

# Package ‘BiocIO’

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**Title** Standard Input and Output for Bioconductor Packages

**Version** 1.17.1

**Description** The ``BiocIO`` package contains high-level abstract classes and generics used by developers to build IO functionality within the Bioconductor suite of packages. Implements ``import()`` and ``export()`` standard generics for importing and exporting biological data formats. ``import()`` supports whole-file as well as chunk-wise iterative import. The ``import()`` interface optionally provides a standard mechanism for 'lazy' access via ``filter()`` (on row or element-like components of the file resource), ``select()`` (on column-like components of the file resource) and ``collect()``. The ``import()`` interface optionally provides transparent access to remote (e.g. via https) as well as local access. Developers can register a file extension, e.g., ``.loom`` for dispatch from character-based URIs to specific ``import()`` / ``export()`` methods based on classes representing file types, e.g., ``LoomFile()``.

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BiocFile-class	<i>BiocFile class objects</i>
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Description

BiocFile is the base virtual class for high-level file abstractions where subclasses are associated with a particular file format or type. It wraps a low-level representation of a file, currently either a path, URL, or connection object. We can represent a list of BiocFile objects with a BiocFileList.

Usage

```
BiocFileList(files)

resource(x)

resource(x) <- value

## S4 method for signature 'BiocFile'
resource(x)

## S4 replacement method for signature 'BiocFile,character_OR_connection'
resource(x) <- value

fileFormat(x)

## S4 method for signature 'character'
fileFormat(x)
```

```
## S4 method for signature 'BiocFile'
fileFormat(x)

## S4 method for signature 'BiocFile'
path(object, ...)

## S4 method for signature 'BiocFile'
show(object)

FileForFormat(path, format = file_ext(path), prefix = NULL, suffix = "File")

## S4 method for signature 'BiocFile'
as.character(x)
```

### Arguments

files	character() A vector of file paths for the BiocFileList constructor
x	A BiocFile instance
object	A BiocFile instance
...	additional arguments to lower-level functions, not used.
path, value	Either a character or connection object to replace the original resource
format	character(1) The file extension conducive to a file class name, e.g., CSVFile
prefix	character(1) The prefix to prepend to the format class name, e.g., Spatial for a class SpatialCSV.
suffix	character(1) The suffix to append to the format class name, e.g., File for a class CSVFile.

### Value

For constructors, an instance of that class. For extractors such as resource and path, typically a character vector of the file path. For FileForFormat, a convenient instance of the class for which the input file corresponds to.

### Accessor Methods

In the code snippets below, x represents a BiocFile object.

- path(x): Gets the path, as a character vector, to the resource represented by the BiocFile object, if possible.
- resource(x): Gets the low-level resource, either a character vector (a path or URL) or a connection.
- fileFormat(x): Gets a string identifying the file format. Can also be called directly on a character file path, in which case it uses a heuristic based on the file extension.

### FileForFormat

The prefix and suffix arguments are used to filter the class names to those that match the pattern `paste0(prefix, format, suffix)`. If either prefix or suffix are NULL, they are ignored. Note that the search is case insensitive and does require the format to be in the name of the class.

**Author(s)**

Michael Lawrence

**See Also**

Implementing classes include: [BigWigFile](#), [TwoBitFile](#), [BEDFile](#), [GFFFile](#), [WIGFile](#)

**Examples**

```
## For our examples, we create a class called CSVFILE that extends BiocFile
.CSVFile <- setClass("CSVFile", contains = "BiocFile")

## Constructor
.CSVFile <- function(resource) {
  .CSVFile(resource = resource)
}

setMethod("import", "CSVFile", function(con, format, text, ...) {
  read.csv(resource(con), ...)
})

## Define export
setMethod("export", c("data.frame", "CSVFile"),
  function(object, con, format, ...) {
    write.csv(object, resource(con), ...)
  }
)

## Recommend CSVFile class for .csv files
temp <- tempfile(fileext = ".csv")
FileForFormat(temp)

## Create CSVFile
csv <- CSVFile(temp)

## Display path of file
path(csv)

## Display resource of file
resource(csv)
```

---

compression

*File compression*

---

**Description**

Methods and generics for file compression strategies.

**Usage**

```
decompress(manager, con, ...)  
  
## S4 method for signature 'ANY'  
decompress(manager, con, ...)  
  
## S4 method for signature 'CompressedFile'  
decompress(manager, con, ...)  
  
## S4 method for signature 'character'  
decompress(manager, con, ...)  
  
## S4 method for signature 'CompressedFile'  
fileFormat(x)
```

**Arguments**

manager	The connection manager, defaults to the internal manager class
con	The connection from which data is loaded or to which data is saved. If this is a character vector, it is assumed to be a file name and a corresponding file connection is created and then closed after exporting the object. If it is a <a href="#">BiocFile</a> derivative, the data is loaded from or saved to the underlying resource. If missing, the function will return the output as a character vector, rather than writing to a connection.
...	Parameters to pass to the format-specific method.
x	A BiocFile instance

**Value**

A decompressed representation of a CompressedFile or character object

**Related functions**

- `FileForFormat(path, format = file_ext(path))`: Determines the file type of path and returns a high-level file object such as `BamFile`, `BEDFile`, `BigWigFile`, etc.

**Examples**

```
file <- tempfile(fileext = ".gzip")  
decompress(con = file)
```

---

IO	<i>Import and export</i>
----	--------------------------

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**Description**

The functions `import` and `export` load and save objects from and to particular file formats.

**Usage**

```
import(con, format, text, ...)

## S4 method for signature 'connection,character,ANY'
import(con, format, text, ...)

## S4 method for signature 'connection,missing,ANY'
import(con, format, text, ...)

## S4 method for signature 'character,missing,ANY'
import(con, format, text, ...)

## S4 method for signature 'character,character,ANY'
import(con, format, text, ...)

## S4 method for signature 'missing,ANY,character'
import(con, format, text, ...)

export(object, con, format, ...)

## S4 method for signature 'ANY,connection,character'
export(object, con, format, ...)

## S4 method for signature 'ANY,connection,missing'
export(object, con, format, ...)

## S4 method for signature 'ANY,missing,character'
export(object, con, format, ...)

## S4 method for signature 'ANY,character,missing'
export(object, con, format, ...)

## S4 method for signature 'ANY,character,character'
export(object, con, format, ...)

## S4 method for signature 'CompressedFile,missing,ANY'
import(con, format, text, ...)

## S4 method for signature 'ANY,CompressedFile,missing'
```

```
export(object, con, format, ...)
```

### Arguments

con	The connection from which data is loaded or to which data is saved. If this is a character vector, it is assumed to be a file name and a corresponding file connection is created and then closed after exporting the object. If it is a <a href="#">BiocFile</a> derivative, the data is loaded from or saved to the underlying resource. If missing, the function will return the output as a character vector, rather than writing to a connection.
format	The format of the output. If missing and con is a file name, the format is derived from the file extension. This argument is unnecessary when con is a derivative of <a href="#">BiocFile</a> .
text	If con is missing, this can be a character vector directly providing the string data to import.
...	Parameters to pass to the format-specific method.
object	The object to export.

### Value

If con is missing, a character vector containing the string output. Otherwise, nothing is returned.

### Author(s)

Michael Lawrence

### See Also

Format-specific options for the popular formats: [GFF](#), [BED](#), [Bed15](#), [bedGraph](#), [WIG](#), [BigWig](#)

### Examples

```
## To illustrate export(), import(), and yeild(), we create a class, CSVFILE
.CSVFile <- setClass("CSVFile", contains = "BiocFile")

## Constructor
CSVFile <- function(resource) {
  .CSVFile(resource = resource)
}

## Define import
setMethod("import", "CSVFile",
  function(con, format, text, ...) {
    read.csv(resource(con), ...)
  }
)

## Define export
setMethod("export", c("data.frame", "CSVFile"),
  function(object, con, format, ...) {
```

```
        write.csv(object, resource(con), ...)  
    }  
)
```

```
## Usage
```

```
temp <- tempfile(fileext = ".csv")
```

```
csv <- CSVFile(temp)
```

```
export(mtcars, csv)
```

```
df <- import(csv)
```



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