

Package ‘callr’

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Title Call R from R

Version 3.7.5

Description It is sometimes useful to perform a computation in a separate R process, without affecting the current R process at all. This package does exactly that.

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URL <https://callr.r-lib.org>, <https://github.com/r-lib/callr>

BugReports <https://github.com/r-lib/callr/issues>

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add_hook	<i>Add a user hook to be executed before launching an R subprocess</i>
----------	--

Description

This function allows users of `callr` to specify functions that get invoked whenever an R session is launched. The function can modify the environment variables and command line arguments.

Usage

```
add_hook(...)
```

Arguments

...	Named argument specifying a hook function to add, or <code>NULL</code> to delete the named hook.
-----	--

Details

The prototype of the hook function is `function (options)`, and it is expected to return the modified options.

Value

add_hook is called for its side-effects.

default_repos

Default value for the repos option in callr subprocesses

Description

callr sets the repos option in subprocesses, to make sure that a CRAN mirror is set up. This is because the subprocess cannot bring up the menu of CRAN mirrors for the user to choose from.

Usage

```
default_repos()
```

Value

Named character vector, the default value of the repos option in callr subprocesses.

Examples

```
default_repos()
```

r

Evaluate an expression in another R session

Description

From callr version 2.0.0, r() is equivalent to r_safe(), and tries to set up a less error prone execution environment. In particular:

- Ensures that at least one reasonable CRAN mirror is set up.
- Adds some command line arguments to avoid saving .RData files, etc.
- Ignores the system and user profiles (by default).
- Sets various environment variables: CYGWIN to avoid warnings about DOS-style paths, R_TESTS to avoid issues when callr is invoked from unit tests, R_BROWSER and R_PDFVIEWER to avoid starting a browser or a PDF viewer. See [rcmd_safe_env\(\)](#).

Usage

```
r(  
  func,  
  args = list(),  
  libpath = .libPaths(),  
  repos = default_repos(),  
  stdout = NULL,  
  stderr = NULL,  
  poll_connection = TRUE,  
  error = getOption("callr.error", "error"),  
  cmdargs = c("--slave", "--no-save", "--no-restore"),  
  show = FALSE,  
  callback = NULL,  
  block_callback = NULL,  
  spinner = show && interactive(),  
  system_profile = FALSE,  
  user_profile = "project",  
  env = rcmd_safe_env(),  
  timeout = Inf,  
  package = FALSE,  
  arch = "same",  
  ...  
)  
  
r_safe(  
  func,  
  args = list(),  
  libpath = .libPaths(),  
  repos = default_repos(),  
  stdout = NULL,  
  stderr = NULL,  
  poll_connection = TRUE,  
  error = getOption("callr.error", "error"),  
  cmdargs = c("--slave", "--no-save", "--no-restore"),  
  show = FALSE,  
  callback = NULL,  
  block_callback = NULL,  
  spinner = show && interactive(),  
  system_profile = FALSE,  
  user_profile = "project",  
  env = rcmd_safe_env(),  
  timeout = Inf,  
  package = FALSE,  
  arch = "same",  
  ...  
)
```

Arguments

func	<p>Function object to call in the new R process. The function should be self-contained and only refer to other functions and use variables explicitly from other packages using the <code>::</code> notation. By default the environment of the function is set to <code>.GlobalEnv</code> before passing it to the child process. (See the <code>package</code> option if you want to keep the environment.) Because of this, it is good practice to create an anonymous function and pass that to <code>callr</code>, instead of passing a function object from a (base or other) package. In particular</p> <pre>r(.libPaths)</pre> <p>does not work, because <code>.libPaths</code> is defined in a special environment, but</p> <pre>r(function() .libPaths())</pre> <p>works just fine.</p>
args	Arguments to pass to the function. Must be a list.
libpath	The library path.
repos	The <code>repos</code> option. If <code>NULL</code> , then no <code>repos</code> option is set. This options is only used if <code>user_profile</code> or <code>system_profile</code> is set <code>FALSE</code> , as it is set using the system or the user profile.
stdout	The name of the file the standard output of the child R process will be written to. If the child process runs with the <code>--slave</code> option (the default), then the commands are not echoed and will not be shown in the standard output. Also note that you need to call <code>print()</code> explicitly to show the output of the command(s). If <code>NULL</code> (the default), then standard output is not returned, but it is recorded and included in the error object if an error happens.
stderr	The name of the file the standard error of the child R process will be written to. In particular <code>message()</code> sends output to the standard error. If nothing was sent to the standard error, then this file will be empty. This argument can be the same file as <code>stdout</code> , in which case they will be correctly interleaved. If this is the string <code>"2>&1"</code> , then standard error is redirected to standard output. If <code>NULL</code> (the default), then standard output is not returned, but it is recorded and included in the error object if an error happens.
poll_connection	Whether to have a control connection to the process. This is used to transmit messages from the subprocess to the main process.
error	What to do if the remote process throws an error. See details below.
cmdargs	Command line arguments to pass to the R process. Note that <code>c("-f", rscript)</code> is appended to this, <code>rscript</code> is the name of the script file to run. This contains a call to the supplied function and some error handling code.
show	Logical, whether to show the standard output on the screen while the child process is running. Note that this is independent of the <code>stdout</code> and <code>stderr</code> arguments. The standard error is not shown currently.
callback	A function to call for each line of the standard output and standard error from the child process. It works together with the <code>show</code> option; i.e. if <code>show = TRUE</code> , and a callback is provided, then the output is shown of the screen, and the callback is also called.

<code>block_callback</code>	A function to call for each block of the standard output and standard error. This callback is not line oriented, i.e. multiple lines or half a line can be passed to the callback.
<code>spinner</code>	Whether to show a calming spinner on the screen while the child R session is running. By default it is shown if <code>show = TRUE</code> and the R session is interactive.
<code>system_profile</code>	Whether to use the system profile file.
<code>user_profile</code>	Whether to use the user's profile file. If this is "project", then only the profile from the working directory is used, but the <code>R_PROFILE_USER</code> environment variable and the user level profile are not. See also "Security considerations" below.
<code>env</code>	Environment variables to set for the child process.
<code>timeout</code>	Timeout for the function call to finish. It can be a <code>base::difftime</code> object, or a real number, meaning seconds. If the process does not finish before the timeout period expires, then a <code>system_command_timeout_error</code> error is thrown. <code>Inf</code> means no timeout.
<code>package</code>	Whether to keep the environment of <code>func</code> when passing it to the other package. Possible values are: <ul style="list-style-type: none"> • <code>FALSE</code>: reset the environment to <code>.GlobalEnv</code>. This is the default. • <code>TRUE</code>: keep the environment as is. • <code>pkg</code>: set the environment to the <code>pkg</code> package namespace.
<code>arch</code>	Architecture to use in the child process, for multi-arch builds of R. By default the same as the main process. See <code>supported_archs()</code> . If it contains a forward or backward slash character, then it is taken as the path to the R executable. Note that on Windows you need the path to <code>Rterm.exe</code> .
<code>...</code>	Extra arguments are passed to <code>processx::run()</code> .

Details

The `r()` function from before 2.0.0 is called `r_copycat()` now.

Value

Value of the evaluated expression.

Error handling

`callr` handles errors properly. If the child process throws an error, then `callr` throws an error with the same error message in the main process.

The error expert argument may be used to specify a different behavior on error. The following values are possible:

- `error` is the default behavior: throw an error in the main process, with a prefix and the same error message as in the subprocess.
- `stack` also throws an error in the main process, but the error is of a special kind, class `callr_error`, and it contains both the original error object, and the call stack of the child, as written out by `utils::dump.frames()`. This is now deprecated, because the error thrown for "error" has the same information.

- `debugger` is similar to `stack`, but in addition to returning the complete call stack, it also starts up a debugger in the child call stack, via `utils::debugger()`.

The default error behavior can be also set using the `callr.error` option. This is useful to debug code that uses `callr`.

`callr` uses parent errors, to keep the stacks of the main process and the subprocess(es) in the same error object.

Security considerations

`callr` makes a copy of the user's `.Renviron` file and potentially of the local or user `.Rprofile`, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the `keyring` package to avoid passwords in plain files.

Transporting objects

`func` and `args` are copied to the child process by first serializing them into a temporary file using `saveRDS()` and then loading them back into the child session using `readRDS()`. The same strategy is used to copy the result of calling `func(args)` to the main session. Note that some objects, notably those with `externalptr` type, won't work as expected after being saved to a file and loaded back.

For performance reasons `compress=FALSE` is used when serializing with `saveRDS()`, this can be disabled by setting `options(callr.compress_transport = TRUE)`.

See Also

Other `callr` functions: [r_copycat\(\)](#), [r_vanilla\(\)](#)

Examples

```
# Workspace is empty
r(function() ls())

# library path is the same by default
r(function() .libPaths())
.libPaths()
```

rcmd

Run an R CMD command

Description

Run an R CMD command from within R. This will usually start another R process, from a shell script.

Usage

```
rcmd(  
  cmd,  
  cmdargs = character(),  
  libpath = .libPaths(),  
  repos = default_repos(),  
  stdout = NULL,  
  stderr = NULL,  
  poll_connection = TRUE,  
  echo = FALSE,  
  show = FALSE,  
  callback = NULL,  
  block_callback = NULL,  
  spinner = show && interactive(),  
  system_profile = FALSE,  
  user_profile = "project",  
  env = rcmd_safe_env(),  
  timeout = Inf,  
  wd = ".",  
  fail_on_status = FALSE,  
  ...  
)
```

```
rcmd_safe(  
  cmd,  
  cmdargs = character(),  
  libpath = .libPaths(),  
  repos = default_repos(),  
  stdout = NULL,  
  stderr = NULL,  
  poll_connection = TRUE,  
  echo = FALSE,  
  show = FALSE,  
  callback = NULL,  
  block_callback = NULL,  
  spinner = show && interactive(),  
  system_profile = FALSE,  
  user_profile = "project",  
  env = rcmd_safe_env(),  
  timeout = Inf,  
  wd = ".",  
  fail_on_status = FALSE,  
  ...  
)
```


Arguments

cmd	Command to run. See <code>R --help</code> from the command line for the various commands. In the current version of R (3.2.4) these are: BATCH, COMPILE, SHLIB, INSTALL, REMOVE, build, check, LINK, Rprof, Rdconv, Rd2pdf, Rd2txt, Stangle, Sweave, Rdiff, config, javareconf, rtags.
cmdargs	Command line arguments.
libpath	The library path.
repos	The repos option. If NULL, then no repos option is set. This options is only used if <code>user_profile</code> or <code>system_profile</code> is set FALSE, as it is set using the system or the user profile.
stdout	Optionally a file name to send the standard output to.
stderr	Optionally a file name to send the standard error to. It may be the same as <code>stdout</code> , in which case standard error is redirected to standard output. It can also be the special string <code>"2>&1"</code> , in which case standard error will be redirected to standard output.
poll_connection	Whether to have a control connection to the process. This is used to transmit messages from the subprocess to the parent.
echo	Whether to echo the complete command run by <code>rcmd</code> .
show	Logical, whether to show the standard output on the screen while the child process is running. Note that this is independent of the <code>stdout</code> and <code>stderr</code> arguments. The standard error is not shown currently.
callback	A function to call for each line of the standard output and standard error from the child process. It works together with the <code>show</code> option; i.e. if <code>show = TRUE</code> , and a callback is provided, then the output is shown of the screen, and the callback is also called.
block_callback	A function to call for each block of the standard output and standard error. This callback is not line oriented, i.e. multiple lines or half a line can be passed to the callback.
spinner	Whether to show a calming spinner on the screen while the child R session is running. By default it is shown if <code>show = TRUE</code> and the R session is interactive.
system_profile	Whether to use the system profile file.
user_profile	Whether to use the user's profile file. If this is "project", then only the profile from the working directory is used, but the <code>R_PROFILE_USER</code> environment variable and the user level profile are not. See also "Security considerations" below.
env	Environment variables to set for the child process.
timeout	Timeout for the function call to finish. It can be a <code>base::difftime</code> object, or a real number, meaning seconds. If the process does not finish before the timeout period expires, then a <code>system_command_timeout_error</code> error is thrown. Inf means no timeout.
wd	Working directory to use for running the command. Defaults to the current working directory.

`fail_on_status` Whether to throw an R error if the command returns with a non-zero status code. By default no error is thrown.

... Extra arguments are passed to `processx::run()`.

Details

Starting from `callr` 2.0.0, `rcmd()` has safer defaults, the same as the `rcmd_safe()` default values. Use `rcmd_copycat()` for the old defaults.

Value

A list with the command line `$command`), standard output (`$stdout`), standard error (`stderr`), exit status (`$status`) of the external R CMD command, and whether a timeout was reached (`$timeout`).

Security considerations

`callr` makes a copy of the user's `.Renv` file and potentially of the local or user `.Rprofile`, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the `keyring` package to avoid passwords in plain files.

See Also

Other R CMD commands: `rcmd_bg()`, `rcmd_copycat()`

Examples

```
rcmd("config", "CC")
```

`rcmd_bg`

Run an R CMD command in the background

Description

The child process is started in the background, and the function return immediately.

Usage

```
rcmd_bg(  
  cmd,  
  cmdargs = character(),  
  libpath = .libPaths(),  
  stdout = "|",  
  stderr = "|",  
  poll_connection = TRUE,
```

```

    repos = default_repos(),
    system_profile = FALSE,
    user_profile = "project",
    env = rcmd_safe_env(),
    wd = ".",
    supervise = FALSE,
    ...
)

```

Arguments

cmd	Command to run. See R --help from the command line for the various commands. In the current version of R (3.2.4) these are: BATCH, COMPILE, SHLIB, INSTALL, REMOVE, build, check, LINK, Rprof, Rdconv, Rd2pdf, Rd2txt, Stangle, Sweave, Rdiff, config, javareconf, rtags.
cmdargs	Command line arguments.
libpath	The library path.
stdout	Optionally a file name to send the standard output to.
stderr	Optionally a file name to send the standard error to. It may be the same as stdout, in which case standard error is redirected to standard output. It can also be the special string "2>&1", in which case standard error will be redirected to standard output.
poll_connection	Whether to have a control connection to the process. This is used to transmit messages from the subprocess to the parent.
repos	The repos option. If NULL, then no repos option is set. This options is only used if user_profile or system_profile is set FALSE, as it is set using the system or the user profile.
system_profile	Whether to use the system profile file.
user_profile	Whether to use the user's profile file. If this is "project", then only the profile from the working directory is used, but the R_PROFILE_USER environment variable and the user level profile are not. See also "Security considerations" below.
env	Environment variables to set for the child process.
wd	Working directory to use for running the command. Defaults to the current working directory.
supervise	Whether to register the process with a supervisor. If TRUE, the supervisor will ensure that the process is killed when the R process exits.
...	Extra arguments are passed to the processx::process constructor.

Value

It returns a [process](#) object.

Security considerations

callr makes a copy of the user's .Renviro file and potentially of the local or user .Rprofile, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the keyring package to avoid passwords in plain files.

See Also

Other R CMD commands: [rcmd_copycat\(\)](#), [rcmd\(\)](#)

rcmd_copycat

Call and R CMD command, while mimicking the current R session

Description

This function is similar to [rcmd\(\)](#), but it has slightly different defaults:

- The repos options is unchanged.
- No extra environment variables are defined.

Usage

```
rcmd_copycat(
  cmd,
  cmdargs = character(),
  libpath = .libPaths(),
  repos = getOption("repos"),
  env = character(),
  ...
)
```

Arguments

cmd	Command to run. See R --help from the command line for the various commands. In the current version of R (3.2.4) these are: BATCH, COMPILE, SHLIB, INSTALL, REMOVE, build, check, LINK, Rprof, Rdconv, Rd2pdf, Rd2txt, Stangle, Sweave, Rdiff, config, javareconf, rtags.
cmdargs	Command line arguments.
libpath	The library path.
repos	The repos option. If NULL, then no repos option is set. This options is only used if user_profile or system_profile is set FALSE, as it is set using the system or the user profile.
env	Environment variables to set for the child process.
...	Additional arguments are passed to rcmd() .

Security considerations

callr makes a copy of the user's .Renviro file and potentially of the local or user .Rprofile, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the keyring package to avoid passwords in plain files.

See Also

Other R CMD commands: [rcmd_bg\(\)](#), [rcmd\(\)](#)

rcmd_process

External R CMD Process

Description

An R CMD * command that runs in the background. This is an R6 class that extends the [processx::process](#) class.

Super class

[processx::process](#) -> rcmd_process

Methods

Public methods:

- [rcmd_process\\$new\(\)](#)
- [rcmd_process\\$finalize\(\)](#)
- [rcmd_process\\$clone\(\)](#)

Method [new\(\)](#): Start an R CMD process.

Usage:

```
rcmd_process$new(options)
```

Arguments:

options A list of options created via [rcmd_process_options\(\)](#).

Returns: A new rcmd_process object.

Method [finalize\(\)](#): Clean up the temporary files created for an R CMD process.

Usage:

```
rcmd_process$finalize()
```

Method [clone\(\)](#): The objects of this class are cloneable with this method.

Usage:

```
rcmd_process$clone(deep = FALSE)
```

Arguments:

deep Whether to make a deep clone.

Examples

```
options <- rcmd_process_options(cmd = "config", cmdargs = "CC")
rp <- rcmd_process$new(options)
rp$wait()
rp$read_output_lines()
```

rcmd_process_options *Create options for an [rcmd_process](#) object*

Description

Create options for an [rcmd_process](#) object

Usage

```
rcmd_process_options(...)
```

Arguments

... Options to override, named arguments.

Value

A list of options.

`rcmd_process_options()` creates a set of options to initialize a new object from the `rcmd_process` class. Its arguments must be named, the names are used as option names. The options correspond to (some of) the arguments of the `rcmd()` function. At least the `cmd` option must be specified, to select the R CMD subcommand to run. Typically `cmdargs` is specified as well, to supply more arguments to R CMD.

Examples

```
## List all options and their default values:
rcmd_process_options()
```

rcmd_safe_env	<i>rcmd_safe_env returns a set of environment variables that are more appropriate for <code>rcmd_safe()</code>. It is exported to allow manipulating these variables (e.g. add an extra one), before passing them to the <code>rcmd()</code> functions.</i>
---------------	---

Description

It currently has the following variables:

- `CYGWIN="nodosfilewarning"`: On Windows, do not warn about MS-DOS style file names.
- `R_TESTS=""` This variable is set by R CMD check, and makes the child R process load a startup file at startup, from the current working directory, that is assumed to be the `/test` directory of the package being checked. If the current working directory is changed to something else (as it typically is by `testthat`, then R cannot start. Setting it to the empty string ensures that `callr` can be used from unit tests.
- `R_BROWSER="false"`: typically we don't want to start up a browser from the child R process.
- `R_PDFVIEWER="false"`: similarly for the PDF viewer.

Usage

```
rcmd_safe_env()
```

Details

Note that `callr` also sets the `R_ENVIRON`, `R_ENVIRON_USER`, `R_PROFILE` and `R_PROFILE_USER` environment variables appropriately, unless these are set by the user in the `env` argument of the `r`, etc. calls.

Value

A named character vector of environment variables.

rscript	<i>Run an R script</i>
---------	------------------------

Description

It uses the `Rscript` program corresponding to the current R version, to run the script. It streams `stdout` and `stderr` of the process.

Usage

```

rscript(
  script,
  cmdargs = character(),
  libpath = .libPaths(),
  repos = default_repos(),
  stdout = NULL,
  stderr = NULL,
  poll_connection = TRUE,
  echo = FALSE,
  show = TRUE,
  callback = NULL,
  block_callback = NULL,
  spinner = FALSE,
  system_profile = FALSE,
  user_profile = "project",
  env = rcmd_safe_env(),
  timeout = Inf,
  wd = ".",
  fail_on_status = TRUE,
  color = TRUE,
  ...
)

```

Arguments

<code>script</code>	Path of the script to run.
<code>cmdargs</code>	Command line arguments.
<code>libpath</code>	The library path.
<code>repos</code>	The repos option. If NULL, then no repos option is set. This options is only used if <code>user_profile</code> or <code>system_profile</code> is set FALSE, as it is set using the system or the user profile.
<code>stdout</code>	Optionally a file name to send the standard output to.
<code>stderr</code>	Optionally a file name to send the standard error to. It may be the same as <code>stdout</code> , in which case standard error is redirected to standard output. It can also be the special string " <code>2>&1</code> ", in which case standard error will be redirected to standard output.
<code>poll_connection</code>	Whether to have a control connection to the process. This is used to transmit messages from the subprocess to the parent.
<code>echo</code>	Whether to echo the complete command run by <code>rcmd</code> .
<code>show</code>	Logical, whether to show the standard output on the screen while the child process is running. Note that this is independent of the <code>stdout</code> and <code>stderr</code> arguments. The standard error is not shown currently.
<code>callback</code>	A function to call for each line of the standard output and standard error from the child process. It works together with the <code>show</code> option; i.e. if <code>show = TRUE</code> , and a

	callback is provided, then the output is shown on the screen, and the callback is also called.
block_callback	A function to call for each block of the standard output and standard error. This callback is not line oriented, i.e. multiple lines or half a line can be passed to the callback.
spinner	Whether to show a calming spinner on the screen while the child R session is running. By default it is shown if <code>show = TRUE</code> and the R session is interactive.
system_profile	Whether to use the system profile file.
user_profile	Whether to use the user's profile file. If this is "project", then only the profile from the working directory is used, but the <code>R_PROFILE_USER</code> environment variable and the user level profile are not. See also "Security considerations" below.
env	Environment variables to set for the child process.
timeout	Timeout for the function call to finish. It can be a <code>base::difftime</code> object, or a real number, meaning seconds. If the process does not finish before the timeout period expires, then a <code>system_command_timeout_error</code> error is thrown. <code>Inf</code> means no timeout.
wd	Working directory to use for running the command. Defaults to the current working directory.
fail_on_status	Whether to throw an R error if the command returns with a non-zero status code. By default no error is thrown.
color	Whether to use terminal colors in the child process, assuming they are active in the parent process.
...	Extra arguments are passed to <code>processx::run()</code> .

Security considerations

`callr` makes a copy of the user's `.Renviron` file and potentially of the local or user `.Rprofile`, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the `keyring` package to avoid passwords in plain files.

rscript_process *External Rscript process*

Description

An `Rscript script.R` command that runs in the background. This is an R6 class that extends the `processx::process` class.

Super class

`processx::process` -> `rscript_process`

Methods

Public methods:

- `rscript_process$new()`
- `rscript_process$finalize()`
- `rscript_process$clone()`

Method `new()`: Create a new Rscript process.

Usage:

```
rscript_process$new(options)
```

Arguments:

`options` A list of options created via `rscript_process_options()`.

Method `finalize()`: Clean up after an Rscript process, remove temporary files.

Usage:

```
rscript_process$finalize()
```

Method `clone()`: The objects of this class are cloneable with this method.

Usage:

```
rscript_process$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
options <- rscript_process_options(script = "script.R")
rp <- rscript_process$new(options)
rp$wait()
rp$read_output_lines()
```

`rscript_process_options`

Create options for an `rscript_process` object

Description

Create options for an `rscript_process` object

Usage

```
rscript_process_options(...)
```

Arguments

... Options to override, named arguments.

Value

A list of options.

`rscript_process_options()` creates a set of options to initialize a new object from the `rscript_process` class. Its arguments must be named, the names are used as option names. The options correspond to (some of) the arguments of the `rscript()` function. At least the `script` option must be specified, the script file to run.

Examples

```
## List all options and their default values:
rscript_process_options()
```

r_bg

Evaluate an expression in another R session, in the background

Description

Starts evaluating an R function call in a background R process, and returns immediately. Use `p$get_result()` to collect the result or to throw an error if the background computation failed.

Usage

```
r_bg(
  func,
  args = list(),
  libpath = .libPaths(),
  repos = default_repos(),
  stdout = "|",
  stderr = "|",
  poll_connection = TRUE,
  error = getOption("callr.error", "error"),
  cmdargs = c("--slave", "--no-save", "--no-restore"),
  system_profile = FALSE,
  user_profile = "project",
  env = rcmd_safe_env(),
  supervise = FALSE,
  package = FALSE,
  arch = "same",
  ...
)
```

Arguments

func	<p>Function object to call in the new R process. The function should be self-contained and only refer to other functions and use variables explicitly from other packages using the <code>::</code> notation. By default the environment of the function is set to <code>.GlobalEnv</code> before passing it to the child process. (See the package option if you want to keep the environment.) Because of this, it is good practice to create an anonymous function and pass that to <code>callr</code>, instead of passing a function object from a (base or other) package. In particular</p> <pre>r(.libPaths)</pre> <p>does not work, because <code>.libPaths</code> is defined in a special environment, but</p> <pre>r(function() .libPaths())</pre> <p>works just fine.</p>
args	Arguments to pass to the function. Must be a list.
libpath	The library path.
repos	The <code>repos</code> option. If <code>NULL</code> , then no <code>repos</code> option is set. This options is only used if <code>user_profile</code> or <code>system_profile</code> is set <code>FALSE</code> , as it is set using the system or the user profile.
stdout	The name of the file the standard output of the child R process will be written to. If the child process runs with the <code>--slave</code> option (the default), then the commands are not echoed and will not be shown in the standard output. Also note that you need to call <code>print()</code> explicitly to show the output of the command(s). IF <code>NULL</code> (the default), then standard output is not returned, but it is recorded and included in the error object if an error happens.
stderr	The name of the file the standard error of the child R process will be written to. In particular <code>message()</code> sends output to the standard error. If nothing was sent to the standard error, then this file will be empty. This argument can be the same file as <code>stdout</code> , in which case they will be correctly interleaved. If this is the string <code>"2>&1"</code> , then standard error is redirected to standard output. IF <code>NULL</code> (the default), then standard output is not returned, but it is recorded and included in the error object if an error happens.
poll_connection	Whether to have a control connection to the process. This is used to transmit messages from the subprocess to the main process.
error	What to do if the remote process throws an error. See details below.
cmdargs	Command line arguments to pass to the R process. Note that <code>c("-f", rscript)</code> is appended to this, <code>rscript</code> is the name of the script file to run. This contains a call to the supplied function and some error handling code.
system_profile	Whether to use the system profile file.
user_profile	Whether to use the user's profile file. If this is <code>"project"</code> , then only the profile from the working directory is used, but the <code>R_PROFILE_USER</code> environment variable and the user level profile are not. See also "Security considerations" below.

env	Environment variables to set for the child process.
supervise	Whether to register the process with a supervisor. If TRUE, the supervisor will ensure that the process is killed when the R process exits.
package	Whether to keep the environment of func when passing it to the other package. Possible values are: <ul style="list-style-type: none"> • FALSE: reset the environment to .GlobalEnv. This is the default. • TRUE: keep the environment as is. • pkg: set the environment to the pkg package namespace.
arch	Architecture to use in the child process, for multi-arch builds of R. By default the same as the main process. See supported_archs() . If it contains a forward or backward slash character, then it is taken as the path to the R executable. Note that on Windows you need the path to Rterm.exe.
...	Extra arguments are passed to the processx::process constructor.

Value

An `r_process` object, which inherits from [process](#), so all process methods can be called on it, and in addition it also has a `get_result()` method to collect the result.

Security considerations

`callr` makes a copy of the user's `.Renviron` file and potentially of the local or user `.Rprofile`, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the `keyring` package to avoid passwords in plain files.

Examples

```
rx <- r_bg(function() 1 + 2)

# wait until it is done
rx$wait()
rx$is_alive()
rx$get_result()
```

Description

Differences to `r()`:

- No extra repositories are set up.
- The `--no-save`, `--no-restore` command line arguments are not used. (But `--slave` still is.)
- The system profile and the user profile are loaded.
- No extra environment variables are set up.

Usage

```
r_copycat(
  func,
  args = list(),
  libpath = .libPaths(),
  repos = getOption("repos"),
  cmdargs = "--slave",
  system_profile = TRUE,
  user_profile = TRUE,
  env = character(),
  ...
)
```

Arguments

<code>func</code>	Function object to call in the new R process. The function should be self-contained and only refer to other functions and use variables explicitly from other packages using the <code>::</code> notation. By default the environment of the function is set to <code>.GlobalEnv</code> before passing it to the child process. (See the package option if you want to keep the environment.) Because of this, it is good practice to create an anonymous function and pass that to <code>callr</code> , instead of passing a function object from a (base or other) package. In particular <code>r(.libPaths)</code> does not work, because <code>.libPaths</code> is defined in a special environment, but <code>r(function() .libPaths())</code> works just fine.
<code>args</code>	Arguments to pass to the function. Must be a list.
<code>libpath</code>	The library path.
<code>repos</code>	The <code>repos</code> option. If <code>NULL</code> , then no <code>repos</code> option is set. This options is only used if <code>user_profile</code> or <code>system_profile</code> is set <code>FALSE</code> , as it is set using the system or the user profile.
<code>cmdargs</code>	Command line arguments to pass to the R process. Note that <code>c("-f", rscript)</code> is appended to this, <code>rscript</code> is the name of the script file to run. This contains a call to the supplied function and some error handling code.
<code>system_profile</code>	Whether to use the system profile file.

user_profile	Whether to use the user's profile file. If this is "project", then only the profile from the working directory is used, but the R_PROFILE_USER environment variable and the user level profile are not. See also "Security considerations" below.
env	Environment variables to set for the child process.
...	Additional arguments are passed to <code>r()</code> .

Security considerations

callr makes a copy of the user's .Renviro file and potentially of the local or user .Rprofile, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the keyring package to avoid passwords in plain files.

See Also

Other callr functions: `r_vanilla()`, `r()`

r_process	<i>External R Process</i>
-----------	---------------------------

Description

An R process that runs in the background. This is an R6 class that extends the `processx::process` class. The process starts in the background, evaluates an R function call, and then quits.

Super class

`processx::process` -> `r_process`

Methods

Public methods:

- `r_process$new()`
- `r_process$get_result()`
- `r_process$finalize()`
- `r_process$clone()`

Method `new()`: Start a new R process in the background.

Usage:

```
r_process$new(options)
```

Arguments:

options A list of options created via `r_process_options()`.

Returns: A new `r_process` object.

Value

A list of options.

`r_process_options()` creates a set of options to initialize a new object from the `r_process` class. Its arguments must be named, the names are used as option names. The options correspond to (some of) the arguments of the `r()` function. At least the `func` option must be specified, this is the R function to run in the background.

Examples

```
## List all options and their default values:
r_process_options()
```

r_session

External R Session

Description

A permanent R session that runs in the background. This is an R6 class that extends the `processx::process` class.

The process is started at the creation of the object, and then it can be used to evaluate R function calls, one at a time.

Super class

`processx::process` -> `r_session`

Public fields

`status` Status codes returned by `read()`.

Methods**Public methods:**

- `r_session$new()`
- `r_session$run()`
- `r_session$run_with_output()`
- `r_session$call()`
- `r_session$poll_process()`
- `r_session$get_state()`
- `r_session$get_running_time()`
- `r_session$read()`
- `r_session$close()`
- `r_session$traceback()`
- `r_session$debug()`
- `r_session$attach()`

- `r_session$finalize()`
- `r_session$print()`
- `r_session$clone()`

Method `new()`: creates a new R background process. It can wait for the process to start up (`wait = TRUE`), or return immediately, i.e. before the process is actually ready to run. In the latter case you may call the `poll_process()` method to make sure it is ready.

Usage:

```
r_session$new(options = r_session_options(), wait = TRUE, wait_timeout = 3000)
```

Arguments:

`options` A list of options created via `r_session_options()`.

`wait` Whether to wait for the R process to start and be ready for running commands.

`wait_timeout` Timeout for waiting for the R process to start, in milliseconds.

Returns: An `r_session` object.

Method `run()`: Similar to `r()`, but runs the function in a permanent background R session. It throws an error if the function call generated an error in the child process.

Usage:

```
r_session$run(func, args = list(), package = FALSE)
```

Arguments:

`func` Function object to call in the background R process. Please read the notes for the similar argument of `r()`.

`args` Arguments to pass to the function. Must be a list.

`package` Whether to keep the environment of `func` when passing it to the other package. Possible values are:

- `FALSE`: reset the environment to `.GlobalEnv`. This is the default.
- `TRUE`: keep the environment as is.
- `pkg`: set the environment to the `pkg` package namespace.

Returns: The return value of the R expression.

Method `run_with_output()`: Similar to `$run()`, but returns the standard output and error of the child process as well. It does not throw on errors, but returns a non-NULL error member in the result list.

Usage:

```
r_session$run_with_output(func, args = list(), package = FALSE)
```

Arguments:

`func` Function object to call in the background R process. Please read the notes for the similar argument of `r()`.

`args` Arguments to pass to the function. Must be a list.

`package` Whether to keep the environment of `func` when passing it to the other package. Possible values are:

- `FALSE`: reset the environment to `.GlobalEnv`. This is the default.
- `TRUE`: keep the environment as is.

- pkg: set the environment to the pkg package namespace.

Returns: A list with the following entries.

- result: The value returned by func. On error this is NULL.
- stdout: The standard output of the process while evaluating
- stderr: The standard error of the process while evaluating the func call.
- error: On error it contains an error object, that contains the error thrown in the subprocess. Otherwise it is NULL.
- code, message: These fields are used by call internally and you can ignore them.

Method `call()`: Starts running a function in the background R session, and returns immediately. To check if the function is done, call the `poll_process()` method.

Usage:

```
r_session$call(func, args = list(), package = FALSE)
```

Arguments:

func Function object to call in the background R process. Please read the notes for the similar argument of `r()`.

args Arguments to pass to the function. Must be a list.

package Whether to keep the environment of func when passing it to the other package. Possible values are:

- FALSE: reset the environment to `.GlobalEnv`. This is the default.
- TRUE: keep the environment as is.
- pkg: set the environment to the pkg package namespace.

Method `poll_process()`: Poll the R session with a timeout. If the session has finished the computation, it returns with "ready". If the timeout is reached, it returns with "timeout".

Usage:

```
r_session$poll_process(timeout)
```

Arguments:

timeout Timeout period in milliseconds.

Returns: Character string "ready" or "timeout".

Method `get_state()`: Return the state of the R session.

Usage:

```
r_session$get_state()
```

Returns: Possible values:

- "starting": starting up,
- "idle": ready to compute,
- "busy": computing right now,
- "finished": the R process has finished.

Method `get_running_time()`: Returns the elapsed time since the R process has started, and the elapsed time since the current computation has started. The latter is NA if there is no active computation.

Usage:

```
r_session$get_running_time()
```

Returns: Named vector of POSIXct objects. The names are "total" and "current".

Method `read()`: Reads an event from the child process, if there is one available. Events might signal that the function call has finished, or they can be progress report events.

This is a low level function that you only need to use if you want to process events (messages) from the R session manually.

Usage:

```
r_session$read()
```

Returns: NULL if no events are available. Otherwise a named list, which is also a `callr_session_result` object. The list always has a code entry which is the type of the event. See also `r_session$public_fields$status` for symbolic names of the event types.

- 200: (DONE) The computation is done, and the event includes the result, in the same form as for the `run()` method.
- 201: (STARTED) An R session that was in 'starting' state is ready to go.
- 202: (ATTACH_DONE) Used by the `attach()` method.
- 301: (MSG) A message from the subprocess. The message is a condition object with class `callr_message`. (It typically has other classes, e.g. `cli_message` for output from the `cli` package.)
- 500: (EXITED) The R session finished cleanly. This means that the evaluated expression quit R.
- 501: (CRASHED) The R session crashed or was killed.
- 502: (CLOSED) The R session closed its end of the connection that `callr` uses for communication.

Method `close()`: Terminate the current computation and the R process. The session object will be in "finished" state after this.

Usage:

```
r_session$close(grace = 1000)
```

Arguments:

`grace` Grace period in milliseconds, to wait for the subprocess to exit cleanly, after its standard input is closed. If the process is still running after this period, it will be killed.

Method `traceback()`: The `traceback()` method can be used after an error in the R subprocess. It is equivalent to the `base::traceback()` call, in the subprocess.

On `callr` version 3.8.0 and above, you need to set the `callr.traceback` option to `TRUE` (in the main process) to make the subprocess save the trace on error. This is because saving the trace can be costly for large objects passed as arguments.

Usage:

```
r_session$traceback()
```

Returns: The same output as from `base::traceback()`

Method `debug()`: Interactive debugger to inspect the dumped frames in the subprocess, after an error. See more at [r_session_debug](#).

On callr version 3.8.0 and above, you need to set the `callr.traceback` option to `TRUE` (in the main process) to make the subprocess dump frames on error. This is because saving the frames can be costly for large objects passed as arguments.

Usage:

```
r_session$debug()
```

Method `attach()`: Experimental function that provides a REPL (Read-Eval-Print-Loop) to the subprocess.

Usage:

```
r_session$attach()
```

Method `finalize()`: Finalizer that is called when garbage collecting an `r_session` object, to clean up temporary files.

Usage:

```
r_session$finalize()
```

Method `print()`: Print method for an `r_session`.

Usage:

```
r_session$print(...)
```

Arguments:

... Arguments are not used currently.

Method `clone()`: The objects of this class are cloneable with this method.

Usage:

```
r_session$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
rs <- r_session$new()
rs$run(function() 1 + 2)
rs$call(function() Sys.sleep(1))
rs$get_state()

rs$poll_process(-1)
rs$get_state()
rs$read()
```

Description

The `r_session$debug()` method is an interactive debugger to inspect the stack of the background process after an error.

Details

Note that on `callr` version 3.8.0 and above, you need to set the `callr.traceback` option to `TRUE` (in the main process) to make the subprocess dump the frames on error. This is because saving the frames can be costly for large objects passed as arguments.

`$debug()` starts a REPL (Read-Eval-Print-Loop), that evaluates R expressions in the subprocess. It is similar to `browser()` and `debugger()` and also has some extra commands:

- `.help` prints a short help message.
- `.where` prints the complete stack trace of the error. (The same as the `$traceback()` method.
- `.inspect <n>` switches the "focus" to frame `<n>`. Frame 0 is the global environment, so `.inspect 0` will switch back to that.

To exit the debugger, press the usual interrupt key, i.e. CTRL+c or ESC in some GUIs.

Here is an example session that uses `$debug()` (some output is omitted for brevity):

```
# -----
> rs <- r_session$new()
> rs$run(function() knitr::knit("no-such-file"))
Error in rs_run(self, private, func, args) :
  callr subprocess failed: cannot open the connection

> rs$debug()
Debugging in process 87361, press CTRL+C (ESC) to quit. Commands:
  .where      -- print stack trace
  .inspect <n> -- inspect a frame, 0 resets to .GlobalEnv
  .help       -- print this message
  <cmd>       -- run <cmd> in frame or .GlobalEnv

3: file(con, "r")
2: readLines(input2, encoding = "UTF-8", warn = FALSE)
1: knitr::knit("no-such-file") at #1

RS 87361 > .inspect 1

RS 87361 (frame 1) > ls()
 [1] "encoding"  "envir"     "ext"       "in.file"   "input"     "input.dir"
 [7] "input2"    "ocode"     "oconc"     "oenviron"  "oopts"     "optc"
[13] "optk"      "otangle"   "out.purl"  "output"    "quiet"     "tangle"
```

```
[19] "text"

RS 87361 (frame 1) > input
[1] "no-such-file"

RS 87361 (frame 1) > file.exists(input)
[1] FALSE

RS 87361 (frame 1) > # <CTRL + C>
# -----
```

r_session_options *Create options for an [r_session](#) object*

Description

Create options for an [r_session](#) object

Usage

```
r_session_options(...)
```

Arguments

... Options to override, named arguments.

Value

Named list of options.

The current options are:

- `libpath`: Library path for the subprocess. By default the same as the *current* library path. I.e. *not* necessarily the library path of a fresh R session.)
- `repos`: `repos` option for the subprocess. By default the current value of the main process.
- `stdout`: Standard output of the sub-process. This can be `NULL` or a pipe: `"|"`. If it is a pipe then the output of the subprocess is not included in the responses, but you need to poll and read it manually. This is for experts. Note that this option is not used for the startup phase that currently always runs with `stdout = "|"`.
- `stderr`: Similar to `stdout`, but for the standard error. Like `stdout`, it is not used for the startup phase, which runs with `stderr = "|"`.
- `error`: See 'Error handling' in [r\(\)](#).
- `cmdargs`: See the same argument of [r\(\)](#). (Its default might be different, though.)
- `system_profile`: See the same argument of [r\(\)](#).
- `user_profile`: See the same argument of [r\(\)](#).
- `env`: See the same argument of [r\(\)](#).

- `load_hook`: NULL, or code (quoted) to run in the sub-process at start up. (I.e. not for every single `run()` call.)
- `extra`: List of extra arguments to pass to `processx::process`.

Call `r_session_options()` to see the default values. `r_session_options()` might contain undocumented entries, you cannot change these.

Examples

```
r_session_options()
```

r_vanilla	<i>Run an R child process, with no configuration</i>
-----------	--

Description

It tries to mimic a fresh R installation. In particular:

- No library path setting.
- No CRAN(-like) repository is set.
- The system and user profiles are not run.

Usage

```
r_vanilla(
  func,
  args = list(),
  libpath = character(),
  repos = c(CRAN = "@CRAN@"),
  cmdargs = "--slave",
  system_profile = FALSE,
  user_profile = FALSE,
  env = character(),
  ...
)
```

Arguments

`func` Function object to call in the new R process. The function should be self-contained and only refer to other functions and use variables explicitly from other packages using the `::` notation. By default the environment of the function is set to `.GlobalEnv` before passing it to the child process. (See the package option if you want to keep the environment.) Because of this, it is good practice to create an anonymous function and pass that to `callr`, instead of passing a function object from a (base or other) package. In particular

```
r(.libPaths)
```


does not work, because `.libPaths` is defined in a special environment, but

```
r(function() .libPaths())
```

works just fine.

<code>args</code>	Arguments to pass to the function. Must be a list.
<code>libpath</code>	The library path.
<code>repos</code>	The <code>repos</code> option. If <code>NULL</code> , then no <code>repos</code> option is set. This options is only used if <code>user_profile</code> or <code>system_profile</code> is set <code>FALSE</code> , as it is set using the system or the user profile.
<code>cmdargs</code>	Command line arguments to pass to the R process. Note that <code>c("-f", rscript)</code> is appended to this, <code>rscript</code> is the name of the script file to run. This contains a call to the supplied function and some error handling code.
<code>system_profile</code>	Whether to use the system profile file.
<code>user_profile</code>	Whether to use the user's profile file. If this is "project", then only the profile from the working directory is used, but the <code>R_PROFILE_USER</code> environment variable and the user level profile are not. See also "Security considerations" below.
<code>env</code>	Environment variables to set for the child process.
<code>...</code>	Additional arguments are passed to <code>r()</code> .

Security considerations

`callr` makes a copy of the user's `.Renviron` file and potentially of the local or user `.Rprofile`, in the session temporary directory. Avoid storing sensitive information such as passwords, in your environment file or your profile, otherwise this information will get scattered in various files, at least temporarily, until the subprocess finishes. You can use the `keyring` package to avoid passwords in plain files.

See Also

Other `callr` functions: `r_copycat()`, `r()`

Examples

```
# Compare to r()
r(function() .libPaths())
r_vanilla(function() .libPaths())

r(function() getOption("repos"))
r_vanilla(function() getOption("repos"))
```

supported_archs	<i>Find supported sub-architectures for the current R installation</i>
-----------------	--

Description

This function uses a heuristic, which might fail, so its result should be taken as a best guess.

Usage

```
supported_archs()
```

Value

Character vector of supported architectures. If the current R build is not a multi-architecture build, then an empty string scalar is returned.

Examples

```
supported_archs()
```

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