

Package ‘jsonlite’

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URL <http://arxiv.org/abs/1403.2805>,<https://www.opencpu.org/posts/jsonlite-a-smarter-json-encoder>

BugReports <http://github.com/jeroenooms/jsonlite/issues>

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VignetteBuilder knitr

Description A fast JSON parser and generator optimized for statistical data and the web. Started out as a fork of RJSONIO, but has been completely rewritten in recent versions. The package offers flexible, robust, high performance tools for working with JSON in R and is particularly powerful for building pipelines and interacting with web APIs. The parser implementation is based on the mapping described in the vignette of the package (Ooms, 2014). In addition to drop-in replacements for toJSON and fromJSON, jsonlite contains functions to stream, validate, and prettify JSON data, and many unit tests to verify that all edge cases are encoded and decoded consistently for use with dynamic data in systems and applications.

Suggests testthat, knitr, reshape2, httr (>= 0.4), rjson, plyr

Repository CRAN

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flatten	<i>Flatten nested data frames</i>
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Description

In a nested data frame, one or more of the columns consist of another data frame. These structures frequently appear when parsing JSON data from the web. We can flatten such data frames into a regular 2 dimensional tabular structure.

Usage

```
flatten(x, recursive = TRUE)
```

Arguments

x	a data frame
recursive	flatten recursively

Examples

```
options(stringsAsFactors=FALSE)
x <- data.frame(driver = c("Bowser", "Peach"), occupation = c("Koopa", "Princess"))
x$vehicle <- data.frame(model = c("Piranha Prowler", "Royal Racer"))
x$vehicle$stats <- data.frame(speed = c(55, 34), weight = c(67, 24), drift = c(35, 32))
str(x)
str(flatten(x))
str(flatten(x, recursive = FALSE))

## Not run:
data1 <- fromJSON("https://api.github.com/users/hadley/repos")
colnames(data1)
colnames(data1$owner)
colnames(flatten(data1))

# or for short:
```

```
data2 <- fromJSON("https://api.github.com/users/hadley/repos", flatten = TRUE)
colnames(data2)

## End(Not run)
```

prettify, minify *Prettify or minify a JSON string*

Description

Prettify adds indentation to a JSON string; minify removes all indentation/whitespace.

Usage

```
prettify(txt)

minify(txt)
```

Arguments

txt JSON string

Examples

```
myjson <- toJSON(cars)
cat(myjson)
prettify(myjson)
minify(myjson)
```

rbind.pages *Combine pages into a single data frame*

Description

The `rbind.pages` function is used to combine a list of data frames into a single data frame. This is often needed when working with a JSON API that limits the amount of data per request. If we need more data than what fits in a single request, we need to perform multiple requests that each retrieve a fragment of data, not unlike pages in a book. In practice this is often implemented using a `page` parameter in the API. The `rbind.pages` function can be used to combine these pages back into a single dataset.

Usage

```
rbind.pages(pages)
```

Arguments

`pages` a list of data frames, each representing a *page* of data

Details

The `rbind.pages` function generalizes `base::rbind` and `plyr::rbind.fill` with added support for nested data frames. Not each column has to be present in each of the individual data frames; missing columns will be filled up in NA values.

Examples

```
# Basic example
x <- data.frame(foo = rnorm(3), bar = c(TRUE, FALSE, TRUE))
y <- data.frame(foo = rnorm(2), col = c("blue", "red"))
rbind.pages(list(x, y))

## Not run:
baseurl <- "http://projects.propublica.org/nonprofits/api/v1/search.json"
pages <- list()
for(i in 0:20){
  mydata <- fromJSON(paste0(baseurl, "?order=revenue&sort_order=desc&page=", i))
  message("Retrieving page ", i)
  pages[[i+1]] <- mydata$filings
}
filings <- rbind.pages(pages)
nrow(filings)
colnames(filings)

## End(Not run)
```

 serializeJSON

serialize R objects to JSON

Description

The `serializeJSON` and `unserializeJSON` functions convert between R objects to JSON data. Instead of using a class based mapping like `toJSON` and `fromJSON`, the serialize functions base the encoding schema on the storage type, and capture all data and attributes from any object. Thereby the object can be restored almost perfectly from its JSON representation, but the resulting JSON output is very verbose. Apart from environments, all standard storage types are supported.

Usage

```
serializeJSON(x, digits = 8, pretty = FALSE)
```

```
unserializeJSON(txt)
```

Arguments

x	an R object to be serialized
digits	max number of digits (after the dot) to print for numeric values
pretty	add indentation/whitespace to JSON output. See prettify
txt	a JSON string which was created using <code>serializeJSON</code>

Note

JSON is a text based format which leads to loss of precision when printing numbers.

Examples

```
jsoncars <- serializeJSON(mtcars)
mtcars2 <- unserializeJSON(jsoncars)
identical(mtcars, mtcars2)

set.seed('123')
myobject <- list(
  mynull = NULL,
  mycomplex = lapply(eigen(matrix(-rnorm(9),3)), round, 3),
  mymatrix = round(matrix(rnorm(9), 3),3),
  myint = as.integer(c(1,2,3)),
  mydf = cars,
  mylist = list(foo='bar', 123, NA, NULL, list('test')),
  mylogical = c(TRUE,FALSE,NA),
  mychar = c('foo', NA, 'bar'),
  somemissings = c(1,2,NA,NaN,5, Inf, 7 -Inf, 9, NA),
  myrawvec = charToRaw('This is a test')
);
identical(unserializeJSON(serializeJSON(myobject)), myobject);
```

stream_in, stream_out *Streaming JSON input/output*

Description

The `stream_in` and `stream_out` functions implement line-by-line processing of JSON data over a [connection](#), such as a socket, url, file or pipe. This allows for processing unlimited amounts of data with limited memory. JSON streaming assumes a slightly different format than [fromJSON](#) and [toJSON](#), see details for more information.

Usage

```
stream_in(con, handler, pagesize = 500, verbose = TRUE, ...)
```

```
stream_out(x, con = stdout(), pagesize = 500, verbose = TRUE, ...)
```

Arguments

con	a connection object. If the connection is not open, stream_in and stream_out will automatically open and later close (and destroy) the connection. See details.
handler	a custom function that is called on each page of JSON data. If not specified, the default handler stores all pages and binds them into a single data frame that will be returned by stream_in. See details.
pagesize	number of lines to read/write from/to the connection per iteration.
verbose	print some information on what is going on.
...	arguments for fromJSON and toJSON that control JSON formatting/parsing where applicable. Use with caution.
x	object to be streamed out. Currently only data frames are supported.

Details

Because parsing huge JSON strings is difficult and inefficient, JSON streaming is done using **lines of minified JSON records**. This is pretty standard: JSON databases such as MongoDB use the same format to import/export large datasets. Note that this means that the total stream combined is not valid JSON itself; only the individual lines are. Also note that because line-breaks are used as separators, prettified JSON is not permitted: the JSON lines *must* be minified. In this respect, the format is a bit different from [fromJSON](#) and [toJSON](#) where all lines are part of a single JSON structure with optional line breaks.

The handler is a callback function which is called for each page (batch) of JSON data with exactly one argument (usually a data frame with pagesize rows). If handler is missing or NULL, a default handler is used which stores all intermediate pages of data in a list, and at the very end uses [rbind.pages](#) to bind all pages together into one single data frame that is returned by stream_in. When a custom handler function is specified, stream_in does not store any intermediate results and always returns NULL. It is then up to the handler to process and/or store data pages. A handler function that does not store intermediate results in memory (for example by writing output to another connection) results in a pipeline that can process an unlimited amount of data. See example.

If a connection is not opened yet, stream_in and stream_out will automatically open and later close the connection. Because R destroys connections when they are closed, they cannot be reused. To use a single connection for multiple calls to stream_in or stream_out, it needs to be opened beforehand. See example.

Value

The stream_out function always returns NULL. When no custom handler is specified, stream_in returns a data frame of all pages binded together. When a custom handler function is specified, stream_in always returns NULL.

References

MongoDB export format: <http://docs.mongodb.org/manual/reference/program/mongoexport/#cmdoption--query>

Examples

```

# compare formats
x <- iris[1:3,]
toJSON(x)
stream_out(x)

## Not run:

# stream large dataset to file and back
library(nycflights13)
stream_out(flights, file(tmp <- tempfile()))
flights2 <- stream_in(file(tmp))
unlink(tmp)
all.equal(flights2, as.data.frame(flights))

# stream over HTTP
diamonds2 <- stream_in(url("http://jeroenooms.github.io/data/diamonds.json"))

# stream over HTTP with gzip compression
flights3 <- stream_in(gzcon(url("http://jeroenooms.github.io/data/nycflights13.json.gz")))
all.equal(flights3, as.data.frame(flights))

# stream over HTTPS (HTTP+SSL) via curl pipe
flights4 <- stream_in(gzcon(pipe("curl https://jeroenooms.github.io/data/nycflights13.json.gz")))
all.equal(flights4, as.data.frame(flights))

# Full JSON IO stream from URL to file connection.
# Calculate delays for flights over 1000 miles in batches of 5k
library(dplyr)
con_in <- gzcon(url("http://jeroenooms.github.io/data/nycflights13.json.gz"))
con_out <- file(tmp <- tempfile(), open = "w")
stream_in(con_in, handler = function(df){
  df <- dplyr::filter(df, distance > 1000)
  df <- dplyr::mutate(df, delta = dep_delay - arr_delay)
  stream_out(df, con_out, pagesize = 1000)
}, pagesize = 5000)
close(con_out)

# stream it back in
mydata <- stream_in(file(tmp))
nrow(mydata)
unlink(tmp)

# Data from http://openweathermap.org/current#bulk
# Each row contains a nested data frame.
daily14 <- stream_in(gzcon(url("http://78.46.48.103/sample/daily_14.json.gz")), pagesize=50)
subset(daily14, city$name == "Berlin")$data[[1]]

# Or with dplyr:
library(dplyr)
daily14f <- flatten(daily14)
filter(daily14f, city.name == "Berlin")$data[[1]]

```

```
## End(Not run)
```

toJSON, fromJSON	<i>Convert R objects to/from JSON</i>
------------------	---------------------------------------

Description

These functions are used to convert between JSON data and R objects. The `toJSON` and `fromJSON` functions use a class based mapping, which follows conventions outlined in this paper: <http://arxiv.org/abs/1403.2805> (also available as vignette).

Usage

```
fromJSON(txt, simplifyVector = TRUE, simplifyDataFrame = simplifyVector,
         simplifyMatrix = simplifyVector, flatten = FALSE, ...)
```

```
toJSON(x, dataframe = c("rows", "columns"), matrix = c("rowmajor",
              "columnmajor"), Date = c("ISO8601", "epoch"), POSIXt = c("string",
              "ISO8601", "epoch", "mongo"), factor = c("string", "integer"),
              complex = c("string", "list"), raw = c("base64", "hex", "mongo"),
              null = c("list", "null"), na = c("null", "string"), auto_unbox = FALSE,
              digits = 4, pretty = FALSE, force = FALSE, ...)
```

Arguments

<code>txt</code>	a JSON string, URL or file
<code>simplifyVector</code>	coerce JSON arrays containing only primitives into an atomic vector
<code>simplifyDataFrame</code>	coerce JSON arrays containing only records (JSON objects) into a data frame
<code>simplifyMatrix</code>	coerce JSON arrays containing vectors of equal mode and dimension into matrix or array
<code>flatten</code>	automatically <code>flatten</code> nested data frames into a single non-nested data frame
<code>...</code>	arguments passed on to class specific print methods
<code>x</code>	the object to be encoded
<code>dataframe</code>	how to encode data.frame objects: must be one of 'rows' or 'columns'
<code>matrix</code>	how to encode matrices and higher dimensional arrays: must be one of 'rowmajor' or 'columnmajor'.
<code>Date</code>	how to encode Date objects: must be one of 'ISO8601' or 'epoch'
<code>POSIXt</code>	how to encode POSIXt (datetime) objects: must be one of 'string', 'ISO8601', 'epoch' or 'mongo'
<code>factor</code>	how to encode factor objects: must be one of 'string' or 'integer'
<code>complex</code>	how to encode complex numbers: must be one of 'string' or 'list'

raw	how to encode raw objects: must be one of 'base64', 'hex' or 'mongo'
null	how to encode NULL values within a list: must be one of 'null' or 'list'
na	how to print NA values: must be one of 'null' or 'string'. Defaults are class specific
auto_unbox	automatically <code>unbox</code> all atomic vectors of length 1. It is usually safer to avoid this and instead use the <code>unbox</code> function to unbox individual elements.
digits	max number of digits (after the dot) to print for numeric values. See: <code>round</code>
pretty	adds indentation whitespace to JSON output. See <code>prettify</code>
force	unclass/skip objects of classes with no defined JSON mapping

Details

The `toJSON` and `fromJSON` functions are drop-in replacements for the identically named functions in packages `rjson` and `RJSONIO`. Our implementation uses an alternative, somewhat more consistent mapping between R objects and JSON strings.

The `serializeJSON` and `unserializeJSON` functions in this package use an alternative system to convert between R objects and JSON, which supports more classes but is much more verbose.

A JSON string is always unicode, using UTF-8 by default, hence there is usually no need to escape any characters. However, the JSON format does support escaping of unicode characters, which are encoded using a backslash followed by a lower case "u" and 4 hex characters, for example: "Z\u00FCrich". The `fromJSON` function will parse such escape sequences but it is usually preferable to encode unicode characters in JSON using native UTF-8 rather than escape sequences.

References

Jeroen Ooms (2014). The `jsonlite` Package: A Practical and Consistent Mapping Between JSON Data and R Objects. *arXiv:1403.2805*. <http://arxiv.org/abs/1403.2805>

Examples

```
#stringify some data
jsoncars <- toJSON(mtcars, pretty=TRUE)
cat(jsoncars)

#parse it back
fromJSON(jsoncars)

#parsing escaped unicode
fromJSON('{"city" : "Z\u00FCrich"}')
```

Not run:

```
# Parse data frame
data1 <- fromJSON("https://api.github.com/users/hadley/orgs")
names(data1)
data1$login

#nested data frames:
data2 <- fromJSON("https://api.github.com/users/hadley/repos")
```

```
names(data2)
names(data2$owner)
data2$owner$login

#same data, but now flattened:
data3 <- fromJSON("https://api.github.com/users/hadley/repos", flatten=TRUE)
names(data3)

## End(Not run)

#control scientific notation
toJSON(10 ^ (0:10))
options(scipen=3)
toJSON(10 ^ (0:10))
```

toMongo

Export to MongoDB

Description

This function will be deprecated. Please use `stream_out` instead.

Usage

```
toMongo(x, array = FALSE, POSIXt = "mongo", raw = "mongo", ...)
```

Arguments

<code>x</code>	a dataframe
<code>array</code>	if output should be an array. See details.
<code>POSIXt</code>	passed on to toJSON
<code>raw</code>	passed on to toJSON
<code>...</code>	other arguments for toJSON

Details

This function will be deprecated. Please use `stream_out` instead.

`unbox`*Unbox a vector or data frame*

Description

This function marks an atomic vector or data frame as a **singleton**, i.e. a set with exactly 1 element. Thereby, the value will not turn into an array when encoded into JSON. This can only be done for atomic vectors of length 1, or data frames with exactly 1 row. Because this function alters how R objects are encoded, it should be used very sparsely, if at all.

Usage

```
unbox(x)
```

Arguments

`x` atomic vector of length 1, or data frame with 1 row.

Details

It is usually recommended to avoid this function and stick with the default encoding schema for the various R classes. The only use case for this function is if you are bound to some specific predefined JSON structure (e.g. to submit to an API), which has no natural R representation. Note that the default encoding for data frames naturally results in a collection of key-value pairs, without using `unbox`. If you are frequently using `unbox`, you're probably doing it wrong.

Value

Returns a singleton version of `x`.

References

[http://en.wikipedia.org/wiki/Singleton_\(mathematics\)](http://en.wikipedia.org/wiki/Singleton_(mathematics))

Examples

```
toJSON(list(foo=123))
toJSON(list(foo=unbox(123)))

x <- iris[1,]
toJSON(list(rec=x))
toJSON(list(rec=unbox(x)))
```

`validate`*Validate JSON*

Description

Test if a string contains valid JSON. Characters vectors will be collapsed into a single string.

Usage

```
validate(txt)
```

Arguments

`txt` JSON string

Examples

```
#Output from toJSON and serializeJSON should pass validation
myjson <- toJSON(mtcars)
validate(myjson) #TRUE
```

```
#Something bad happened
truncated <- substring(myjson, 1, 100)
validate(truncated) #FALSE
```

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