

Package: marshal (via r-universe)

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Title Framework to Marshal Objects to be Used in Another R Process

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Description Some types of R objects can be used only in the R session they were created. If used as-is in another R process, such objects often result in an immediate error or in obscure and hard-to-troubleshoot outcomes. Because of this, they cannot be saved to file and re-used at a later time. They can also not be exported to a worker in parallel processing. These objects are sometimes referred to as non-exportable or non-serializable objects. One solution to this problem is to use ``marshalling" to encode the R object into an exportable representation that then can be used to re-create a copy of that object in another R process. This package provides a framework for marshalling and unmarshalling R objects such that they can be transferred using functions such as `serialize()` and `unserialize()` of base R.

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marshal-package	<i>Package marshal - Marshal Objects to be Used in Another R Process</i>
-----------------	--

Description

Some types of R objects can be used only in the R session they were created. If used as-is in another R process, such objects often result in an immediate error or in obscure and hard-to-troubleshoot outcomes. Because of this, they cannot be saved to file and re-used at a later time. They can also not be exported to a worker in parallel processing. These objects are sometimes referred to as non-exportable or non-serializable objects. One solution to this problem is to use "marshalling" to encode the R object into an exportable representation that then can be used to re-create a copy

of that object in another R process. This package provides a framework for marshalling and unmarshalling R objects such that they can be transferred using functions such as `serialize()` and `unserialize()` of base R.

marshal	<i>Marshalling of R objects</i>
---------	---------------------------------

Description

Marshalling of R objects

Usage

```
marshal(...)
```

```
unmarshal(...)
```

Arguments

... The object to be marshalled, or unmarshalled, followed by additional arguments passed to the specific S3 method.

Value

`marshal()` returns a marshalled object, which is a list with components:

- `marshalled`: marshalled version of the original object
- `unmarshal`: function that takes the marshalled object as input and returns an unmarshalled version of the original object.

`unmarshal()` returns an unmarshalled version of the original object.

marshal.CFunc	<i>Marshalling of 'inline' objects</i>
---------------	--

Description

WARNING: This is very limited proof of concept!

Usage

```
## S3 method for class 'CFunc'
marshal(inline, ...)
```

```
## S3 method for class 'CFunc'
marshallable(...)
```

Arguments

inline	A CFunc function.
...	Not used.

Details

Currently, it is only possible to marshal a function:

- of class CFunc that was created *without* "includes" or "otherdefs"

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```
if (requireNamespace("inline", quietly = TRUE)) {
  code <- "
    int i;
    for (i = 0; i < *n; i++) x[0] = x[0] + (i+1);
  "
  sum_1_to_n <- inline::cfunction(
    signature(n = "integer", x = "numeric"),
    code,
    language = "C", convention = ".C"
  )

  ## Marshal CFunc function
  sum_1_to_n_ <- marshal(sum_1_to_n)

  ## Unmarshal CFunc function
  sum_1_to_n2 <- unmarshal(sum_1_to_n_)

  y <- sum_1_to_n(10, 0)$x
  print(y)

  y2 <- sum_1_to_n2(10, 0)$x
  print(y2)
}
```

marshal.connection	<i>Marshalling of R connections</i>
--------------------	-------------------------------------

Description

Marshalling of R connections

Usage

```
## S3 method for class 'connection'
marshal(con, ...)

## S3 method for class 'connection'
marshallable(con, ...)
```

Arguments

con	A connection .
...	Not used.

Value

A marshalled object as described in [marshal\(\)](#).

Limitations

Not all connections can be marshalled, specifically we:

- cannot marshal connections stdin (0), stdout (1), and stderr (2)
- can only marshal *read-only* connections
- can only marshal *unopened* or *seekable* connections

Examples

```
tf <- tempfile()
cat(file = tf, letters, sep = "")

## Read-only connection
con <- file(tf, open = "rb")

bfr <- readChar(con, nchars = 4L)
print(bfr) ## "abcd"

## Marshal read-only connection, which records the
## current state, including the current file position.
con_ <- marshal(con)

## Unmarshal connection, which restores the state
## of the original connection, including the current
## file position
con2 <- unmarshal(con_)
stopifnot(
  all.equal(summary(con2), summary(con)),
  identical(seek(con2), seek(con))
)

bfr <- readChar(con, nchars = 4L)
print(bfr)
```

```
bfr2 <- readChar(con2, nchars = 4L)
print(bfr2)
stopifnot(identical(bfr2, bfr))

## Cleanup
close(con)
close(con2)
file.remove(tf)
con <- url("https://www.r-project.org")
print(con)

## Marshal read-only connection, which records the
## current state, including the current file position.
con_ <- marshal(con)

## Unmarshal connection, which restores the state
## of the original connection
con2 <- unmarshal(con_)
print(con2)

stopifnot(all.equal(summary(con2), summary(con)))

bfr <- readChar(con, nchars = 100L)
print(bfr)
bfr2 <- readChar(con2, nchars = 100L)
print(bfr2)
stopifnot(identical(bfr2, bfr))

## Cleanup
close(con)
close(con2)
```

marshal.data.table	<i>Marshalling of 'data.table' objects</i>
--------------------	--

Description

Marshalling of 'data.table' objects

Usage

```
## S3 method for class 'data.table'
marshal(x, ...)

## S3 method for class 'data.table'
marshallable(...)
```

Arguments

x A `data.table::data.table` object.
... Not used.

Value

A marshalled object as described in `marshal()`.

Examples

```
if (requireNamespace("data.table", quietly = TRUE)) {  
  dt <- data.table::data.table(a = 1:3, b = letters[1:3])  
  
  ## Marshal  
  dt_ <- marshal(dt)  
  
  ## Unmarshal  
  dt2 <- unmarshal(dt_)  
  
  stopifnot(identical(dt2, dt))  
  
  ## Marshal and unmarshal again  
  dt2_ <- marshal(dt2)  
  dt3 <- unmarshal(dt2_)  
  
  stopifnot(  
    identical(dt2_, dt_),  
    identical(dt3, dt2)  
  )  
}
```

`marshal.DBIconnection` *Marshalling of 'DBI:DBIconnection' objects (not supported)*

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class 'DBIconnection'  
marshal(x, ...)  
  
## S3 method for class 'DBIconnection'  
marshallable(...)
```

Arguments

x A [DBI::DBConnection](#) object.
 ... Not used.

Value

A marshalled object as described in [marshal\(\)](#).

marshal.H2OAutoML	<i>Marshalling of 'h2o' objects</i>
-------------------	-------------------------------------

Description

Marshalling of 'h2o' objects

Usage

```
## S3 method for class 'H2OAutoML'
marshal(x, ...)

## S3 method for class 'H2OMultinomialModel'
marshal(x, ...)

## S3 method for class 'H2OBinomialModel'
marshal(x, ...)

## S3 method for class 'H2ORegressionModel'
marshal(x, ...)

## S3 method for class 'H2OAutoML'
marshallable(...)

## S3 method for class 'H2OMultinomialModel'
marshallable(...)

## S3 method for class 'H2OBinomialModel'
marshallable(...)

## S3 method for class 'H2ORegressionModel'
marshallable(...)
```

Arguments

x An "h2o" object.
 ... Not used.

Details

`h2o::h2o.save_mojo()` and `h2o::h2o.saveModel()` are used to produce a marshalled version of the original object. `h2o::h2o.import_mojo()` and `h2o::h2o.loadModel()` are used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in `marshal()`.

marshal.jclassName	<i>Marshalling of 'rJava' objects (not supported)</i>
--------------------	---

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class 'jclassName'
marshal(x, ...)

## S3 method for class 'jobjRef'
marshal(x, ...)

## S3 method for class 'jclassName'
marshallable(...)

## S3 method for class 'jobjRef'
marshallable(...)
```

Arguments

x	"rJava" object.
...	Not used.

Value

A marshalled object as described in `marshal()`.

```
marshal.keras.engine.base_layer.Layer
```

Marshalling of 'keras' objects

Description

Marshalling of 'keras' objects

Usage

```
## S3 method for class 'keras.engine.base_layer.Layer'
marshal(model, ...)
```

```
## S3 method for class 'keras.engine.base_layer.Layer'
marshallable(...)
```

Arguments

model	A keras.keras.engine.base_layer.Layer object.
...	Not used.

Details

[keras::serialize_model\(\)](#) is used to produce a marshalled version of the original object. [keras::unserialize_model\(\)](#) is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```
## Run only in interactive mode, because example takes > 5 seconds,
## which is longer than what is allowed on CRAN
if (interactive() && requireNamespace("keras", quietly = TRUE)) {
  library(keras)

  ## Create a keras model (adopted from {keras} vignette)
  inputs <- layer_input(shape = shape(32))
  outputs <- layer_dense(inputs, units = 1L)
  model <- keras_model(inputs, outputs)
  model <- compile(model, optimizer = "adam", loss = "mean_squared_error")
  print(model)

  ## Not needed anymore
  rm(list = c("inputs", "outputs"))

  ## Marshal
  model_ <- marshal(model)
```

```

## Unmarshal
model2 <- unmarshal(model_)

stopifnot(
  identical(summary(model2), summary(model))
)

## Fitted keras model (adopted from {keras} vignette)
test_input <- array(runif(128 * 32), dim = c(128, 32))
test_target <- array(runif(128), dim = c(128, 1))
hist <- fit(model, test_input, test_target)
print(hist)
print(model)

## Not needed anymore
rm(list = "test_target")

## Marshal
model_ <- marshal(model)

## Unmarshal
model2 <- unmarshal(model_)

stopifnot(
  identical(summary(model2), summary(model)),
  identical(stats::predict(model2, test_input), stats::predict(model, test_input))
)
}

```

marshal.luz_module_fitted

Marshalling of 'torch' objects

Description

Marshalling of 'torch' objects

Usage

```
## S3 method for class 'luz_module_fitted'
marshal(model, ...)
```

```
## S3 method for class 'luz_module_fitted'
marshallable(...)
```

Arguments

model	A luz_module_fitted object.
...	Not used.

Details

`luz::luz_save()` is used to produce a marshalled version of the original object. `luz::luz_load()` is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in `marshal()`.

<code>marshal.magick-image</code>	<i>Marshalling of 'magick' objects (not supported)</i>
-----------------------------------	--

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class '`magick-image`'
marshal(x, ...)

## S3 method for class '`magick-image`'
marshallable(...)
```

Arguments

<code>x</code>	A <code>magick:magick-image</code> object.
<code>...</code>	Not used.

Value

A marshalled object as described in `marshal()`.

<code>marshal.model_fit</code>	<i>Marshalling of 'parsnip' objects</i>
--------------------------------	---

Description

Marshalling of 'parsnip' objects

Usage

```
## S3 method for class 'model_fit'
marshal(x, ...)

## S3 method for class 'model_fit'
marshallable(...)
```

Arguments

`x` A parsnip:model_fit object.
`...` Not used.

Details

The fit element of the model_fit object is marshalled.

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```
if (requireNamespace("parsnip", quietly = TRUE) && requireNamespace("xgboost", quietly = TRUE)) {
  library(parsnip)

  ## Adopted from example("boost_tree", package = "parsnip")
  model <- boost_tree(mode = "classification", trees = 20L, engine = "xgboost")
  model <- set_mode(model, "regression")
  fit <- fit(model, mpg ~ ., data = datasets::mtcars)

  ## Marshal
  fit_ <- marshal(fit)

  ## Unmarshal
  fit2 <- unmarshal(fit_)

  ## Marshal again
  fit2_ <- marshal(fit2)

  ## Assert identity
  stopifnot(
    all.equal(fit2_, fit_)
  )

  fit3 <- unmarshal(fit2_)

  ## Assert identity
  stopifnot(
    all.equal(fit3, fit2)
  )
}
```

 marshal.ncdf4

Marshalling of 'ncdf4' objects

Description

Marshalling of 'ncdf4' objects

Usage

```
## S3 method for class 'ncdf4'
marshal(x, ...)

## S3 method for class 'ncdf4'
marshallable(...)
```

Arguments

x	A ncdf4:ncdf4 object.
...	Not used.

Details

[base::readBin\(\)](#) is used to produce a marshalled version of the original object. [base::writeBin\(\)](#) and [ncdf4::nc_open\(\)](#) are used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```
if (requireNamespace("ncdf4", quietly = TRUE)) {
  library(ncdf4)

  ## Create a temporary NCDF file
  tf <- tempfile(fileext = ".nc")

  x <- ncvar_def("x", units = "count", dim = list())
  nf <- nc_create(tf, x)
  ncvar_put(nf, x, 42)
  print(nf)
  nc_close(nf)
  rm(list = c("nf", "x"))

  ## Open NCDF file
  nf <- nc_open(tf)
  y <- ncvar_get(nf, "x")

  ## Marshal
  nf_ <- marshal(nf)

  ## Unmarshal
  nf2 <- unmarshal(nf_)

  y2 <- ncvar_get(nf2, "x")
  stopifnot(identical(y2, y))
}
```

marshal.python.builtin.object
Marshalling of 'reticulate' objects (not supported)

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class 'python.builtin.object'
marshal(x, ...)

## S3 method for class 'python.builtin.object'
marshallable(...)
```

Arguments

x	"reticulate" object.
...	Not used.

Value

A marshalled object as described in [marshal\(\)](#).

marshal.RasterLayer *Marshalling of 'raster' objects*

Description

Marshalling of 'raster' objects

Usage

```
## S3 method for class 'RasterLayer'
marshal(x, ...)

## S3 method for class 'RasterLayer'
marshallable(x, ...)
```

Arguments

x	A raster:RasterLayer object.
...	Not used.

Details

`raster::writeRaster()` is used to produce a marshalled version of the original object. `raster::raster()` is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in `marshal()`.

WARNING - Numerical identical results cannot be guaranteed

Marshalling of RasterLayer objects is *leaky*. More precisely, the method *cannot* guarantee that multiple rounds of marshalling and unmarshalling produce numerically identical objects.

Examples

```
if (requireNamespace("raster", quietly = TRUE)) {
  r <- raster::raster(system.file("external/test.grd", package = "raster"))
  print(r)

  ## Marshal
  r_ <- marshal(r)

  ## Unmarshal
  r2 <- unmarshal(r_)
  print(r2)
}
```

marshal.SOCKcluster	<i>Marshalling of 'parallel' objects (not supported)</i>
---------------------	--

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class 'SOCKcluster'
marshal(x, ...)

## S3 method for class 'SOCKnode'
marshal(x, ...)

## S3 method for class 'SOCK0node'
marshal(x, ...)

## S3 method for class 'SOCKcluster'
marshallable(...)
```

```
## S3 method for class 'SOCKnode'
marshallable(...)

## S3 method for class 'SOCK0node'
marshallable(...)
```

Arguments

x	A magick:magick-image object.
...	Not used.

Value

A marshalled object as described in [marshal\(\)](#).

marshal.SpatVector	<i>Marshalling of 'terra' objects</i>
--------------------	---------------------------------------

Description

Marshalling of 'terra' objects

Usage

```
## S3 method for class 'SpatVector'
marshal(terra, ...)

## S3 method for class 'SpatVector'
marshallable(...)
```

Arguments

terra	An terra::SpatVector .
...	Not used.

Details

[terra::wrap\(\)](#) is used to produce a marshalled version of the original object. [terra::vect\(\)](#) is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```

if (requireNamespace("terra", quietly = TRUE)) {
  file <- system.file("ex/lux.shp", package = "terra")
  v <- terra::vect(file)

  ## Marshal SpatVector object
  v_ <- marshal(v)

  ## Unmarshal SpatVector object
  v2 <- unmarshal(v_)

  stopifnot(all.equal(v2, v, check.attributes = FALSE))
}

```

marshal.stanfit	<i>Marshalling of 'rstan' objects</i>
-----------------	---------------------------------------

Description

Marshalling of 'rstan' objects

Usage

```

## S3 method for class 'stanfit'
marshal(x, ...)

## S3 method for class 'stanfit'
marshallable(...)

```

Arguments

x	A rstan:stanfit object.
...	Not used.

Value

A marshalled object as described in [marshal\(\)](#).

marshal.tbl_spark	<i>Marshalling of 'sparklyr' objects (not supported)</i>
-------------------	--

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class 'tbl_spark'  
marshal(x, ...)  
  
## S3 method for class 'tbl_spark'  
marshallable(...)
```

Arguments

x	"sparklyr" object.
...	Not used.

Value

A marshalled object as described in [marshal\(\)](#).

marshal.train	<i>Marshalling of 'caret:train' objects</i>
---------------	---

Description

Marshalling of 'caret:train' objects

Usage

```
## S3 method for class 'train'  
marshal(train, ...)  
  
## S3 method for class 'train'  
marshallable(...)
```

Arguments

train	A caret::train object.
...	Not used.

Details

`bundle::bundle()` is used to produce a marshalled version of the original object. `bundle::unbundle()` is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in `marshal()`.

<code>marshal.udpipe_model</code>	<i>Marshalling of 'udpipe' objects (not supported)</i>
-----------------------------------	--

Description

Warning: Objects of this class are not possible to marshal. If attempted, an error is produced.

Usage

```
## S3 method for class 'udpipe_model'
marshal(x, ...)

## S3 method for class 'udpipe_model'
marshallable(...)
```

Arguments

<code>x</code>	"udpipe" object.
<code>...</code>	Not used.

Value

A marshalled object as described in `marshal()`.

<code>marshal.xgb.DMatrix</code>	<i>Marshalling of 'xgboost' objects</i>
----------------------------------	---

Description

Marshalling of 'xgboost' objects

Usage

```

## S3 method for class 'xgb.DMatrix'
marshal(x, ...)

## S3 method for class 'xgb.Booster'
marshal(x, ...)

## S3 method for class 'xgb.Booster'
marshallable(...)

## S3 method for class 'xgb.DMatrix'
marshallable(...)

```

Arguments

x	An <code>xgboost::xgb.DMatrix</code> or an <code>xgboost:xgb.Booster</code> object.
...	Not used.

Details

`xgboost::xgb.DMatrix.save()` is used to produce a marshalled version of the original object. `xgboost::xgb.DMatrix()` is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in `marshal()`.

marshal.xml_document	<i>Marshalling of 'xml2' objects</i>
----------------------	--------------------------------------

Description

Marshalling of 'xml2' objects

Usage

```

## S3 method for class 'xml_document'
marshal(xml2, ...)

## S3 method for class 'xml_nodeset'
marshal(xml2, ...)

## S3 method for class 'xml_document'
marshallable(...)

## S3 method for class 'xml_nodeset'
marshallable(...)

```

Arguments

xml2	A xml2::xml_document or similar.
...	Not used.

Details

[xml2::xml_serialize\(\)](#) is used to produce a marshalled version of the original object. [xml2::xml_unserialize\(\)](#) is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```
if (requireNamespace("xml2", quietly = TRUE)) {
  doc <- xml2::read_xml("<body></body>")

  ## Marshal 'xml_document' object
  doc_ <- marshal(doc)

  ## Unmarshal 'xml_document' object
  doc2 <- unmarshal(doc_)

  stopifnot(all.equal(doc2, doc))
}
```

marshal.XMLAbstractNode

Marshalling of 'XML' objects

Description

Marshalling of 'XML' objects

Usage

```
## S3 method for class 'XMLAbstractNode'
marshal(xml, ...)

## S3 method for class 'XMLAbstractDocument'
marshal(xml, ...)

## S3 method for class 'XMLAbstractDocument'
marshallable(...)

## S3 method for class 'XMLAbstractNode'
marshallable(...)
```

Arguments

`xml` An [XML::XMLAbstractNode](#) or [XML::XMLAbstractDocument](#).
`...` Not used.

Details

[XML::xmlSerializeHook\(\)](#) is used to produce a marshalled version of the original object. [XML::xmlDeserializeHook\(\)](#) is used to reconstruct a version of the original object from the marshalled object.

Value

A marshalled object as described in [marshal\(\)](#).

Examples

```
if (requireNamespace("XML", quietly = TRUE)) {
  node <- XML::xmlParseString("<a><b>c</b></a>")
  print(node)

  ## Marshal XMLAbstractNode object
  node_ <- marshal(node)
  ## Unmarshal XMLAbstractNode object
  node2 <- unmarshal(node_)
  print(node2)

  stopifnot(all.equal(node2, node))

  doc <- XML::xmlParse(system.file("exampleData", "tides.xml", package = "XML"))

  ## Marshal XMLAbstractDocument object
  doc_ <- marshal(doc)
  ## Unmarshal XMLAbstractDocument object
  doc2 <- unmarshal(doc_)

  stopifnot(all.equal(doc2, doc))
}
```

marshallable

Check if R object can be marshalled

Description

Check if R object can be marshalled

Usage

```
marshallable(...)
```

Arguments

... The object to be checked, followed by additional arguments passed to the specific S3 method.

Value

TRUE if the object can be marshalled, FALSE if it cannot be marshalled, and NA if it is not known whether the object can be marshalled.

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