Package 'pkgbuild'

May 26, 2025

Title Find Tools Needed to Build R Packages

Version 1.4.8

Description Provides functions used to build R packages. Locates compilers needed to build R packages on various platforms and ensures the PATH is configured appropriately so R can use them.

License MIT + file LICENSE

URL https://github.com/r-lib/pkgbuild, https://pkgbuild.r-lib.org

BugReports https://github.com/r-lib/pkgbuild/issues

Depends R (>= 3.5)

Imports callr (>= 3.2.0), cli (>= 3.4.0), desc, processx, R6

Suggests covr, cpp11, knitr, Rcpp, rmarkdown, testthat (>= 3.2.0), withr (>= 2.3.0)

Config/Needs/website tidyverse/tidytemplate

Config/testthat/edition 3

Config/usethis/last-upkeep 2025-04-30

Encoding UTF-8

RoxygenNote 7.3.2

NeedsCompilation no

Author Hadley Wickham [aut],
Jim Hester [aut],
Gábor Csárdi [aut, cre],
Posit Software, PBC [cph, fnd] (ROR: <https://ror.org/03wc8by49>)

Maintainer Gábor Csárdi <csardi.gabor@gmail.com>

Repository CRAN

Date/Publication 2025-05-26 14:10:06 UTC

Contents

`build` *Build package*

Description

Building converts a package source directory into a single bundled file. If `binary = FALSE` this creates a `tar.gz` package that can be installed on any platform, provided they have a full development environment (although packages without source code can typically be installed out of the box). If `binary = TRUE`, the package will have a platform specific extension (e.g. `.zip` for windows), and will only be installable on the current platform, but no development environment is needed.

Usage

```
build(
  path = ".",
  dest_path = NULL,
  binary = FALSE,
  vignettes = TRUE,
  manual = FALSE,
  clean_doc = NULL,
  args = NULL,
  quiet = FALSE,
  needs_compilation = pkg_has_src(path),
  compile_attributes = FALSE,
  register_routines = FALSE
)
```

Arguments

path	Path to a package, or within a package.
dest_path	path in which to produce package. If it is an existing directory, then the output file is placed in dest_path and named according to the current R conversions (e.g. .zip for Windows binary packages, .tgz for macOS binary packages, etc). If it is an existing file, then it will be overwritten. If dest_path does not exist, then it is used as a file name. If NULL, it defaults to the parent directory of the package.
binary	Produce a binary (--binary) or source (--no-manual --no-resave-data) version of the package.
vignettes, manual	For source packages: if FALSE, don't build PDF vignettes (--no-build-vignettes) or manual (--no-manual).
clean_doc	If TRUE, clean the files in inst/doc before building the package. If NULL and the Config/build/clean-inst-doc entry is present in DESCRIPTION, then that is used. Otherwise, if NULL, and interactive, ask to remove the files prior to cleaning. In most cases cleaning the files is the correct behavior to avoid stale vignette outputs in the built package.
args	An optional character vector of additional command line arguments to be passed to R CMD build if binary = FALSE, or R CMD install if binary = TRUE.
quiet	if TRUE suppresses output from this function.
needs_compilation	Usually only needed if the packages has C/C++/Fortran code. By default this is autodetected.
compile_attributes	if TRUE and the package uses Rcpp, call Rcpp::compileAttributes() before building the package. It is ignored if package does not need compilation.
register_routines	if TRUE and the package does not use Rcpp, call register routines with tools::package_native_routine before building the package. It is ignored if package does not need compilation.

Details

Configuration:

DESCRIPTION *entries:*

- Config/build/clean-inst-doc can be set to FALSE to avoid cleaning up inst/doc when building a source package. Set it to TRUE to force a cleanup. See the clean_doc argument.
- Config/build/copy-method can be used to avoid copying large directories in R CMD build. It works by copying (or linking) the files of the package to a temporary directory, leaving out the (possibly large) files that are not part of the package. Possible values:
  - none: pkgbuild does not copy the package tree. This is the default.
  - copy: the package files are copied to a temporary directory before R CMD build.
  - link: the package files are symbolic linked to a temporary directory before R CMD build. Windows does not have symbolic links, so on Windows this is equivalent to copy.

You can also use the pkg.build_copy_method option or the PKG_BUILD_COPY_METHOD environment variable to set the copy method. The option is consulted first, then the DESCRIPTION entry, then the environment variable.

- Config/build/extra-sources can be used to define extra source files for pkgbuild to decide whether a package DLL needs to be recompiled in needs_compile(). The syntax is a comma separated list of file names, or globs. (See utils::glob2rx().) E.g. src/rust/src/*.rs or configure*.
- Config/build/bootstrap can be set to TRUE to run Rscript bootstrap.R in the source directory prior to running subsequent build steps.
- Config/build/never-clean can be set to TRUE to never add --preclean to R CMD INSTALL, e.g., when header files have changed. This helps avoiding rebuilds that can take long for very large C/C++ codebases and can lead to build failures if object files are out of sync with header files. Control the dependencies between object files and header files by adding include file.d to Makevars for each file.c or file.cpp source file.

Options:

- pkg.build_copy_method: use this option to avoid copying large directories when building a package. See possible values above, at the Config/build/copy-method DESCRIPTION entry.
- pkg.build_stop_for_warnings: if it is set to TRUE, then pkgbuild will stop for R CMD build errors. It takes precedence over the PKG_BUILD_STOP_FOR_WARNINGS environment variable.

Environment variables:

- PKG_BUILD_COLOR_DIAGNOSTICS: set it to false to opt out of colored compiler diagnostics. Set it to true to force colored compiler diagnostics.
- PKG_BUILD_COPY_METHOD: use this environment variable to avoid copying large directories when building a package. See possible values above, at the Config/build/copy-method DESCRIPTION entry.

will stop for R CMD build errors. The pkg.build_stop_for_warnings option takes precedence over this environment variable.

Value

a string giving the location (including file name) of the built package

---

clean_dll *Remove compiled objects from /src/ directory*

Description

Invisibly returns the names of the deleted files.

Usage

```
clean_dll(path = ".")
```

Arguments

path	Path to a package, or within a package.

See Also

compile_dll()

---

compiler_flags *Default compiler flags used by devtools.*

Description

These default flags enforce good coding practice by ensuring that CFLAGS and CXXFLAGS are set to -Wall -pedantic. These tests are run by cran and are generally considered to be good practice.

Usage

```
compiler_flags(debug = FALSE)
```

Arguments

debug	If TRUE adds -g -O0 to all flags (Adding FFLAGS and FCFLAGS)

Details

By default compile_dll() is run with compiler_flags(TRUE), and check with compiler_flags(FALSE). If you want to avoid the possible performance penalty from the debug flags, install the package.

See Also

Other debugging flags: with_debug()

Examples

```
compiler_flags()
compiler_flags(TRUE)
```

compile_dll *Compile a .dll/.so from source.*

Description

compile_dll performs a fake R CMD install so code that works here should work with a regular install (and vice versa). During compilation, debug flags are set with compiler_flags(TRUE).

Usage

```
compile_dll(
  path = ".",
  force = FALSE,
  compile_attributes = pkg_links_to_cpp11(path) || pkg_links_to_rcpp(path),
  register_routines = FALSE,
  quiet = FALSE,
  debug = TRUE
)
```

Arguments

path	Path to a package, or within a package.
force	If TRUE, for compilation even if needs_compile() is FALSE.
compile_attributes	if TRUE and the package uses Rcpp, call Rcpp::compileAttributes() before building the package. It is ignored if package does not need compilation.
register_routines	if TRUE and the package does not use Rcpp, call register routines with tools::package_native_routine before building the package. It is ignored if package does not need compilation.
quiet	if TRUE suppresses output from this function.
debug	If TRUE, and if no user Makevars is found, then the build runs without optimisation (-O0) and with debug symbols (-g). See compiler_flags() for details. If you have a user Makevars (e.g., ~/.R/Makevars) then this argument is ignored.

Details

Invisibly returns the names of the DLL.

Configuration:

Options:

- pkg.build_extra_flags: set this to FALSE to to opt out from adding debug compiler flags in compile_dll(). Takes precedence over the PKG_BUILD_EXTRA_FLAGS environment variable. Possible values:
  - TRUE: add extra flags,
  - FALSE: do not add extra flags,

  - "missing": add extra flags if the user does not have a $HOME/.R/Makevars file.

Environment variables:

- PKG_BUILD_EXTRA_FLAGS: set this to false to to opt out from adding debug compiler flags in compile_dll(). The pkg.build_extra_flags option takes precedence over this environment variable. Possible values:
  - "true": add extra flags,
  - "false": do not add extra flags,
  - "missing": add extra flags if the user does not have a $HOME/.R/Makevars file.

Note

If this is used to compile code that uses Rcpp, you will need to add the following line to your Makevars file so that it knows where to find the Rcpp headers:

```
PKG_CPPFLAGS=`$(R_HOME)/bin/Rscript -e 'Rcpp:::CxxFlags()'`
```

See Also

clean_dll() to delete the compiled files.

---

has_build_tools *Are build tools are available?*

Description

has_build_tools returns a logical, check_build_tools throws an error. with_build_tools checks that build tools are available, then runs code in an correctly staged environment. If run interactively from RStudio, and the build tools are not available these functions will trigger an automated install.

Usage

```
has_build_tools(debug = FALSE)

check_build_tools(debug = FALSE, quiet = FALSE)

with_build_tools(code, debug = FALSE, required = TRUE)

local_build_tools(
  debug = FALSE,
  required = TRUE,
  .local_envir = parent.frame()
)
```

Arguments

debug	If TRUE, will print out extra information useful for debugging. If FALSE, it will use result cached from a previous run.
quiet	if TRUE suppresses output from this function.
code	Code to rerun in environment where build tools are guaranteed to exist.
required	If TRUE, and build tools are not available, will throw an error. Otherwise will attempt to run code without them.
.local_envir	The environment to use for scoping.

Details

Errors like `running command '"C:/PROGRA~1/R/R-34~1.2/bin/x64/R" CMD config CC' had status 127` indicate the code expected Rtools to be on the system PATH. You can then verify you have rtools installed with `has_build_tools()` and temporarily add Rtools to the PATH `with_build_tools({ code })`.

It is possible to add Rtools to your system PATH manually; you can use `rtools_path()` to show the installed location. However because this requires manual updating when a new version of Rtools is installed and the binaries in Rtools may conflict with existing binaries elsewhere on the PATH it is better practice to use `with_build_tools()` as needed.

See Also

has_rtools

Examples

```
has_build_tools(debug = TRUE)
check_build_tools()
```

---

has_compiler *Is a compiler available?*

Description

These functions check if a small C file can be compiled, linked, loaded and executed.

`has_compiler()` and `has_devel()` return TRUE or FALSE. `check_compiler()` and `check_devel()` throw an error if you don't have developer tools installed. If the `"pkgbuild.has_compiler"` option is set to TRUE or FALSE, no check is carried out, and the value of the option is used.

The implementation is based on a suggestion by Simon Urbanek. End-users (particularly those on Windows) should generally run `check_build_tools()` rather than `check_compiler()`.

Usage

```
has_compiler(debug = FALSE)

check_compiler(debug = FALSE)
```

Arguments

debug	If TRUE, will print out extra information useful for debugging. If FALSE, it will use result cached from a previous run.

See Also

check_build_tools()

Examples

```
has_compiler()
check_compiler()

with_build_tools(has_compiler())
```

---

has_latex *Is latex installed?*

Description

Checks for presence of pdflatex on path.

Usage

```
has_latex()

check_latex()
```

---

pkgbuild_process *Build package in the background*

Description

This R6 class is a counterpart of the build() function, and represents a background process that builds an R package.

Usage

```
bp <- pkgbuild_process$new(path = ".", dest_path = NULL,
         binary = FALSE, vignettes = TRUE, manual = FALSE, args = NULL)
bp$get_dest_path()
```

Other methods are inherited from callr::rcmd_process and processx::process.

Arguments

See the corresponding arguments of build().

Details

Most methods are inherited from callr::rcmd_process and `processx::process`.

`bp$get_dest_path()` returns the path to the built package.

Examples

```
## Here we are just waiting, but in a more realistic example, you
## would probably run some other code instead...
bp <- pkgbuild_process$new("mypackage", dest_path = tempdir())
bp$is_alive()
bp$get_pid()
bp$wait()
bp$read_all_output_lines()
bp$read_all_error_lines()
bp$get_exit_status()
bp$get_dest_path()
```

---

pkg_has_src *Does a source package have* src/ *directory?*

Description

If it does, you definitely need build tools.

Usage

```
pkg_has_src(path = ".")
```

Arguments

path	Path to package (or directory within package).

---

rcmd_build_tools *Call R CMD 'command' with build tools active*

Description

This is a wrapper around `callr::rcmd_safe()` that checks that you have build tools available, and on Windows, automatically sets the path to include Rtools.

Usage

```
rcmd_build_tools(..., env = character(), required = TRUE, quiet = FALSE)
```

Arguments

...	Parameters passed on to rcmd_safe.
env	Additional environment variables to set. The defaults from callr::rcmd_safe_env() are always set.
required	If TRUE, and build tools are not available, will throw an error. Otherwise will attempt to run code without them.
quiet	if TRUE suppresses output from this function.

Examples

```
# These env vars are always set
callr::rcmd_safe_env()

if (has_build_tools()) {
  rcmd_build_tools("CONFIG", "CC")$stdout
  rcmd_build_tools("CC", "--version")$stdout
}
```

---

without_compiler *Tools for testing pkgbuild*

Description

with_compiler temporarily disables code compilation by setting CC, CXX, makevars to test. without_cache resets the cache before and after running code.

Usage

```
without_compiler(code)

without_cache(code)

without_latex(code)

with_latex(code)
```

Arguments

code	Code to execute with broken compilers

`with_debug` *Temporarily set debugging compilation flags.*

Description

Temporarily set debugging compilation flags.

Usage

```
with_debug(
  code,
  CFLAGS = NULL,
  CXXFLAGS = NULL,
  FFLAGS = NULL,
  FCFLAGS = NULL,
  debug = TRUE
)
```

Arguments

`code`	to execute.
`CFLAGS`	flags for compiling C code
`CXXFLAGS`	flags for compiling C++ code
`FFLAGS`	flags for compiling Fortran code.
`FCFLAGS`	flags for Fortran 9x code.
`debug`	If `TRUE` adds `-g -O0` to all flags (Adding `FFLAGS` and `FCFLAGS`)

See Also

Other debugging flags: `compiler_flags()`

Examples

```
flags <- names(compiler_flags(TRUE))
with_debug(Sys.getenv(flags))
## Not run:
install("mypkg")
with_debug(install("mypkg"))

## End(Not run)
```

Index