

# Package ‘cpp11’

May 6, 2026

**Title** A C++11 Interface for R's C Interface

**Version** 0.5.5

**Description** Provides a header only, C++11 interface to R's C interface. Compared to other approaches 'cpp11' strives to be safe against long jumps from the C API as well as C++ exceptions, conform to normal R function semantics and supports interaction with 'ALTREP' vectors.

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**URL** <https://cpp11.r-lib.org>, <https://github.com/r-lib/cpp11>

**BugReports** <https://github.com/r-lib/cpp11/issues>

**Depends** R (>= 4.0.0)

**Suggests** bench, brio, callr, cli, covr, decor, desc, ggplot2, glue, knitr, lobstr, mockery, progress, rmarkdown, scales, Rcpp, testthat (>= 3.2.0), tibble, utils, vctrs, withr

**VignetteBuilder** knitr

**Config/Needs/website** tidyverse/tidytemplate

**Config/testthat/edition** 3

**Config/Needs/cpp11/cpp\_register** brio, cli, decor, desc, glue, tibble, vctrs

**Encoding** UTF-8

**RoxygenNote** 7.3.3

**NeedsCompilation** no

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**Date/Publication** 2026-05-06 14:40:12 UTC

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cpp_register	<i>Generates wrappers for registered C++ functions</i>
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## Description

Functions decorated with `[[cpp11::register]]` in files ending in `.cc`, `.cpp`, `.h` or `.hpp` will be wrapped in generated code and registered to be called from R.

## Usage

```
cpp_register(
  path = ".",
  quiet = !is_interactive(),
  extension = c(".cpp", ".cc")
)
```

## Arguments

path	The path to the package root directory
quiet	If TRUE suppresses output from this function
extension	The file extension to use for the generated src/cpp11 file. <code>.cpp</code> by default, but <code>.cc</code> is also supported.

## Details

Note registered functions will not be *exported* from your package unless you also add a `@export roxygen2` directive for them.

In order to use `cpp_register()` the `cli`, `decor`, `desc`, `glue`, `tibble` and `vctrs` packages must also be installed.

## Value

The paths to the generated R and C++ source files (in that order).

## Examples

```
# create a minimal package
dir <- tempfile()
dir.create(dir)

writeLines("Package: testPkg", file.path(dir, "DESCRIPTION"))
writeLines("useDynLib(testPkg, .registration = TRUE)", file.path(dir, "NAMESPACE"))

# create a C++ file with a decorated function
dir.create(file.path(dir, "src"))
writeLines("[[cpp11::register]] int one() { return 1; }", file.path(dir, "src", "one.cpp"))

# register the functions in the package
cpp_register(dir)

# Files generated by registration
file.exists(file.path(dir, "R", "cpp11.R"))
file.exists(file.path(dir, "src", "cpp11.cpp"))

# cleanup
unlink(dir, recursive = TRUE)
```

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cpp\_source

*Compile C++ code*

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## Description

`cpp_source()` compiles and loads one or more C++ files for use in R. `cpp_function()` compiles and loads a single function for use in R. `cpp_eval()` evaluates a single C++ expression and returns the result.

## Usage

```
cpp_source(
  file,
  code = NULL,
  env = parent.frame(),
  clean = TRUE,
  quiet = TRUE,
  cxx_std = Sys.getenv("CXX_STD", "CXX11"),
  dir = tempfile()
)
```

```
cpp_function(
  code,
  env = parent.frame(),
  clean = TRUE,
  quiet = TRUE,
```

```

    cxx_std = Sys.getenv("CXX_STD", "CXX11")
  )

  cpp_eval(
    code,
    env = parent.frame(),
    clean = TRUE,
    quiet = TRUE,
    cxx_std = Sys.getenv("CXX_STD", "CXX11")
  )

```

### Arguments

file	One or more files containing C++ code to compile
code	If non-null, the C++ code to compile
env	The R environment where the R wrapping functions should be defined.
clean	If TRUE, cleanup the files after sourcing
quiet	If 'TRUE', do not show compiler output
cxx_std	The C++ standard to use, the CXX_STD make macro is set to this value. The default value queries the CXX_STD environment variable, or uses 'CXX11' if unset.
dir	The directory to store the generated source files. <code>tempfile()</code> is used by default. The directory will be removed if <code>clean</code> is TRUE.

### Details

Within C++ code you can use `[[cpp11::linking_to("pkgxyz")]]` to link to external packages. This is equivalent to putting those packages in the `LinkingTo` field in a package `DESCRIPTION`.

### Value

For `cpp_source()` and `[cpp_function()]` the results of `dyn.load()` (invisibly). For `[cpp_eval()]` the results of the evaluated expression.

### Examples

```

cpp_source(
  code = '#include "cpp11/integers.hpp"

  [[cpp11::register]]
  int num_odd(cpp11::integers x) {
    int total = 0;
    for (int val : x) {
      if ((val % 2) == 1) {
        ++total;
      }
    }
    return total;
  }

```

```

    ')

    num_odd(as.integer(c(1:10, 15, 23)))

    if (interactive() && require("progress")) {

    cpp_source(
      code = '
#include <cpp11/R.hpp>
#include <RProgress.h>

[[cpp11::linking_to("progress")]]

[[cpp11::register]] void
show_progress() {
  RProgress::RProgress pb("Processing [:bar] ETA: :eta");

  pb.tick(0);
  for (int i = 0; i < 100; i++) {
    usleep(2.0 / 100 * 1000000);
    pb.tick();
  }
}
')

show_progress()
}

```

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cpp\_vendor

*Vendor the cpp11 dependency*


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## Description

Vendoring is the act of making your own copy of the 3rd party packages your project is using. It is often used in the go language community.

## Usage

```
cpp_vendor(path = ".")
```

## Arguments

path                    The path to the package root directory

## Details

This function vendors cpp11 into your package by copying the cpp11 headers into the `inst/include` folder of your package and adding `'cpp11 version: XYZ'` to the top of the files, where XYZ is the version of cpp11 currently installed on your machine.

If you choose to vendor the headers you should *remove* `LinkingTo: cpp11` from your DESCRIPTION.

**Note:** vendoring places the responsibility of updating the code on **you**. Bugfixes and new features in `cpp11` will not be available for your code until you run `cpp_vendor()` again.

### Value

The file path to the vendored code (invisibly).

### Examples

```
# create a new directory
dir <- tempfile()
dir.create(dir)

# vendor the cpp11 headers into the directory
cpp_vendor(dir)

list.files(file.path(dir, "inst", "include", "cpp11"))

# cleanup
unlink(dir, recursive = TRUE)
```

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