

Package ‘curl’

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Type Package

Title A Modern and Flexible Web Client for R

Version 4.3

Description The `curl()` and `curl_download()` functions provide highly configurable drop-in replacements for `base::url()` and `download.file()` with better performance, support for encryption (https, ftps), gzip compression, authentication, and other 'libcurl' goodies. The core of the package implements a framework for performing fully customized requests where data can be processed either in memory, on disk, or streaming via the callback or connection interfaces. Some knowledge of 'libcurl' is recommended; for a more-user-friendly web client see the 'httr' package which builds on this package with http specific tools and logic.

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SystemRequirements libcurl: libcurl-devel (rpm) or
libcurl4-openssl-dev (deb).

URL <https://jeroen.cran.dev/curl> (docs)
<https://github.com/jeroen/curl#readme> (devel)
<https://curl.haxx.se/libcurl/> (upstream)

BugReports <https://github.com/jeroen/curl/issues>

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curl

Curl connection interface

Description

Drop-in replacement for base `url` that supports https, ftps, gzip, deflate, etc. Default behavior is identical to `url`, but request can be fully configured by passing a custom `handle`.

Usage

```
curl(url = "http://httpbin.org/get", open = "", handle = new_handle())
```

Arguments

url	character string. See examples.
open	character string. How to open the connection if it should be opened initially. Currently only "r" and "rb" are supported.
handle	a curl handle object

Details

As of version 2.3 curl connections support `open(con, blocking = FALSE)`. In this case `readBin` and `readLines` will return immediately with data that is available without waiting. For such non-blocking connections the caller needs to call `isIncomplete` to check if the download has completed yet.

Examples

```
## Not run:
con <- curl("https://httpbin.org/get")
readLines(con)

# Auto-opened connections can be recycled
open(con, "rb")
bin <- readBin(con, raw(), 999)
close(con)
rawToChar(bin)

# HTTP error
curl("https://httpbin.org/status/418", "r")

# Follow redirects
readLines(curl("https://httpbin.org/redirect/3"))

# Error after redirect
curl("https://httpbin.org/redirect-to?url=http://httpbin.org/status/418", "r")

# Auto decompress Accept-Encoding: gzip / deflate (rfc2616 #14.3)
readLines(curl("http://httpbin.org/gzip"))
readLines(curl("http://httpbin.org/deflate"))

# Binary support
buf <- readBin(curl("http://httpbin.org/bytes/98765", "rb"), raw(), 1e5)
length(buf)

# Read file from disk
test <- paste0("file://", system.file("DESCRIPTION"))
readLines(curl(test))

# Other protocols
read.csv(curl("ftp://cran.r-project.org/pub/R/CRAN_mirrors.csv"))
readLines(curl("ftps://test.rebex.net:990/readme.txt"))
readLines(curl("gopher://quux.org/1"))

# Streaming data
con <- curl("http://jeroen.github.io/data/diamonds.json", "r")
while(length(x <- readLines(con, n = 5))){
  print(x)
}

# Stream large dataset over https with gzip
library(jsonlite)
```

```
con <- gzcon(curl("https://jeroen.github.io/data/nycflights13.json.gz"))
nycflights <- stream_in(con)

## End(Not run)
```

curl_download	<i>Download file to disk</i>
---------------	------------------------------

Description

Libcurl implementation of `C_download` (the "internal" download method) with added support for https, ftps, gzip, etc. Default behavior is identical to `download.file`, but request can be fully configured by passing a custom `handle`.

Usage

```
curl_download(url, destfile, quiet = TRUE, mode = "wb", handle = new_handle())
```

Arguments

<code>url</code>	A character string naming the URL of a resource to be downloaded.
<code>destfile</code>	A character string with the name where the downloaded file is saved. Tilde-expansion is performed.
<code>quiet</code>	If TRUE, suppress status messages (if any), and the progress bar.
<code>mode</code>	A character string specifying the mode with which to write the file. Useful values are "w", "wb" (binary), "a" (append) and "ab".
<code>handle</code>	a curl handle object

Details

The main difference between `curl_download` and `curl_fetch_disk` is that `curl_download` checks the http status code before starting the download, and raises an error when status is non-successful. The behavior of `curl_fetch_disk` on the other hand is to proceed as normal and write the error page to disk in case of a non success response.

Value

Path of downloaded file (invisibly).

Examples

```
# Download large file
## Not run:
url <- "http://www2.census.gov/acs2011_5yr/pums/csv_pus.zip"
tmp <- tempfile()
curl_download(url, tmp)

## End(Not run)
```

curl_echo	<i>Echo Service</i>
-----------	---------------------

Description

This function is only for testing purposes. It starts a local httpuv server to echo the request body and content type in the response.

Usage

```
curl_echo(handle, port = 9359, progress = interactive(), file = NULL)
```

Arguments

handle	a curl handle object
port	the port number on which to run httpuv server
progress	show progress meter during http transfer
file	path or connection to write body. Default returns body as raw vector.

Examples

```
h <- new_handle(url = 'https://httpbin.org/post')
handle_setform(h, foo = "blabla", bar = charToRaw("test"),
  myfile = form_file(system.file("DESCRIPTION"), "text/description"))

# Echo the POST request data
formdata <- curl_echo(h)

# Show the multipart body
cat(rawToChar(formdata$body))

# Parse multipart
webutils::parse_http(formdata$body, formdata$content_type)
```

curl_escape	<i>URL encoding</i>
-------------	---------------------

Description

Escape all special characters (i.e. everything except for a-z, A-Z, 0-9, '-', '.', '_' or '~') for use in URLs.

Usage

```
curl_escape(url)
```

```
curl_unescape(url)
```

Arguments

`url` A character vector (typically containing urls or parameters) to be encoded/decoded

Examples

```
# Escape strings
out <- curl_escape("foo = bar + 5")
curl_unescape(out)

# All non-ascii characters are encoded
mu <- "\u00b5"
curl_escape(mu)
curl_unescape(curl_escape(mu))
```

`curl_fetch_memory` *Fetch the contents of a URL*

Description

Low-level bindings to write data from a URL into memory, disk or a callback function. These are mainly intended for `httr`, most users will be better off using the `curl` or `curl_download` function, or the http specific wrappers in the `httr` package.

Usage

```
curl_fetch_memory(url, handle = new_handle())

curl_fetch_disk(url, path, handle = new_handle())

curl_fetch_stream(url, fun, handle = new_handle())

curl_fetch_multi(
  url,
  done = NULL,
  fail = NULL,
  pool = NULL,
  data = NULL,
  handle = new_handle()
)

curl_fetch_echo(url, handle = new_handle())
```

Arguments

`url` A character string naming the URL of a resource to be downloaded.

`handle` a curl handle object

`path` Path to save results

fun	Callback function. Should have one argument, which will be a raw vector.
done	callback function for completed request. Single argument with response data in same structure as curl_fetch_memory .
fail	callback function called on failed request. Argument contains error message.
pool	a multi handle created by new_pool . Default uses a global pool.
data	(advanced) callback function, file path, or connection object for writing incoming data. This callback should only be used for <i>streaming</i> applications, where small pieces of incoming data get written before the request has completed. The signature for the callback function is <code>write(data, final = FALSE)</code> . If set to NULL the entire response gets buffered internally and returned by in the done callback (which is usually what you want).

Details

The `curl_fetch` functions automatically raise an error upon protocol problems (network, disk, ssl) but do not implement application logic. For example for you need to check the status code of http requests yourself in the response, and deal with it accordingly.

Both `curl_fetch_memory` and `curl_fetch_disk` have a blocking and non-blocking C implementation. The latter is slightly slower but allows for interrupting the download prematurely (using e.g. CTRL+C or ESC). Interrupting is enabled when R runs in interactive mode or when `getOption("curl_interrupt") == TRUE`.

The `curl_fetch_multi` function is the asynchronous equivalent of `curl_fetch_memory`. It wraps `multi_add` to schedule requests which are executed concurrently when calling `multi_run`. For each successful request the `done` callback is triggered with response data. For failed requests (when `curl_fetch_memory` would raise an error), the `fail` function is triggered with the error message.

Examples

```
# Load in memory
res <- curl_fetch_memory("http://httpbin.org/cookies/set?foo=123&bar=ftw")
res$content

# Save to disk
res <- curl_fetch_disk("http://httpbin.org/stream/10", tempfile())
res$content
readLines(res$content)

# Stream with callback
res <- curl_fetch_stream("http://www.httpbin.org/drip?duration=3&numbytes=15&code=200", function(x){
  cat(rawToChar(x))
})

# Async API
data <- list()
success <- function(res){
  cat("Request done! Status:", res$status, "\n")
  data <- c(data, list(res))
}
failure <- function(msg){
```

```
  cat("Oh noes! Request failed!", msg, "\n")
}
curl_fetch_multi("http://httpbin.org/get", success, failure)
curl_fetch_multi("http://httpbin.org/status/418", success, failure)
curl_fetch_multi("https://urldoesnotexist.xyz", success, failure)
multi_run()
str(data)
```

curl_options

List curl version and options.

Description

curl_version() shows the versions of libcurl, libssl and zlib and supported protocols. curl_options() lists all options available in the current version of libcurl. The dataset curl_symbols lists all symbols (including options) provides more information about the symbols, including when support was added/removed from libcurl.

Usage

```
curl_options(filter = "")
```

```
curl_symbols(filter = "")
```

```
curl_version()
```

Arguments

filter string: only return options with string in name

Examples

```
# Available options
curl_options()

# List proxy options
curl_options("proxy")

# Symbol table
curl_symbols("proxy")
# Curl/ssl version info
curl_version()
```

curl_upload	<i>Upload a File</i>
-------------	----------------------

Description

Upload a file to an `http://`, `ftp://`, or `sftp://` (ssh) server. Uploading to HTTP means performing an HTTP PUT on that URL. Be aware that `sftp` is only available for libcurl clients built with `libssh2`.

Usage

```
curl_upload(file, url, verbose = TRUE, reuse = TRUE, ...)
```

Arguments

<code>file</code>	connection object or path to an existing file on disk
<code>url</code>	where to upload, should start with e.g. <code>ftp://</code>
<code>verbose</code>	emit some progress output
<code>reuse</code>	try to keep alive and recycle connections when possible
<code>...</code>	other arguments passed to <code>handle_setopt</code> , for example a username and password.

Examples

```
# Upload package to winbuilder:  
curl_upload('mypkg_1.3.tar.gz', 'ftp://win-builder.r-project.org/R-devel/')
```

file_writer	<i>File Writer</i>
-------------	--------------------

Description

Generates a closure that writes binary (raw) data to a file.

Usage

```
file_writer(path)
```

Arguments

<code>path</code>	file name or path on disk
-------------------	---------------------------

Details

The writer function automatically opens the file on the first write and closes when it goes out of scope, or explicitly by setting `close = TRUE`. This can be used for the data callback in `multi_add()` or `curl_fetch_multi()`.

Value

Function with signature `writer(data = raw(), close = FALSE)`

Examples

```
# Doesn't open yet
tmp <- tempfile()
writer <- file_writer(tmp)

# Now it opens
writer(charToRaw("Hello!\n"))
writer(charToRaw("How are you?\n"))

# Close it!
writer(charToRaw("All done!\n"), close = TRUE)

# Check it worked
readLines(tmp)
```

handle

Create and configure a curl handle

Description

Handles are the work horses of libcurl. A handle is used to configure a request with custom options, headers and payload. Once the handle has been set up, it can be passed to any of the download functions such as `curl`, `curl_download` or `curl_fetch_memory`. The handle will maintain state in between requests, including keep-alive connections, cookies and settings.

Usage

```
new_handle(...)

handle_setopt(handle, ..., .list = list())

handle_setheaders(handle, ..., .list = list())

handle_getheaders(handle)

handle_getcustom(handle)

handle_setform(handle, ..., .list = list())
```

```
handle_reset(handle)
```

```
handle_data(handle)
```

Arguments

...	named options / headers to be set in the handle. To send a file, see form_file . To list all allowed options, see curl_options
handle	Handle to modify
.list	A named list of options. This is useful if you've created a list of options elsewhere, avoiding the use of <code>do.call()</code> .

Details

Use `new_handle()` to create a new clean curl handle that can be configured with custom options and headers. Note that `handle_setopt` appends or overrides options in the handle, whereas `handle_setheaders` replaces the entire set of headers with the new ones. The `handle_reset` function resets only options/headers/forms in the handle. It does not affect active connections, cookies or response data from previous requests. The safest way to perform multiple independent requests is by using a separate handle for each request. There is very little performance overhead in creating handles.

Value

A handle object (external pointer to the underlying curl handle). All functions modify the handle in place but also return the handle so you can create a pipeline of operations.

See Also

Other handles: [handle_cookies\(\)](#)

Examples

```
h <- new_handle()
handle_setopt(h, customrequest = "PUT")
handle_setform(h, a = "1", b = "2")
r <- curl_fetch_memory("http://httpbin.org/put", h)
cat(rawToChar(r$content))

# Or use the list form
h <- new_handle()
handle_setopt(h, .list = list(customrequest = "PUT"))
handle_setform(h, .list = list(a = "1", b = "2"))
r <- curl_fetch_memory("http://httpbin.org/put", h)
cat(rawToChar(r$content))
```

handle_cookies	<i>Extract cookies from a handle</i>
----------------	--------------------------------------

Description

The `handle_cookies` function returns a data frame with 7 columns as specified in the [netscape cookie file format](#).

Usage

```
handle_cookies(handle)
```

Arguments

`handle` a curl handle object

See Also

Other handles: [handle](#)

Examples

```
h <- new_handle()
handle_cookies(h)

# Server sets cookies
req <- curl_fetch_memory("http://httpbin.org/cookies/set?foo=123&bar=ftw", handle = h)
handle_cookies(h)

# Server deletes cookies
req <- curl_fetch_memory("http://httpbin.org/cookies/delete?foo", handle = h)
handle_cookies(h)

# Cookies will survive a reset!
handle_reset(h)
handle_cookies(h)
```

ie_proxy	<i>Internet Explorer proxy settings</i>
----------	-----------------------------------------

Description

Lookup and mimic the system proxy settings on Windows as set by Internet Explorer. This can be used to configure curl to use the same proxy server.

Usage

```
ie_proxy_info()

ie_get_proxy_for_url(target_url = "http://www.google.com")
```

Arguments

target_url url with host for which to lookup the proxy server

Details

The `ie_proxy_info` function looks up your current proxy settings as configured in IE under "Internet Options" > "Tab: Connections" > "LAN Settings". The `ie_get_proxy_for_url` determines if and which proxy should be used to connect to a particular URL. If your settings have an "automatic configuration script" this involves downloading and executing a PAC file, which can take a while.

multi	<i>Async Multi Download</i>
-------	-----------------------------

Description

AJAX style concurrent requests, possibly using HTTP/2 multiplexing. Results are only available via callback functions. Advanced use only!

Usage

```
multi_add(handle, done = NULL, fail = NULL, data = NULL, pool = NULL)

multi_run(timeout = Inf, poll = FALSE, pool = NULL)

multi_set(total_con = 50, host_con = 6, multiplex = TRUE, pool = NULL)

multi_list(pool = NULL)

multi_cancel(handle)

new_pool(total_con = 100, host_con = 6, multiplex = TRUE)

multi_fdset(pool = NULL)
```

Arguments

handle a curl [handle](#) with preconfigured url option.

done callback function for completed request. Single argument with response data in same structure as [curl_fetch_memory](#).

fail callback function called on failed request. Argument contains error message.

data	(advanced) callback function, file path, or connection object for writing incoming data. This callback should only be used for <i>streaming</i> applications, where small pieces of incoming data get written before the request has completed. The signature for the callback function is <code>write(data, final = FALSE)</code> . If set to NULL the entire response gets buffered internally and returned by in the done callback (which is usually what you want).
pool	a multi handle created by <code>new_pool</code> . Default uses a global pool.
timeout	max time in seconds to wait for results. Use 0 to poll for results without waiting at all.
poll	If TRUE then return immediately after any of the requests has completed. May also be an integer in which case it returns after n requests have completed.
total_con	max total concurrent connections.
host_con	max concurrent connections per host.
multiplex	enable HTTP/2 multiplexing if supported by host and client.

Details

Requests are created in the usual way using a curl `handle` and added to the scheduler with `multi_add`. This function returns immediately and does not perform the request yet. The user needs to call `multi_run` which performs all scheduled requests concurrently. It returns when all requests have completed, or case of a timeout or SIGINT (e.g. if the user presses ESC or CTRL+C in the console). In case of the latter, simply call `multi_run` again to resume pending requests.

When the request succeeded, the done callback gets triggered with the response data. The structure of this data is identical to `curl_fetch_memory`. When the request fails, the `fail` callback is triggered with an error message. Note that failure here means something went wrong in performing the request such as a connection failure, it does not check the http status code. Just like `curl_fetch_memory`, the user has to implement application logic.

Raising an error within a callback function stops execution of that function but does not affect other requests.

A single handle cannot be used for multiple simultaneous requests. However it is possible to add new requests to a pool while it is running, so you can re-use a handle within the callback of a request from that same handle. It is up to the user to make sure the same handle is not used in concurrent requests.

The `multi_cancel` function can be used to cancel a pending request. It has no effect if the request was already completed or canceled.

The `multi_fdset` function returns the file descriptors curl is polling currently, and also a timeout parameter, the number of milliseconds an application should wait (at most) before proceeding. It is equivalent to the `curl_multi_fdset` and `curl_multi_timeout` calls. It is handy for applications that is expecting input (or writing output) through both curl, and other file descriptors.

Examples

```
results <- list()
success <- function(x){
  results <<- append(results, list(x))
}
```

```

failure <- function(str){
  cat(paste("Failed request:", str), file = stderr())
}
# This handle will take longest (3sec)
h1 <- new_handle(url = "https://eu.httpbin.org/delay/3")
multi_add(h1, done = success, fail = failure)

# This handle writes data to a file
con <- file("output.txt")
h2 <- new_handle(url = "https://eu.httpbin.org/post", postfields = "bla bla")
multi_add(h2, done = success, fail = failure, data = con)

# This handle raises an error
h3 <- new_handle(url = "https://urldoesnotexist.xyz")
multi_add(h3, done = success, fail = failure)

# Actually perform the requests
multi_run(timeout = 2)
multi_run()

# Check the file
readLines("output.txt")
unlink("output.txt")

```

multipart

POST files or data

Description

Build multipart form data elements. The `form_file` function uploads a file. The `form_data` function allows for posting a string or raw vector with a custom content-type.

Usage

```
form_file(path, type = NULL)
```

```
form_data(value, type = NULL)
```

Arguments

path	a string with a path to an existing file on disk
type	MIME content-type of the file.
value	a character or raw vector to post

nslookup	<i>Lookup a hostname</i>
----------	--------------------------

Description

The nslookup function is similar to ns1 but works on all platforms and can resolve ipv6 addresses if supported by the OS. Default behavior raises an error if lookup fails.

Usage

```
nslookup(host, ipv4_only = FALSE, multiple = FALSE, error = TRUE)
```

```
has_internet()
```

Arguments

host	a string with a hostname
ipv4_only	always return ipv4 address. Set to 'FALSE' to allow for ipv6 as well.
multiple	returns multiple ip addresses if possible
error	raise an error for failed DNS lookup. Otherwise returns NULL.

Details

The has_internet function tests for internet connectivity by performing a dns lookup. If a proxy server is detected, it will also check for connectivity by connecting via the proxy.

Examples

```
# Should always work if we are online
nslookup("www.r-project.org")

# If your OS supports IPv6
nslookup("ipv6.test-ipv6.com", ipv4_only = FALSE, error = FALSE)
```

parse_date	<i>Parse date/time</i>
------------	------------------------

Description

Can be used to parse dates appearing in http response headers such as Expires or Last-Modified. Automatically recognizes most common formats. If the format is known, [strptime](#) might be easier.

Usage

```
parse_date(datestring)
```


Arguments

datestring a string consisting of a timestamp

Examples

```
# Parse dates in many formats
parse_date("Sunday, 06-Nov-94 08:49:37 GMT")
parse_date("06 Nov 1994 08:49:37")
parse_date("20040911 +0200")
```

parse_headers	<i>Parse response headers</i>
---------------	-------------------------------

Description

Parse response header data as returned by `curl_fetch`, either as a set of strings or into a named list.

Usage

```
parse_headers(txt, multiple = FALSE)

parse_headers_list(txt)
```

Arguments

txt raw or character vector with the header data

multiple parse multiple sets of headers separated by a blank line. See details.

Details

The `parse_headers_list` function parses the headers into a normalized (lowercase field names, trimmed whitespace) named list.

If a request has followed redirects, the data can contain multiple sets of headers. When `multiple = TRUE`, the function returns a list with the response headers for each request. By default it only returns the headers of the final request.

Examples

```
req <- curl_fetch_memory("https://httpbin.org/redirect/3")
parse_headers(req$headers)
parse_headers(req$headers, multiple = TRUE)

# Parse into named list
parse_headers_list(req$headers)
```

send_mail	<i>Send email</i>
-----------	-------------------

Description

Use the curl SMTP client to send an email. The message argument must be properly formatted [RFC2822](#) email message with From/To/Subject headers and CRLF line breaks.

Usage

```
send_mail(
    mail_from,
    mail_rcpt,
    message,
    smtp_server = "smtp://localhost",
    use_ssl = c("try", "no", "force"),
    verbose = TRUE,
    ...
)
```

Arguments

mail_from	email address of the sender.
mail_rcpt	one or more recipient email addresses. Do not include names, these go into the message headers.
message	either a string or connection with (properly formatted) email message, including sender/recipient/subject headers. See example.
smtp_server	hostname or address of the SMTP server, or, an smtp:// or smtps:// URL. See "Specifying the server, port, and protocol" below.
use_ssl	Request to upgrade the connection to SSL using the STARTTLS command, see CURLOPT_USE_SSL for details. Default will try to SSL, proceed as normal otherwise.
verbose	print output
...	other options passed to handle_setopt . In most cases you will need to set a username and password to authenticate with the SMTP server.

Specifying the server, port, and protocol

The smtp_server argument takes a hostname, or an SMTP URL:

- mail.example.com - hostname only
- mail.example.com:587 - hostname and port
- smtp://mail.example.com - protocol and hostname
- smtp://mail.example.com:587 - full SMTP URL
- smtps://mail.example.com:465 - full SMTPS URL

By default, the port will be 25, unless smtps:// is specified—then the default will be 465 instead.

Encrypting connections via SMTPS or STARTTLS

There are two different ways in which SMTP can be encrypted: SMTPS servers run on a port which only accepts encrypted connections, similar to HTTPS. Alternatively, a regular insecure smtp connection can be "upgraded" to a secure TLS connection using the STARTTLS command. It is important to know which method your server expects.

If your smtp server listens on port 465, then use a `smtps://hostname:465` URL. The SMTPS protocol *guarantees* that TLS will be used to protect all communications from the start.

If your email server listens on port 25 or 587, use an `smtp://` URL in combination with the `use_ssl` parameter to control if the connection should be upgraded with STARTTLS. The default value "try" will *opportunistically* try to upgrade to a secure connection if the server supports it, and proceed as normal otherwise.

Examples

```
# Set sender and recipients (email addresses only)
recipients <- readline("Enter your email address to receive test: ")
sender <- 'test@noreply.com'

# Full email message in RFC2822 format
message <- 'From: "R (curl package)" <test@noreply.com>
To: "Roger Recipient" <roger@noreply.com>
Subject: Hello R user!

Dear R user,

I am sending this email using curl.'

# Send the email
send_mail(sender, recipients, message, smtp_server = 'smtps://smtp.gmail.com',
  username = 'curlpackage', password = 'qyyjddvphjsrbnlm')
```

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