Package ‘covr’

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Title Test Coverage for Packages
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Description Track and report code coverage for your package and (optionally) upload the results to a coverage service like ‘Codecov’ <https://about.codecov.io> or ‘Coveralls’ <https://coveralls.io>. Code coverage is a measure of the amount of code being exercised by a set of tests. It is an indirect measure of test quality and completeness. This package is compatible with any testing methodology or framework and tracks coverage of both R code and compiled C/C++/FORTRAN code.


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

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Suggests R6, curl, knitr, rmarkdown, htmltools, DT (>= 0.2), testthat, rlang, rstudioapi (>= 0.2), xml2 (>= 1.0.0), parallel, memoise, mockery, covr

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covr-package

Description

covr tracks and reports code coverage for your package and (optionally) upload the results to a coverage service like 'Codecov' [https://about.codecov.io](https://about.codecov.io) or 'Coveralls' [https://coveralls.io](https://coveralls.io). Code coverage is a measure of the amount of code being exercised by a set of tests. It is an indirect measure of test quality and completeness. This package is compatible with any testing methodology or framework and tracks coverage of both R code and compiled C/C++/FORTRAN code.

Details

A coverage report can be used to inspect coverage for each line in your package. Using `report()` requires the additional dependencies `DT` and `htmltools`.

```
# If run with no arguments `report()` implicitly calls `package_coverage()`
report()
```

Package options

covr uses the following `options()` to configure behaviour:

- `covr.covrignore`: A filename to use as an ignore file, listing glob-style wildcarded paths of files to ignore for coverage calculations. Defaults to the value of environment variable `COVR_COVRIGNORE`, or "covrignore" if the neither the option nor the environment variable are set.
- `covr.exclude_end`: Used along with `covr.exclude_start`, an optional regular expression which ends a line-exclusion region. For more details, see `?exclusions`.
- `covr.exclude_pattern`: An optional line-exclusion pattern. Lines which match the pattern will be excluded from coverage. For more details, see `?exclusions`.
- `covr.exclude_start`: Used along with `covr.exclude_end`, an optional regular expression which starts a line-exclusion region. For more details, see `?exclusions`.
- `covr.filter_non_package`: If TRUE (the default behavior), coverage of files outside the target package are filtered from coverage output.
• `covr.fix_parallel_mcexit`:
• `covr.flags`
• `covr.gcov`:
  If the appropriate gcov version is not on your path you can use this option to set
  the appropriate location. If set to "" it will turn off coverage of compiled code.
• `covr.gcov_additional_paths`:
• `covr.gcov_args`:
• `covr.icov`:
• `covr.icov_args`:
• `covr.icov_flags`:
• `covr.icov_prof`:
• `covr.rstudio_source_markers`:
  A logical value. If TRUE (the default behavior), source
  markers are displayed within the RStudio IDE when using zero_coverage.
• `covr.record_tests`:
  If TRUE (default NULL), record a listing of top level test expressions and
  associate tests with covr traces evaluated during the test’s execution. For more details, see
  ?covr.record_tests.
• `covr.showCfunctions`:

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See Also

Useful links:

• https://covr.r-lib.org
• https://github.com/r-lib/covr
• Report bugs at https://github.com/r-lib/covr/issues

<table>
<thead>
<tr>
<th>as_coverage</th>
<th>Convert a counters object to a coverage object</th>
</tr>
</thead>
</table>

Description

Convert a counters object to a coverage object

Usage

as_coverage(counters = NULL, ...)

Arguments

counters An environment of covr trace results to convert to a coverage object. If counters is not provided, the covr namespace value .counters is used.

... Additional attributes to include with the coverage object.
as_coverage_with_tests

Clean and restructure counter tests for a coverage object

Description

For tests produced with `options(covr.record_tests)`, prune any unused records in the $tests$tally matrices of each trace and get rid of the wrapping $tests$ environment (reassigning with value of $tests$tally)

Usage

```
as_coverage_with_tests(counters)
```

Arguments

counters: An environment of covr trace results to convert to a coverage object. If `counters` is not provided, the covr namespace value .counters is used.

azure

Run covr on a package and output the result so it is available on Azure Pipelines

Description

Run covr on a package and output the result so it is available on Azure Pipelines

Usage

```
azure(
  ..., 
  coverage = package_coverage(..., quiet = quiet), 
  filename = "coverage.xml", 
  quiet = TRUE 
)
```

Arguments

...: arguments passed to `package_coverage()`

coverage: an existing coverage object to submit, if NULL, `package_coverage()` will be called with the arguments from ...

filename: the name of the Cobertura XML file

quiet: if FALSE, print the coverage before submission.
Description

Run covr on a package and upload the result to codecov.io

Usage

codecov(
    ..., 
    coverage = NULL,
    base_url = "https://codecov.io",
    token = NULL,
    commit = NULL,
    branch = NULL,
    pr = NULL,
    flags = NULL,
    quiet = TRUE
)

Arguments

... arguments passed to package_coverage()
coverage an existing coverage object to submit, if NULL, package_coverage() will be called with the arguments from ...
base_url Codecov url (change for Enterprise)
token a codecov upload token, if NULL then following external sources will be checked in this order:
    1. the environment variable ‘CODECOV_TOKEN’. If it is empty, then
    2. package will look at directory of the package for a file codecov.yml. File must have codecov section where field token is set to a token that will be used.
commit explicitly set the commit this coverage result object corresponds to. Is looked up from the service or locally if it is NULL.
branch explicitly set the branch this coverage result object corresponds to, this is looked up from the service or locally if it is NULL.
pr explicitly set the pr this coverage result object corresponds to, this is looked up from the service if it is NULL.
flags A flag to use for this coverage upload see https://docs.codecov.com/docs/flags for details.
quiet if FALSE, print the coverage before submission.
Examples

```r
## Not run:
codecov(path = "test")

## End(Not run)
```

### code_coverage

**Calculate coverage of code directly**

#### Description

This function is useful for testing, and is a thin wrapper around `file_coverage()` because parseData is not populated properly unless the functions are defined in a file.

#### Usage

```r
code_coverage(
  source_code,
  test_code,
  line_exclusions = NULL,
  function_exclusions = NULL,
  ...
)
```

#### Arguments

- `source_code`: A character vector of source code
- `test_code`: A character vector of test code
- `line_exclusions`: a named list of files with the lines to exclude from each file.
- `function_exclusions`: a vector of regular expressions matching function names to exclude. Example `print\`` to match print methods.
- `...`: Additional arguments passed to `file_coverage()`

#### Examples

```r
source <- "add <- function(x, y) { x + y }"
test <- "add(1, 2) == 3"
code_coverage(source, test)
```
coverage_to_list  

Convert a coverage dataset to a list

Description

Convert a coverage dataset to a list

Usage

coverage_to_list(x = package_coverage())

Arguments

x  

a coverage dataset, defaults to running package_coverage().

Value

A list containing coverage result for each individual file and the whole package

coveralls  

Run covr on a package and upload the result to coveralls

Description

Run covr on a package and upload the result to coveralls

Usage

coveralls(..., coverage = NULL, 
  repo_token = Sys.getenv("COVERALLS_TOKEN"), 
  service_name = Sys.getenv("CI_NAME", "travis-ci"), 
  quiet = TRUE)

Arguments

...  

arguments passed to package_coverage()

coverage  

an existing coverage object to submit, if NULL, package_coverage() will be called with the arguments from ...

repo_token  

The secret repo token for your repository, found at the bottom of your repository’s page on Coveralls. This is useful if your job is running on a service Coveralls doesn’t support out-of-the-box. If set to NULL, it is assumed that the job is running on travis-ci
service_name  the CI service to use, if environment variable ‘CI_NAME’ is set that is used, otherwise ‘travis-ci’ is used.
quiet         if FALSE, print the coverage before submission.

---

covr.record_tests  Record Test Traces During Coverage Execution

Description

By setting options(covr.record_tests = TRUE), the result of covr coverage collection functions will include additional data pertaining to the tests which are executed and an index of which tests, at what stack depth, trigger the execution of each trace.

Details

This functionality requires that the package code and tests are installed and sourced with the source. For more details, refer to R options, `keep.source`, `keep.source.pkgs` and `keep.parse.data.pkgs`.

Additional fields

Within the covr result, you can explore this information in two places:

- `attr(,"tests")`: A list of call stacks, which results in target code execution.
- `$<srcref>$tests`: For each srcref count in the coverage object, a `$tests` field is now included which contains a matrix with three columns, "test", "depth" and "i" which specify the test number (corresponding to the index of the test in `attr(,"tests")`), the stack depth into the target code where the trace was executed, and the order of execution for each test.

Test traces

The content of test traces are dependent on the unit testing framework that is used by the target package. The behavior is contingent on the available information in the sources kept for the testing files.

Test traces are extracted by the following criteria:

1. If any srcref files are are provided by a file within covr’s temporary library, all calls from those files are kept as a test trace. This will collect traces from tests run with common testing frameworks such as testthat and RUnit.
2. Otherwise, as a conservative fallback in situations where no source references are found, or when none are from within the temporary directory, the entire call stack is collected.

These calls are subsequently subset for only those up until the call to covr’s internal count function, and will always include the last call in the call stack prior to a call to count.
Examples

defcode <- 'f <- function(x) {
    if (x)
        f(!x)
    else
        FALSE
}
'

options(covr.record_tests = TRUE)
cov <- code_coverage(fcode, "f(TRUE)")

# extract executed test code for the first test
tail(attr(cov, "tests")[[1L]], 1L)
# [[1]]
# f(TRUE)

# extract test itemization per trace
cov[[3]][c("srcref", "tests")]
# $srcref
# f(!x)
#
# $tests
#   test depth i
# [1,] 1 2 4

# reconstruct the code path of a test by ordering test traces by [,"i"]
lapply(cov, `[`, "tests")
#   test depth i
# [1,] 1 1 2
# # $'source.Ref2326138c55:3:8:3:8:8:3:3'
#   test depth i
# [1,] 1 1 1
# [2,] 1 2 3
#   test depth i
# [1,] 1 2 4

environment_coverage

Calculate coverage of an environment

Description

Calculate coverage of an environment
Usage

environment_coverage(
    env = parent.frame(),
    test_files,
    line_exclusions = NULL,
    function_exclusions = NULL
)

Arguments

env       The environment to be instrumented.
test_files Character vector of test files with code to test the functions
line_exclusions a named list of files with the lines to exclude from each file.
function_exclusions a vector of regular expressions matching function names to exclude. Example print\\*. to match print methods.

Description

covr supports a couple of different ways of excluding some or all of a file.

Line Exclusions

The line_exclusions argument to package_coverage() can be used to exclude some or all of a file. This argument takes a list of filenames or named ranges to exclude.

Function Exclusions

Alternatively function_exclusions can be used to exclude R functions based on regular expression(s). For example print\\*. can be used to exclude all the print methods defined in a package from coverage.

Exclusion Comments

In addition you can exclude lines from the coverage by putting special comments in your source code. This can be done per line or by specifying a range. The patterns used can be specified by the exclude_pattern, exclude_start, exclude_end arguments to package_coverage() or by setting the global options covr.exclude_pattern, covr.exclude_start, covr.exclude_end.
Examples

```r
## Not run:
# exclude whole file of R/test.R
package_coverage(exclusions = "R/test.R")

# exclude lines 1 to 10 and 15 from R/test.R
package_coverage(line_exclusions = list("R/test.R" = c(1:10, 15)))

# exclude lines 1 to 10 from R/test.R, all of R/test2.R
package_coverage(line_exclusions = list("R/test.R" = 1:10, "R/test2.R"))

# exclude all print and format methods from the package.
package_coverage(function_exclusions = c("print\.", "format\."))

# single line exclusions
f1 <- function(x) {
  x + 1 # nocov
}

# ranged exclusions
f2 <- function(x) { # nocov start
  x + 2
} # nocov end

## End(Not run)
```

## file_coverage

### Calculate test coverage for sets of files

#### Description

The files in `source_files` are first sourced into a new environment to define functions to be checked. Then they are instrumented to track coverage and the files in `test_files` are sourced.

#### Usage

```r
file_coverage(
  source_files,  # Character vector of source files with function definitions to measure coverage
  test_files,    # Character vector of test files with code to test the functions
  line_exclusions = NULL,
  function_exclusions = NULL,
  parent_env = parent.frame()
)
```
line_exclusions

  a named list of files with the lines to exclude from each file.

function_exclusions

  a vector of regular expressions matching function names to exclude. Example
  print\. to match print methods.

parent_env

  The parent environment to use when sourcing the files.

Examples

  # For the purpose of this example, save code containing code and tests to files
  cat("add \<- function(x, y) \{ x + y \}\", file="add.R")
  cat("add(1, 2) == 3", file="add_test.R")

  # Use file_coverage() to calculate test coverage
  file_coverage(source_files = "add.R", test_files = "add_test.R")

  # cleanup
  file.remove(c("add.R", "add_test.R"))

file_report

A coverage report for a specific file

Description

  A coverage report for a specific file

Usage

  file_report(
    x = package_coverage(),
    file = NULL,
    out_file = file.path(tempdir(), paste0(get_package_name(x), "-file-report.html")),
    browse = interactive()
  )

Arguments

  x

    a coverage dataset, defaults to running package_coverage().

  file

    The file to report on, if NULL, use the first file in the coverage output.

  out_file

    The output file

  browse

    whether to open a browser to view the report.
function_coverage

Description

Calculate test coverage for a specific function.

Usage

function_coverage(fun, code = NULL, env = NULL, enc = parent.frame())

Arguments

- **fun**: name of the function.
- **code**: expressions to run.
- **env**: environment the function is defined in.
- **enc**: the enclosing environment which to run the expressions.

Examples

```r
add <- function(x, y) { x + y }
function_coverage(fun = add, code = NULL) # 0% coverage
function_coverage(fun = add, code = add(1, 2) == 3) # 100% coverage
```

gitlab

Run covr on package and create report for GitLab

Description

Utilize internal GitLab static pages to publish package coverage. Creates local covr report in a package subdirectory. Uses the pages GitLab job to publish the report.

Usage

```r
gitlab(..., coverage = NULL, file = "public/coverage.html", quiet = TRUE)
```

Arguments

- **...**: arguments passed to `package_coverage()`
- **coverage**: an existing coverage object to submit, if NULL, `package_coverage()` will be called with the arguments from ...
- **file**: The report filename.
- **quiet**: if FALSE, print the coverage before submission.
has_srcref  

Is the source bound to the expression

Description

Is the source bound to the expression

Usage

has_srcref(expr)

Arguments

expr  

A language object which may have a srcref attribute

Value

A logical value indicating whether the language object has source

in_covr  

Determine if code is being run in covr

Description

covr functions set the environment variable R_COVR when they are running. in_covr() returns TRUE if this environment variable is set and FALSE otherwise.

Usage

in_covr()

Examples

if (require(testthat)) {
  testthat::skip_if(in_covr())
}
is_covr_count_call

Is the expression a call to covr:::count

Description

Is the expression a call to covr:::count

Usage

is_covr_count_call(expr)

Arguments

expr A language object

Value

A logical value indicating whether the object is a call to covr:::count.

is_current_test_finished

Returns TRUE if we’ve moved on from test reflected in .current_test

Description

Quickly dismiss the need to update the current test if we can. To test if we’re still in the last test, check if the same srcref (or call, if source is not kept) exists at the last recorded calling frame prior to entering a covr trace. If this has changed, do a more comprehensive test to see if any of the test call stack has changed, in which case we are onto a new test.

Usage

is_current_test_finished()
new_test_counter  Initialize a new test counter for a coverage trace

Description

Initialize a test counter, a matrix used to tally tests, their stack depth and the execution order as the
trace associated with key is hit. Each test trace is an environment, which allows assignment into a
pre-allocated tests matrix with minimal reallocation.

Usage

new_test_counter(key)

Arguments

key generated with key()

Details

The tests matrix has columns tests, depth and i, corresponding to the test index (the index of the
associated test in .counters$tests), the stack depth when the trace is evaluated and the number
of traces that have been hit so far during test evaluation.

package_coverage  Calculate test coverage for a package

Description

This function calculates the test coverage for a development package on the path. By default it runs
only the package tests, but it can also run vignette and example code.

Usage

package_coverage(
  path = ".",
  type = c("tests", "vignettes", "examples", "all", "none"),
  combine_types = TRUE,
  relative_path = TRUE,
  quiet = TRUE,
  clean = TRUE,
  line_exclusions = NULL,
  function_exclusions = NULL,
  code = character(),
  install_path = temp_file("R_LIBS"),
  ...
  exclusions,
  pre_clean = TRUE
)
Arguments

path  file path to the package.

type  run the package ‘tests’, ‘vignettes’, ‘examples’, ‘all’, or ‘none’. The default is ‘tests’.

combine_types  If TRUE (the default) the coverage for all types is simply summed into one coverage object. If FALSE separate objects are used for each type of coverage.

relative_path  whether to output the paths as relative or absolute paths. If a string, it is interpreted as a root path and all paths will be relative to that root.

quiet  whether to load and compile the package quietly, useful for debugging errors.

clean  whether to clean temporary output files after running, mainly useful for debugging errors.

line_exclusions  a named list of files with the lines to exclude from each file.

function_exclusions  a vector of regular expressions matching function names to exclude. Example print\\ to match print methods.

code  A character vector of additional test code to run.

install_path  The path the instrumented package will be installed to and tests run in. By default it is a path in the R sessions temporary directory. It can sometimes be useful to set this (along with clean = FALSE) to help debug test failures.

...  Additional arguments passed to tools::testInstalledPackage().

exclusions  ‘Deprecated’, please use ‘line_exclusions’ instead.

pre_clean  whether to delete all objects present in the src directory before recompiling.

Details

This function uses tools::testInstalledPackage() to run the code, if you would like to test your package in another way you can set type = "none" and pass the code to run as a character vector to the code parameter.

Parallelized code using parallel's mcpparallel() needs to use a patched parallel:::mceixt. This is done automatically if the package depends on parallel, but can also be explicitly set using the environment variable COVR_FIX_PARALLEL_MCEIXT or the global option covr.fix_parallel_mceixt.

See Also

exclusions() For details on excluding parts of the package from the coverage calculations.
**percent_coverage**

*Provide percent coverage of package*

**Description**

Calculate the total percent coverage from a coverage result object.

**Usage**

```r
percent_coverage(x, ...)
```

**Arguments**

- `x` the coverage object returned from `package_coverage()`
- `...` additional arguments passed to `tally_coverage()`

**Value**

The total percentage as a numeric(1).

---

**print.coverage**

*Print a coverage object*

**Description**

Print a coverage object

**Usage**

```r
## S3 method for class 'coverage'
print(x, group = c("filename", "functions"), by = "line", ...)
```

**Arguments**

- `x` the coverage object to be printed
- `group` whether to group coverage by filename or function
- `by` whether to count coverage by line or expression
- `...` additional arguments ignored

**Value**

The coverage object (invisibly).
**report**

Display covr results using a standalone report

**Usage**

```r
define_report(
    x = package_coverage(),
    file = file.path(tempdir(), paste0(get_package_name(x), "-report.html")),
    browse = interactive()
)
```

**Arguments**

- `x`: a coverage dataset, defaults to running `package_coverage()`.
- `file`: The report filename.
- `browse`: whether to open a browser to view the report.

**Examples**

```r
# Not run:
x <- package_coverage()
report(x)
# End(Not run)
```

---

**tally_coverage**

Tally coverage by line or expression

**Description**

Tally coverage by line or expression

**Usage**

```r
tally_coverage(x, by = c("line", "expression"))
```

**Arguments**

- `x`: the coverage object returned from `package_coverage()`
- `by`: whether to tally coverage by line or expression

**Value**

a data.frame of coverage tallied by line or expression.
to_cobertura

Create a Cobertura XML file

Description

Create a cobertura-compliant XML report following this DTD. Because there are two DTDs called coverage-04.dtd and some tools do not seem to adhere to either of them, the parser you’re using may balk at the file. Please see this github discussion for context. Where covr doesn’t provide a coverage metric (branch coverage, complexity), a zero is reported.

Usage

to_cobertura(cov, filename = "cobertura.xml")

Arguments

cov the coverage object returned from package_coverage()
filename the name of the Cobertura XML file

Details

Note: This functionality requires the xml2 package be installed.

to_sonarqube

Create a SonarQube Generic XML file for test coverage according to https://docs.sonarqube.org/latest/analysis/generic-test/ Based on cobertura.R

Description

This functionality requires the xml2 package be installed.

Usage

to_sonarqube(cov, filename = "sonarqube.xml")

Arguments

cov the coverage object returned from package_coverage()
filename the name of the SonarQube Generic XML file

Author(s)

Talkdesk Inc.
**truncat_call**

Truncate call objects to limit the number of arguments

**Description**

A helper to circumvent R errors when deserializing large call objects from Rds. Trims the number of arguments in a call object, and replaces the last argument with a `<truncated>` symbol.

**Usage**

```r
truncat_call(call_obj, limit = 10000)
```

**Arguments**

- `call_obj` A (possibly large) call object
- `limit` A call length limit to impose

**Value**

The `call_obj` with arguments trimmed

---

**value**

Retrieve the value from an object

**Description**

Retrieve the value from an object

**Usage**

```r
value(x, ...)
```

**Arguments**

- `x` object from which to retrieve the value
- `...` additional arguments passed to methods
zero_coverage

---

**zero_coverage**  
*Provide locations of zero coverage*

---

**Description**

When examining the test coverage of a package, it is useful to know if there are any locations where there is 0 test coverage.

**Usage**

```r
zero_coverage(x, ...)
```

**Arguments**

- `x` a coverage object returned by `package_coverage()`
- `...` additional arguments passed to `tally_coverage()`

**Details**

If used within RStudio this function outputs the results using the Marker API.

**Value**

A `data.frame` with coverage data where the coverage is 0.
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