Package ‘reqres’

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Type Package

Title Powerful Classes for HTTP Requests and Responses

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Description In order to facilitate parsing of http requests and creating appropriate responses this package provides two classes to handle a lot of the housekeeping involved in working with http exchanges. The infrastructure builds upon the 'rook' specification and is thus well suited to be combined with 'httpuv' based web servers.

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Encoding UTF-8

LazyData TRUE

Depends R (>= 2.10)

Imports R6, assertthat, stringi, urltools, tools, brotli, jsonlite, xml2, webutils, utils

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Suggests fiery, testthat, covr

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    https://github.com/thomasp85/reqres#reqres

BugReports https://github.com/thomasp85/reqres/issues

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### default_formatters

**Description**

This list matches the most normal mime types with their respective formatters using default arguments. For a no-frills request parsing this can be supplied directly to `Response$format()`. To add or modify to this list simply supply the additional parsers as second, third, etc, argument and they will overwrite or add depending on whether it specifies a mime type already present.

**Usage**

```r
default_formatters
```

**See Also**

`formatters` for an overview of the build in formatters in `reqres`.

**Examples**

```r
## Not run:
res$format(default_formatters, 'text/plain' = format_plain(sep = ' '))

## End(Not run)
```
default_parsers

A list of default parser mappings

Description

This list matches the most normal mime types with their respective parsers using default arguments. For a no-frills request parsing this can be supplied directly to Request$parse(). To add or modify to this list simply supply the additional parsers as second, third, etc, argument and they will overwrite or add depending on whether it specifies a mime type already present.

Usage

default_parsers

See Also

parsers for an overview of the built-in parsers in reqres

Examples

```r
## Not run:
req$parse(default_parsers, 'application/json' = parse_json(flatten = TRUE))
## End(Not run)
```

formatters

Pre-supplied formatting generators

Description

This set of functions can be used to construct formatting functions adhering to the Response$format() requirements.

Usage

format_json(dataframe = "rows", matrix = "rowmajor",
            Date = "ISO8601", POSIXt = "string", factor = "string",
            complex = "string", raw = "base64", null = "list", na = "null",
            auto_unbox = FALSE, digits = 4, pretty = FALSE, force = FALSE)

format_plain(sep = "\n")

format_xml(encoding = "UTF-8", options = "as_xml")

format_html(encoding = "UTF-8", options = "as_html")

format_table(...)
Arguments

- **dataframe**: how to encode data.frame objects: must be one of 'rows', 'columns' or 'values'
- **matrix**: how to encode matrices and higher dimensional arrays: must be one of 'rowmajor' or 'columnmajor'.
- **Date**: how to encode Date objects: must be one of 'ISO8601' or 'epoch'
- **POSIXt**: how to encode POSIXt (datetime) objects: must be one of 'string', 'ISO8601', 'epoch' or 'mongo'
- **factor**: how to encode factor objects: must be one of 'string' or 'integer'
- **complex**: 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 unbox all atomic vectors of length 1. It is usually safer to avoid this and instead use the unbox function to unbox individual elements. An exception is that objects of class AsIs (i.e. wrapped in I()) are not automatically unboxed. This is a way to mark single values as length-1 arrays.

- **digits**: max number of decimal digits to print for numeric values. Use I() to specify significant digits. Use NA for max precision.

- **pretty**: adds indentation whitespace to JSON output. Can be TRUE/FALSE or a number specifying the number of spaces to indent. See prettify

- **force**: unclass/skip objects of classes with no defined JSON mapping

- **sep**: The line separator. Plain text will be split into multiple strings based on this.


- **options**: default: ‘format’. Zero or more of
  - **format**: Format output
  - **no_declaration**: Drop the XML declaration
  - **no_empty_tags**: Remove empty tags
  - **no_xhtml**: Disable XHTML1 rules
  - **require_xhtml**: Force XHTML1 rules
  - **as_xml**: Force XML output
  - **as_html**: Force HTML output
  - **format_whitespace**: Format with non-significant whitespace

  ... parameters passed on to write.table()

Value

A function accepting an R object
See Also

parsers for converting Request bodies into R objects
default_formatters for a list that maps the most common mime types to their respective formatters

Examples

```r
fake_rook <- fiery::fake_request(
  'http://example.com/test',
  content = '',
  headers = list(
    Content_Type = 'text/plain',
    Accept = 'application/json, text/csv'
  ),
)

req <- Request$new(fake_rook)
res <- req$respond()
res$body <- mtcars
res$format(json = format_json(), csv = format_table(sep = ','))
res$body

# Cleaning up connections
rm(fake_rook, req, res)
gc()
```

---

**parsers**  
*Pre-supplied parsing generators*

Description

This set of functions can be used to construct parsing functions adhering to the Request$parse() requirements.

Usage

- `parse_json(simplifyVector = TRUE, simplifyDataFrame = simplifyVector, simplifyMatrix = simplifyVector, flatten = FALSE)`
- `parse_plain(sep = '\n')`
- `parse_xml(encoding = '', options = "NOBLANKS", base_url = '')`
- `parse_html(encoding = '', options = c("RECOVER", "NOERROR", "NOBLANKS"), base_url = '')`
- `parse_multiform()`
parse_queryform()

parse_table(...)

Arguments

simplifyVector coerce JSON arrays containing only primitives into an atomic vector
simplifyDataFrame coerce JSON arrays containing only records (JSON objects) into a data frame
simplifyMatrix coerce JSON arrays containing vectors of equal mode and dimension into matrix or array
flatten automatically flatten nested data frames into a single non-nested data frame
sep The line separator. Plain text will be split into multiple strings based on this.
encoding Specify a default encoding for the document. Unless otherwise specified XML documents are assumed to be in UTF-8 or UTF-16. If the document is not UTF-8/16, and lacks an explicit encoding directive, this allows you to supply a default.
options Set parsing options for the libxml2 parser. Zero or more of

   RECOVER recover on errors
   NOENT substitute entities
   DTDLOAD load the external subset
   DTDATTR default DTD attributes
   DTDVALID validate with the DTD
   NOERROR suppress error reports
   NOWARNING suppress warning reports
   PEDANTIC pedantic error reporting
   NOBLANKS remove blank nodes
   SAX1 use the SAX1 interface internally
   XINCLUDE Implement XInclude substitution
   NONET Forbid network access
   NODICT Do not reuse the context dictionary
   NSCLEAN remove redundant namespaces declarations
   NOCDATA merge CDATA as text nodes
   NOXINCNODE do not generate XINCLUDE START/END nodes
   COMPACT compact small text nodes; no modification of the tree allowed afterwards (will possibly crash if you try to modify the tree)
   OLD10 parse using XML-1.0 before update 5
   NOBASEFIX do not fixup XINCLUDE xml:base uris
   HUGE relax any hardcoded limit from the parser
   OLDSAX parse using SAX2 interface before 2.7.0
   IGNORE_ENC ignore internal document encoding hint
   BIG_LINES Store big lines numbers in text PSVI field
base_url

When loading from a connection, raw vector or literal html/xml, this allows you to specify a base url for the document. Base urls are used to turn relative urls into absolute urls.

... parameters passed on to `read.table()`

Value

A function accepting a raw vector and a named list of directives

See Also

formatters for converting Response bodies into compatible types
default_parsers for a list that maps the most common mime types to their respective parsers

Examples

```r
fake_rook <- fiery::fake_request(
  'http://example.com/test',
  content = '[1, 2, 3, 4]',
  headers = list(
    Content_Type = 'application/json'
  )
)

req <- Request$new(fake_rook)
req$parse(json = parse_json())
req$body

# Cleaning up connections
rm(fake_rook, req)
gc()
```

Description

This class wraps all functionality related to extracting information from a http request. Much of the functionality is inspired by the Request class in Express.js, so the documentation for this will complement this document. As `reqres` is build on top of the Rook specifications the Request object is initialized from a Rook-compliant object. This will often be the request object provided by the `httpuv` framework. While it shouldn’t be needed, the original Rook object is always accessible and can be modified, though any modifications will not propagate to derived values in the Request object (e.g. changing the HTTP_HOST element of the Rook object will not change the host field of the Request object). Because of this, direct manipulation of the Rook object is generally discouraged.
Usage

as.Request(x, ...)

is.Request(x)

Arguments

x An object coercible to a Request.

... Parameters passed on to Request$new()

Value

A Request object (for as.Request()) or a logical indicating whether the object is a Request (for is.Request())

Initialization

A new 'Request'-object is initialized using the new() method on the generator:

Usage

req <- Request$new(rook, trust = FALSE)

Arguments

rook The rook request that the new object should wrap

trust Is this request trusted blindly. If TRUE X-Forwarded-* headers will be returned when querying host, ip, and protocol

Fields

The following fields are accessible in a Request object:

trust A logical indicating whether the request is trusted. Mutable

method A string indicating the request method (in lower case, e.g. 'get', 'put', etc.). Immutable

body An object holding the body of the request. This is an empty string by default and needs to be populated using the set_body() method (this is often done using a body parser that accesses the Rook$input stream). Immutable

cookies Access a named list of all cookies in the request. These have been URI decoded. Immutable

headers Access a named list of all headers in the request. In order to follow R variable naming standards - have been substituted with _. Use the get_header() method to lookup based on the correct header name. Immutable

host Return the domain of the server given by the "Host" header if trust == FALSE. If trust == true returns the X-Forwarded-Host instead.

ip Returns the remote address of the request if trust == FALSE. if trust == TRUE it will instead return the first value of the X-Forwarded-For header. Immutable
Request

ips If trust == TRUE it will return the full list of ips in the X-Forwarded-For header. If trust == FALSE it will return an empty vector. Immutable

protocol Returns the protocol (e.g. 'http') used for the request. If trust == TRUE it will use the value of the X-Forwarded-Proto header. Immutable

root The mount point of the application receiving this request. Can be empty if the application is mounted on the server root. Immutable

path The part of the url following the root. Defines the local target of the request (independent of where it is mounted). Immutable

url The full URL of the request. Immutable

query The query string of the request (anything following "?" in the URL) parsed into a named list. The query has been url decoded and "+" has been substituted with space. Multiple queries are expected to be separated by either "&" or "|". Immutable

querystring The unparsed query string of the request, including "?". If no query string exists it will be "" rather than "?"

xhr A logical indicating whether the X-Requested-With header equals XMLHttpRequest thus indicating that the request was performed using a JavaScript library such as jQuery. Immutable

secure A logical indicating whether the request was performed using a secure connection, i.e. protocol == 'https'. Immutable

origin The original object used to create the Request object. As reqres currently only works with rook this will always return the original rook object. Immutable, though the content of the rook object itself might be manipulated as it is an environment.

response If a Response object has been created for this request it is accessible through this field. Immutable

Methods

The following methods are available in a Request object:

set_body(content) Sets the content of the request body. This method should mainly be used in concert with a body parser that reads the rook$input stream

set_cookies(cookies) Sets the cookies of the request. The cookies are automatically parsed and populated, so this method is mainly available to facilitate cookie signing and encryption

get_header(name) Get the header of the specified name.

accepts(types) Given a vector of response content types it returns the preferred one based on the Accept header.

accepts_charsets(charsets) Given a vector of possible character encodings it returns the preferred one based on the Accept-Charset header.

accepts_encoding(encoding) Given a vector of possible content encodings (usually compression algorithms) it selects the preferred one based on the Accept-Encoding header. If there is no match it will return "identity" signaling no compression.

accepts_language(language) Given a vector of possible content languages it selects the best one based on the Accept-Language header.

is(type) Queries whether the body of the request is in a given format by looking at the Content-Type header. Used for selecting the best parsing method.
respond() Creates a new Response object from the request

parse(..., autofail = TRUE) Based on provided parsers it selects the appropriate one by looking at the Content-Type header and assigns the result to the request body. A parser is a function accepting a raw vector, and a named list of additional directives, and returns an R object of any kind (if the parser knows the input to be plain text, simply wrap it in `rawToChar()`). If the body is compressed, it will be decompressed based on the Content-Encoding header prior to passing it on to the parser. See parsers for a list of pre-supplied parsers. Parsers are either supplied in a named list or as named arguments to the parse method. The names should correspond to mime types or known file extensions. If autofail = TRUE the response will be set with the correct error code if parsing fails. `parse()` returns TRUE if parsing was successful and FALSE if not.

parse_raw(autofail = TRUE) This is a simpler version of the parse() method. It will attempt to decompress the body and set the body field to the resulting raw vector. It is then up to the server to decide how to handle the payload. It returns TRUE if successful and FALSE otherwise.

as_message() Prints a HTTP representation of the request to the output stream.

See Also

Response for handling http responses

Examples

```r
defake_rook <- fiery::fake_request(
  'http://example.com/test?id=34632&question=who+is+hadley',
  content = 'This is an elaborate ruse',
  headers = list(
    Accept = 'application/json; text/*',
    Content_Type = 'text/plain'
  )
)

req <- Request$new(fake_rook)

# Get full URL
req$url

# Get list of query parameters
req$query

# Test if content is text
req$is('txt')

# Perform content negotiation for the response
req$accepts(c('html', 'json', 'txt'))

# Cleaning up connections
rm(fake_rook, req)
gc()
```
Description

This class handles all functionality involved in crafting a http response. Much of the functionality is inspired by the Request class in Express.js, so the documentation for this will complement this document. As reqres is build on top of the Rook specifications the Response object can be converted to a compliant list object to be passed on to e.g. the httpuv handler.

Usage

```r
## S3 method for class 'Response'
as.list(x, ...)

is.Response(x)
```

Arguments

- `x` A Response object
- `...` Ignored

Details

A Response object is always created as a response to a Request object and contains a reference to the originating Request object. A Response is always initialized with a 404 Not Found code, an empty string as body and the Content-Type header set to text/plain. As the Content-Type header is required for httpuv to function, it will be inferred if missing when converting to a list. If the body is a raw vector it will be set to application/octet-stream and otherwise it will be set to text/plain. It is always advised to consciously set the Content-Type header though. The only exception is when attaching a standard file where the type is inferred from the file extension automatically. Unless the body is a raw vector it will automatically be converted to a character vector and collapsed to a single string with "\n" separating the individual elements before the Response object is converted to a list (that is, the body can exist as any type of object up until the moment where the Response object is converted to a list). To facilitate communication between different middleware the Response object contains a data store where information can be stored during the lifetime of the response.

Value

A rook-compliant list-response (in case of `as.list()`) or a logical indicating whether the object is a Response (in case of `is.Response()`)

Initialization

A new 'Response'-object is initialized using the `new()` method on the generator:

Usage
```r
res <- Response$new(request)

But often it will be provided by the request using the respond() method, which will provide the
response, creating one if it doesn’t exist

Usage

res <- request$respond()

Arguments

  request  The Request object that the Response is responding to

Fields

The following fields are accessible in a Response object:

  status  Gets or sets the status code of the response. Is initialised with 404L
  body  Set or get the body of the response. If it is a character vector with a single element named
        'file' it will be interpreted as the location of a file. It is better to use the file field for
        creating a response referencing a file as it will automatically set the correct headers.
  file  Set or get the location of a file that should be used as the body of the response. If the body
        is not referencing a file (but contains something else) it will return NULL. The Content-Type
        header will automatically be inferred from the file extension, if known. If unknown it will
        defaults to application/octet-stream. If the file has no extension it will be text/plain.
        Existence of the file will be checked.
  type  Get or sets the Content-Type header of the response based on a file extension or mime-type.
  request  Get the original Request object that the object is responding to.

Methods

The following methods are available in a Response object:

  set_header(name, value)  Sets the header given by name. value will be converted to character.
        A header will be added for each element in value. Use append_header() for setting headers
        without overwriting existing ones.
  get_header(name)  Returns the header(s) given by name
  remove_header(name)  Removes all headers given by name
  has_header(name)  Test for the existence of any header given by name
  append_header(name, value)  Adds an additional header given by name with the value given by
        value. If the header does not exist yet it will be created.
  set_data(key, value)  Adds value to the internal data store and stores it with key
  get_data(key)  Retrieves the data stored under key in the internal data store.
  remove_data(key)  Removes the data stored under key in the internal data store.
  has_data(key)  Queries whether the data store has an entry given by key
```
attach(file, filename=basename(file), type=NULL) Sets the body to the file given by file and marks the response as a download by setting the Content-Disposition to attachment; filename=<filename>. Use the type argument to overwrite the automatic type inference from the file extension.

status_with_text(code) Sets the status to code and sets the body to the associated status code description (e.g. Bad Gateway for 502L)

set_cookie(name, value, encode = TRUE, expires = NULL, http_only = NULL, max_age = NULL, path = NULL, secure = NULL, same_site = NULL) Adds the cookie given by name to the given value, optionally url encoding it, along with any additional directives. See https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Set-Cookie for a description of the different directives. If the cookie already exists it will be overwritten. The validity of the directives will automatically be checked. expires expects a POSIXct object, http_only and secure expect a logical, max_age expects an integer, path a string, and same_site either "Lax" or "Strict"

remove_cookie(name) Removes the cookie named name from the response.

has_cookie(name) Queries whether the response contains a cookie named name

set_links(...) Sets the Link header based on the named arguments passed to .... The names will be used for the rel directive.

format(..., autofail = TRUE, compress = TRUE) Based on the formatters passed in through ... content negotiation is performed with request and the preferred formatter is chosen. The Content-Type header is set automatically. If compress = TRUE the compress() method will be called after formatting. If an error is encountered and autofail = TRUE the response will be set to 500. If a formatter is not found and autofail = TRUE the response will be set to 406. If formatting is successful it will return TRUE, if not it will return FALSE

compress(priority = c('gzip', 'deflate', 'br', 'identity')) Based on the provided priority, an encoding is negotiated with the request and applied. The Content-Encoding header is set to the chosen compression algorithm.

content_length() Calculates the length (in bytes) of the body. This is the number that goes into the Content-Length header. Note that the Content-Length header is set automatically by httpuv so this method should only be called if the response size is needed for other reasons.

as_list() Converts the object to a list for further processing by a Rook compliant server such as httpuv. Will set Content-Type header if missing and convert a non-raw body to a single character string.

See Also

Response for handling http requests

Examples

fake_rook <- fiery::fake_request(
   http://example.com/test?id=34632&question=who+is+hadley',
   content = 'This is elaborate ruse',
   headers = list(
      Accept = 'application/json; text/*',
      Content_Type = 'text/plain'
   )
)
```r
req <- Request$new(fake_rook)
res <- Response$new(req)
res

# Set the body to the associated status text
res$status_with_text(200L)
res$body

# Infer Content-Type from file extension
res$type <- 'json'
res$type

# Prepare a file for download
res$attach(system.file('DESCRIPTION', package = 'reqres'))
res$type
res$body
res$get_header('Content-Disposition')

# Cleaning up connections
rm(fake_rook, req, res)
gc()
```

---

### to_http_date

**Format timestamps to match the HTTP specs**

**Description**

Dates/times in HTTP headers needs a specific format to be valid, and is furthermore always given in GMT time. These two functions aids in converting back and forth between the required format.

**Usage**

```r
to_http_date(time, format = NULL)

from_http_date(time)
```

**Arguments**

- **time**: A string or an object coercible to POSIXct
- **format**: In case time is not a POSIXct object a specification how the string should be interpreted.

**Value**

- `to_http_date()` returns a properly formatted string, while `from_http_date()` returns a POSIXct object
to_http_date

Examples

```r
time <- to_http_date(Sys.time())
time
from_http_date(time)
```
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