all elements in the matrix

**Min** signature(object = "BufferedMatrix"): Returns the minimum of all elements in the matrix

**Var** signature(object = "BufferedMatrix"): Returns the sample variance of all elements in the matrix

**Sd** signature(object = "BufferedMatrix"): Returns the sample standard deviations of all elements in the matrix

**Sum** signature(object = "BufferedMatrix"): Returns the sum of all elements in the matrix

**mean** signature(object = "BufferedMatrix"): Returns the mean of all elements in the matrix

**colApply** signature(object = "BufferedMatrix"): apply a function columnwise. Returns either a vector or BufferedMatrix.

**rowApply** signature(object = "BufferedMatrix"): apply a function row-wise. Returns either a vector or BufferedMatrix.

**as.matrix** signature(object = "BufferedMatrix"): coerce BufferedMatrix into a regular R matrix

**subBufferedMatrix** signature(object = "BufferedMatrix"): gets data from BufferedMatrix and returns it in another BufferedMatrix

**rownames** signature(object = "BufferedMatrix") : access the row names

**colnames** signature(object = "BufferedMatrix") : access the column names

**rownames<-** signature(object = "BufferedMatrix") : replace the row names

**colnames<-** signature(object = "BufferedMatrix") : replace the column names

**dimnames** signature(object = "BufferedMatrix") : Access the row and column names

**dimnames** signature(object = "BufferedMatrix") : Replace the row and column names

**ReadOnlyMode** signature(object = "BufferedMatrix") : Toggles the Read Only mode on and off

**is.ReadOnlyMode** signature(object = "BufferedMatrix") : Finds out if it is in Read Only Mode

**memory.usage** signature(object = "BufferedMatrix") : Give amount of RAM currently in use by BufferedMatrix object

**disk.usage** signature(object = "BufferedMatrix") : Give amount of disk space currently in use by BufferedMatrix object

as(matrix, BufferedMatrix): Coerce matrix to BufferedMatrix.

as(BufferedMatrix, matrix): Coerce the Buffered to matrix.

AddColumn: Add an additional column to the matrix. Will be all empty (set to 0)

MoveStorageDirectory: Move the temporary files used to store the matrix from one location to another

### Author(s)

B. M. Bolstad <bmb@bmbolstad.com>

---

createBufferedMatrix    *createBufferedMatrix*

---

### Description

Creates a Buffered Matrix object

### Usage

```
createBufferedMatrix(rows, cols=0, bufferrows=1, buffercols=1, prefix="BM", directory=getwd())
```

### Arguments

rows	Number of rows in the matrix
cols	Initial number of coulmsns in the matrix
bufferrows	number of rows to be buffered if the row buffer is activated
buffercols	number of columns to be buffered
prefix	String to be used as start of name for any temporary files
directory	path to directory where temporary files should be stored

### Author(s)

B. M. Bolstad <bmb@bmbolstad.com>

# Index

- \* **classes**
  - BufferedMatrix-class, 2
- \* **manip**
  - as.BufferedMatrix, 2
  - [,BufferedMatrix-method (BufferedMatrix-class), 2
  - [<- ,BufferedMatrix-method (BufferedMatrix-class), 2
  
  - AddColumn (BufferedMatrix-class), 2
  - AddColumn,BufferedMatrix-method (BufferedMatrix-class), 2
  - as.BufferedMatrix, 2
  - as.matrix,BufferedMatrix-method (BufferedMatrix-class), 2
  
  - buffer.dim (BufferedMatrix-class), 2
  - buffer.dim,BufferedMatrix-method (BufferedMatrix-class), 2
  - BufferedMatrix, 2
  - BufferedMatrix-class, 2
  
  - coerce,BufferedMatrix,matrix-method (BufferedMatrix-class), 2
  - coerce,matrix,BufferedMatrix-method (BufferedMatrix-class), 2
  - colApply (BufferedMatrix-class), 2
  - colApply,BufferedMatrix-method (BufferedMatrix-class), 2
  - colMax (BufferedMatrix-class), 2
  - colMax,BufferedMatrix-method (BufferedMatrix-class), 2
  - colMeans (BufferedMatrix-class), 2
  - colMeans,BufferedMatrix-method (BufferedMatrix-class), 2
  - colMedians (BufferedMatrix-class), 2
  - colMedians,BufferedMatrix-method (BufferedMatrix-class), 2
  - colMin (BufferedMatrix-class), 2
  - colMin,BufferedMatrix-method (BufferedMatrix-class), 2
  - ColMode (BufferedMatrix-class), 2
  - ColMode,BufferedMatrix-method (BufferedMatrix-class), 2
  - colnames,BufferedMatrix-method (BufferedMatrix-class), 2
  - colnames<- ,BufferedMatrix-method (BufferedMatrix-class), 2
  - colRanges (BufferedMatrix-class), 2
  - colRanges,BufferedMatrix-method (BufferedMatrix-class), 2
  - colSd (BufferedMatrix-class), 2
  - colSd,BufferedMatrix-method (BufferedMatrix-class), 2
  - colSums (BufferedMatrix-class), 2
  - colSums,BufferedMatrix-method (BufferedMatrix-class), 2
  - colVars (BufferedMatrix-class), 2
  - colVars,BufferedMatrix-method (BufferedMatrix-class), 2
  - createBufferedMatrix, 2, 5
  
  - dim,BufferedMatrix-method (BufferedMatrix-class), 2
  - dimnames,BufferedMatrix-method (BufferedMatrix-class), 2
  - dimnames<- ,BufferedMatrix-method (BufferedMatrix-class), 2
  - directory (BufferedMatrix-class), 2
  - directory,BufferedMatrix-method (BufferedMatrix-class), 2
  - disk.usage (BufferedMatrix-class), 2
  - disk.usage,BufferedMatrix-method (BufferedMatrix-class), 2
  - duplicate (BufferedMatrix-class), 2
  - duplicate,BufferedMatrix-method (BufferedMatrix-class), 2
  
  - ewApply (BufferedMatrix-class), 2

- ewApply, BufferedMatrix-method  
(BufferedMatrix-class), 2
- exp, BufferedMatrix-method  
(BufferedMatrix-class), 2
- filenames (BufferedMatrix-class), 2
- filenames, BufferedMatrix-method  
(BufferedMatrix-class), 2
- is.BufferedMatrix (as.BufferedMatrix), 2
- is.ColMode (BufferedMatrix-class), 2
- is.ColMode, BufferedMatrix-method  
(BufferedMatrix-class), 2
- is.ReadOnlyMode (BufferedMatrix-class),  
2
- is.ReadOnlyMode, BufferedMatrix-method  
(BufferedMatrix-class), 2
- is.RowMode (BufferedMatrix-class), 2
- is.RowMode, BufferedMatrix-method  
(BufferedMatrix-class), 2
- log, BufferedMatrix-method  
(BufferedMatrix-class), 2
- matrix, 2, 4
- Max (BufferedMatrix-class), 2
- Max, BufferedMatrix-method  
(BufferedMatrix-class), 2
- mean, BufferedMatrix-method  
(BufferedMatrix-class), 2
- memory.usage (BufferedMatrix-class), 2
- memory.usage, BufferedMatrix-method  
(BufferedMatrix-class), 2
- Min (BufferedMatrix-class), 2
- Min, BufferedMatrix-method  
(BufferedMatrix-class), 2
- MoveStorageDirectory  
(BufferedMatrix-class), 2
- MoveStorageDirectory, BufferedMatrix-method  
(BufferedMatrix-class), 2
- ncol, BufferedMatrix-method  
(BufferedMatrix-class), 2
- nrow, BufferedMatrix-method  
(BufferedMatrix-class), 2
- pow (BufferedMatrix-class), 2
- pow, BufferedMatrix-method  
(BufferedMatrix-class), 2
- prefix (BufferedMatrix-class), 2
- prefix, BufferedMatrix-method  
(BufferedMatrix-class), 2
- ReadOnlyMode (BufferedMatrix-class), 2
- ReadOnlyMode, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowApply (BufferedMatrix-class), 2
- rowApply, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowMax (BufferedMatrix-class), 2
- rowMax, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowMeans (BufferedMatrix-class), 2
- rowMeans, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowMedians (BufferedMatrix-class), 2
- rowMedians, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowMin (BufferedMatrix-class), 2
- rowMin, BufferedMatrix-method  
(BufferedMatrix-class), 2
- RowMode (BufferedMatrix-class), 2
- RowMode, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rownames, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rownames<-, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowSd (BufferedMatrix-class), 2
- rowSd, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowSums (BufferedMatrix-class), 2
- rowSums, BufferedMatrix-method  
(BufferedMatrix-class), 2
- rowVars (BufferedMatrix-class), 2
- rowVars, BufferedMatrix-method  
(BufferedMatrix-class), 2
- Sd (BufferedMatrix-class), 2
- Sd, BufferedMatrix-method  
(BufferedMatrix-class), 2
- set.buffer.dim (BufferedMatrix-class), 2
- set.buffer.dim, BufferedMatrix-method  
(BufferedMatrix-class), 2
- show, BufferedMatrix-method  
(BufferedMatrix-class), 2
- sqrt, BufferedMatrix-method  
(BufferedMatrix-class), 2

subBufferedMatrix  
    (BufferedMatrix-class), 2  
subBufferedMatrix, BufferedMatrix-method  
    (BufferedMatrix-class), 2  
Sum (BufferedMatrix-class), 2  
Sum, BufferedMatrix-method  
    (BufferedMatrix-class), 2  
  
Var (BufferedMatrix-class), 2  
Var, BufferedMatrix-method  
    (BufferedMatrix-class), 2