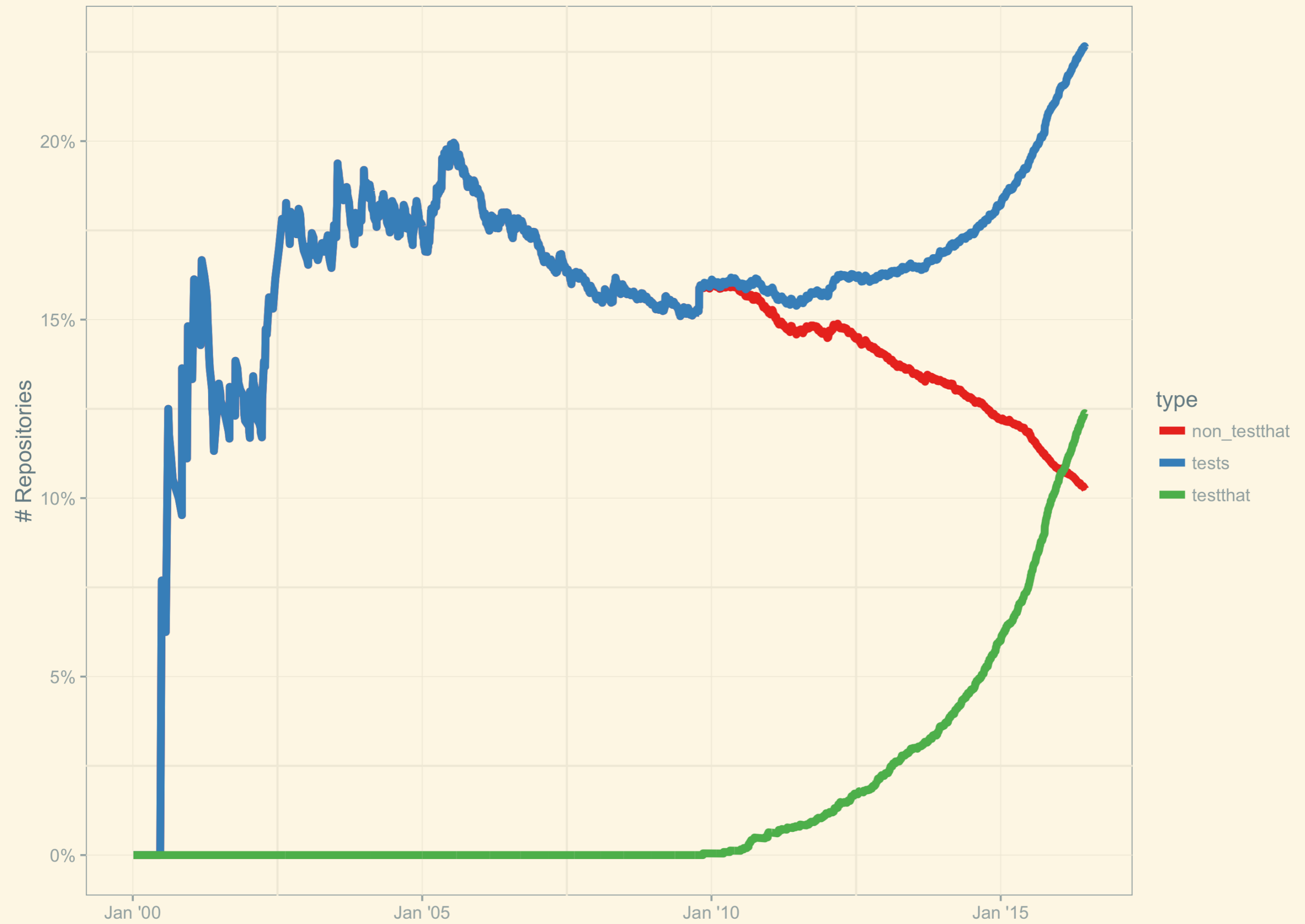


Covr: Bringing Test Coverage to R

June 2016

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Why Test?

- Correctness
- Contributions
- Confidence

Test Coverage

- Tracks of code tested by tests
- **Tracks code not tested by tests**

Covr

- R package (Dec 2014)
- Local Reports
- Continuous Integration (Travis)
- R (S3, S4, RC, R6), C, C++, Fortran
- Tests, Examples, Vignettes

R

```
> f <- function(x) {y = x + 1; y - 2}
> covr::trace_calls(f)
function (x)
{
  {
    covr::count(":1:19:1:27:19:27:1:1")
    y = x + 1
  }
  {
    covr::count(":1:30:1:34:30:34:1:1")
    y - 2
  }
}
```

```
> f <- function(x) { switch(x, a = 1, b = 2, c = d <- 1) }
> covr:::trace_calls(f)
function (x)
{
  switch({
    covr:::count("test-braceless.R:40:12:40:12:12:12:40:40")
    x
  }, a = {
    covr:::count("test-braceless.R:41:11:41:11:11:11:41:41")
    1
  }, b = {
    covr:::count("test-braceless.R:42:11:42:11:11:11:42:42")
    2
  }, c = {
    covr:::count("test-braceless.R:43:11:43:16:11:16:43:43")
    d <- 1
  })
}
```

Compiled

- Gcov
 - gcc and clang
 - -O0 -coverage
 - Run gcov binary *.gcov

Install

- `install.packages(repo = NULL, lib.loc = tempfile())`
- Copy Makevars
 - `CFLAGS = "-O0 -coverage"`
- Tracing Hooks

Install

```
local({
  info <- loadingNamespaceInfo()
  pkg <- info$pkgname
  ns <- .getNamespace(as.name(pkg))
  if (is.null(ns))
    stop("cannot find namespace environment for ", pkg, domain =
NA);
  dbbase <- file.path(info$libname, pkg, "R", pkg)
  lazyLoad(dbbase, ns, filter = function(n) n != ".__NAMESPACE__.")

  setHook(packageEvent(pkg, "onLoad"),
    function(...) covr:::trace_environment(ns))

  reg.finalizer(ns,
    function(...) { covr:::save_trace("/tmp/R_lib123/pkg") },
    onexit = TRUE)
})
```

Test

- `tools::testInstalledPackage(type = c("examples", "tests", "vignettes"))`
- `tests/*.R` - separate process
- Each type - separate process

Aggregate

- `covr:::save_trace()`
- `covr:::merge_coverage()`
- Parallel code

mcexit()

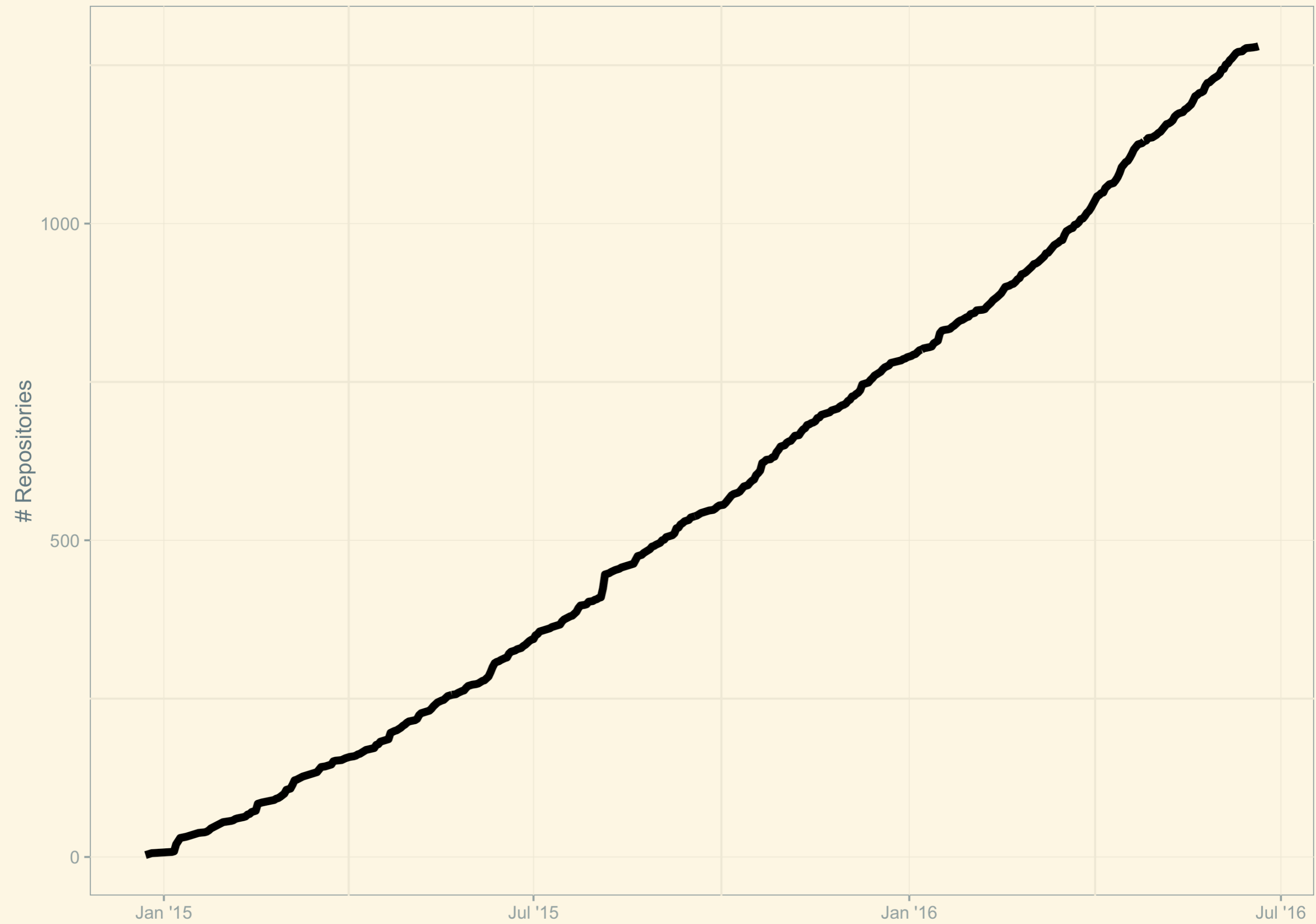
- mc exits process using C code
- Does not run finalizers
- Karl Forner PR to patch mcexit() to call `covr::save_trace()` (<https://github.com/jimhester/covr/pull/195>)

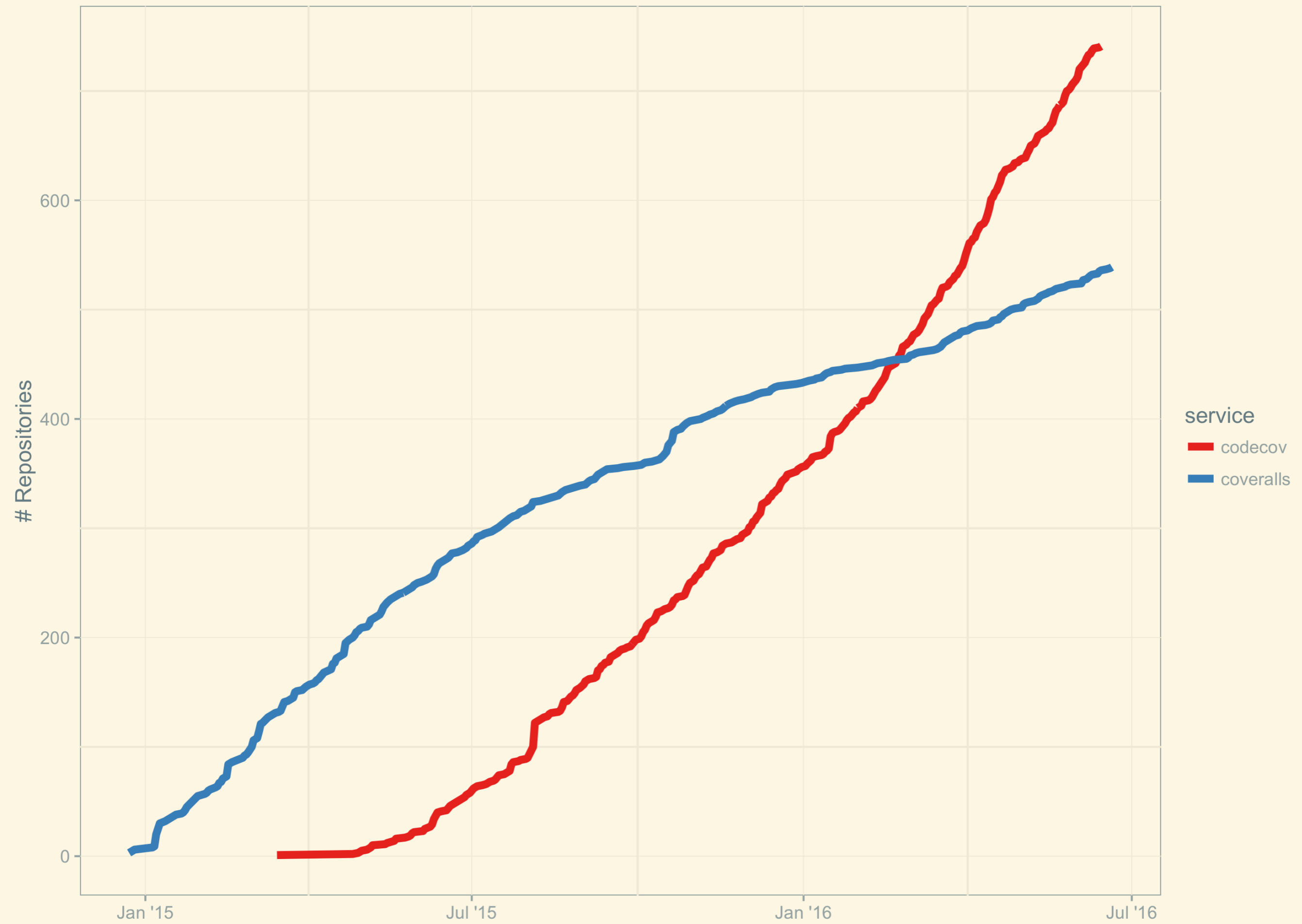
Interactive Use

- `package_coverage()`
- `as.data.frame()`
- `print(group = "function")`
- `print(by = "expression")`
- `report()`

Non-local Workers

- Modify cleanup functions to send back traces?
- Worth implementation effort?





Code Coverage

Working group

- Chris Campbell, Mango Solutions
- Shivank Agrawal, Oracle
- Santosh Chaudhari, Oracle
- Karl Forner, Quartz Bio
- Jim Hester, RStudio
- Mark Hornick, Oracle – Group Leader
- Chen Liang, Oracle
- Willem Ligtenberg, Open Analytics
- Tobias Verbeke, Open Analytics
- Qin Wang, Oracle

Questions

Benchmarks

