Covr: Bringing Test Coverage to R

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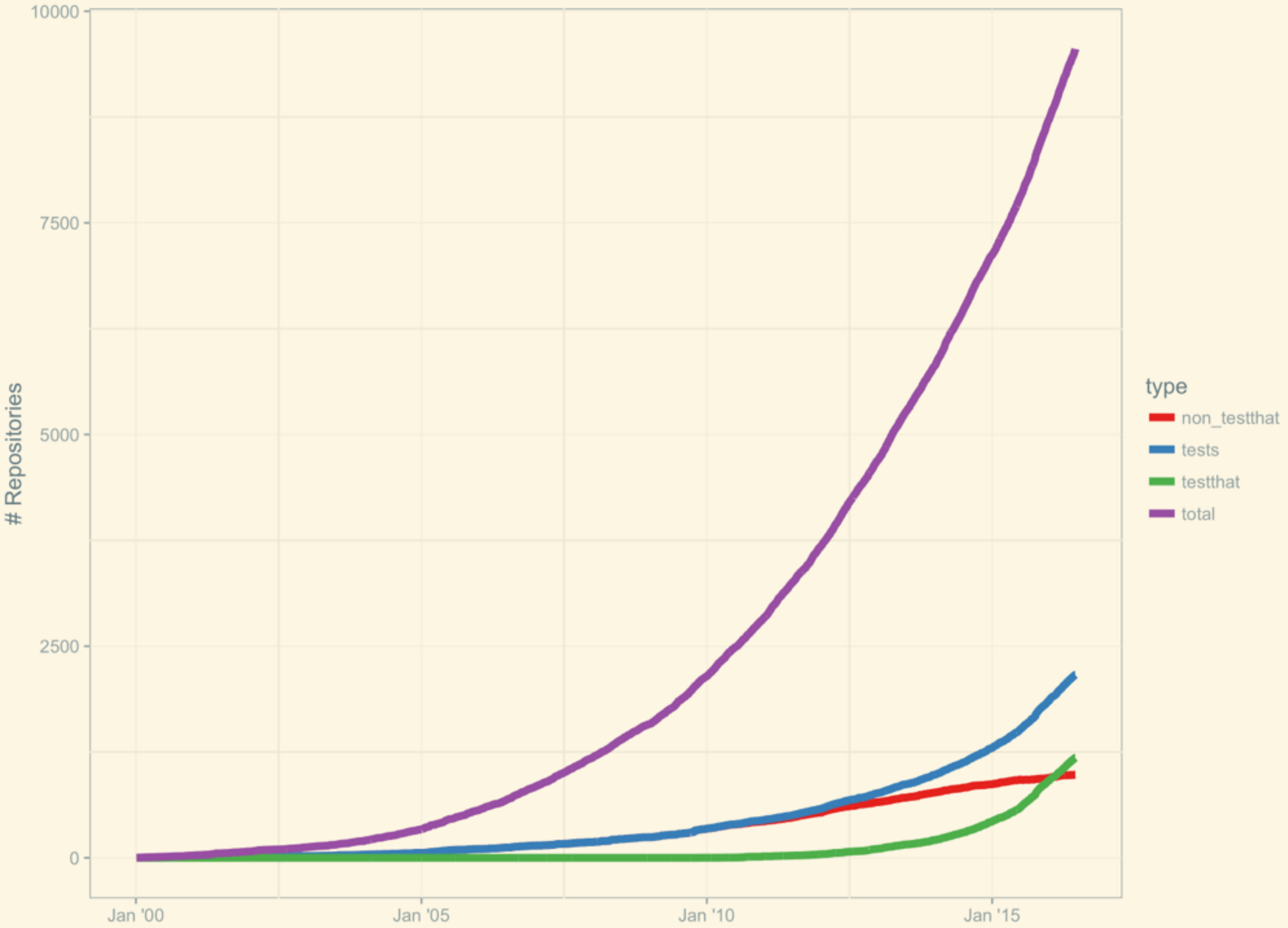
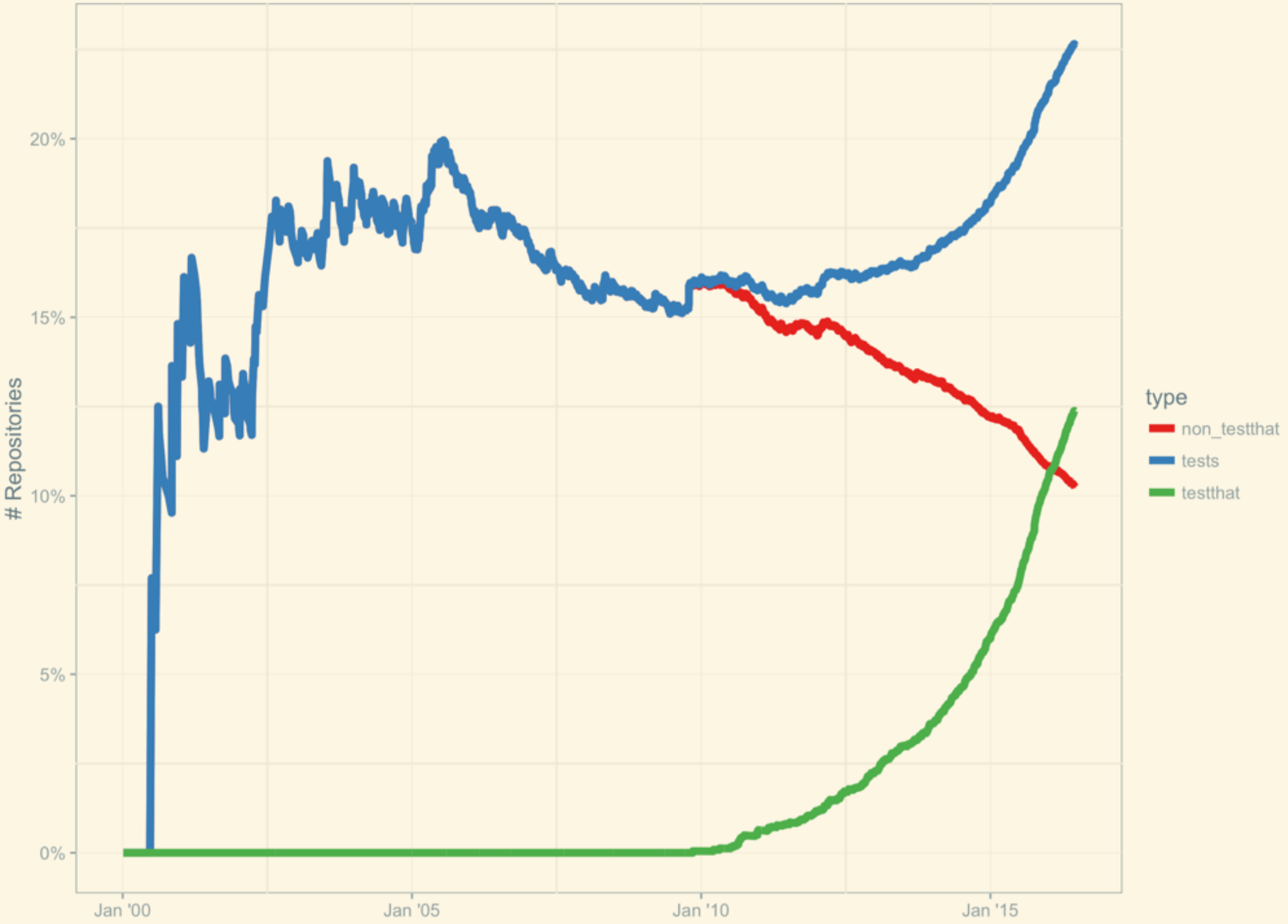
	Tests	Total	%
CRAN	2,091	9,772	21.40
Bioconductor	449	1,258	35.69
rOpenSci	84	146	57.53
Total	2,624	11,176	23.50


10000
7500
5000
2500
0
Repositories
Jan '00
Jan '05
Jan '10
Jan '15
type
non_testthat
tests
testthat
total


20%
15%
10%
5%
0%
Repositories
Jan '00
Jan '05
Jan '10
Jan '15
type
non_testthat
tests
testthat

Why Test?

- Correctness
- Contributions
- Confidence

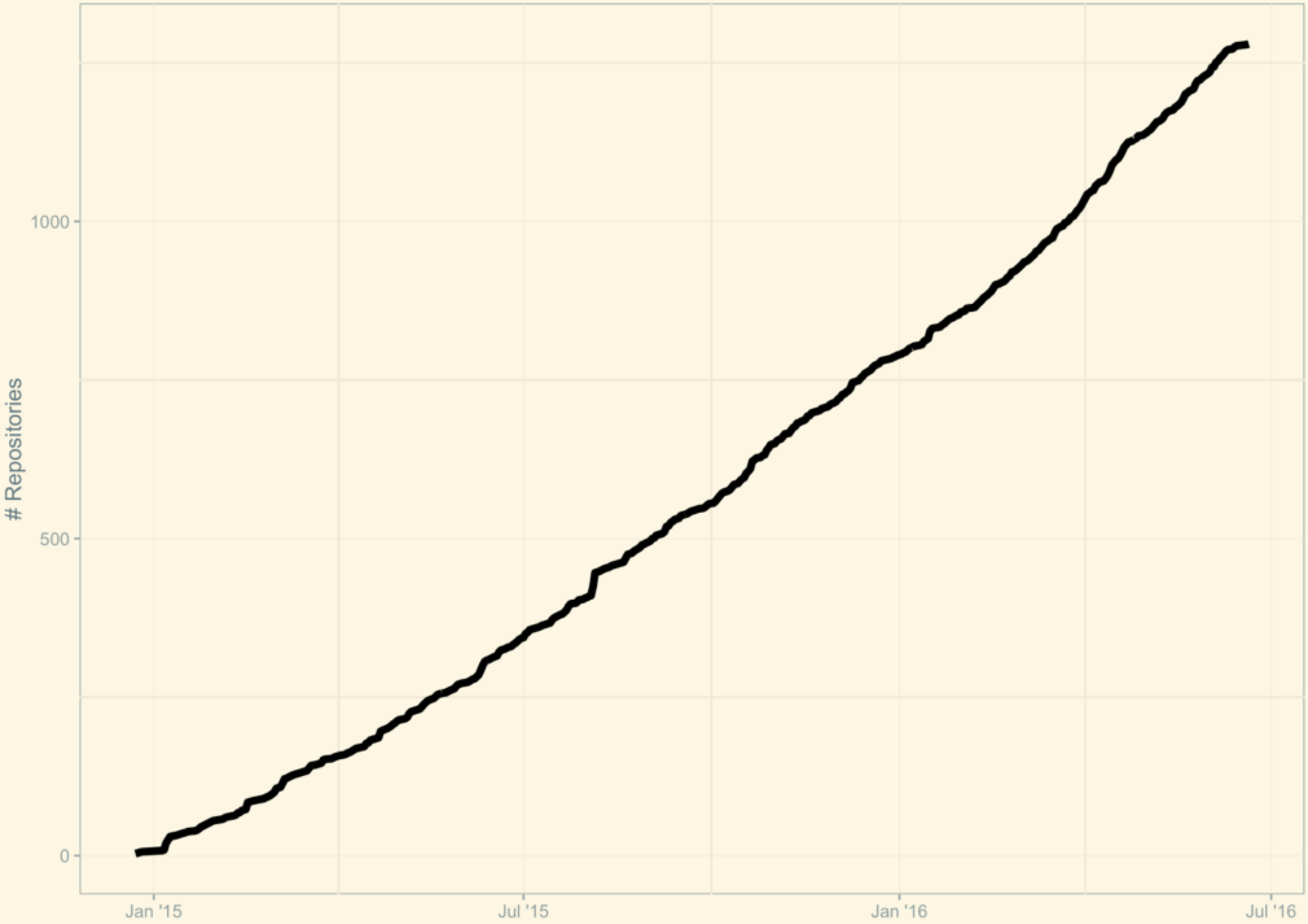
Coverage

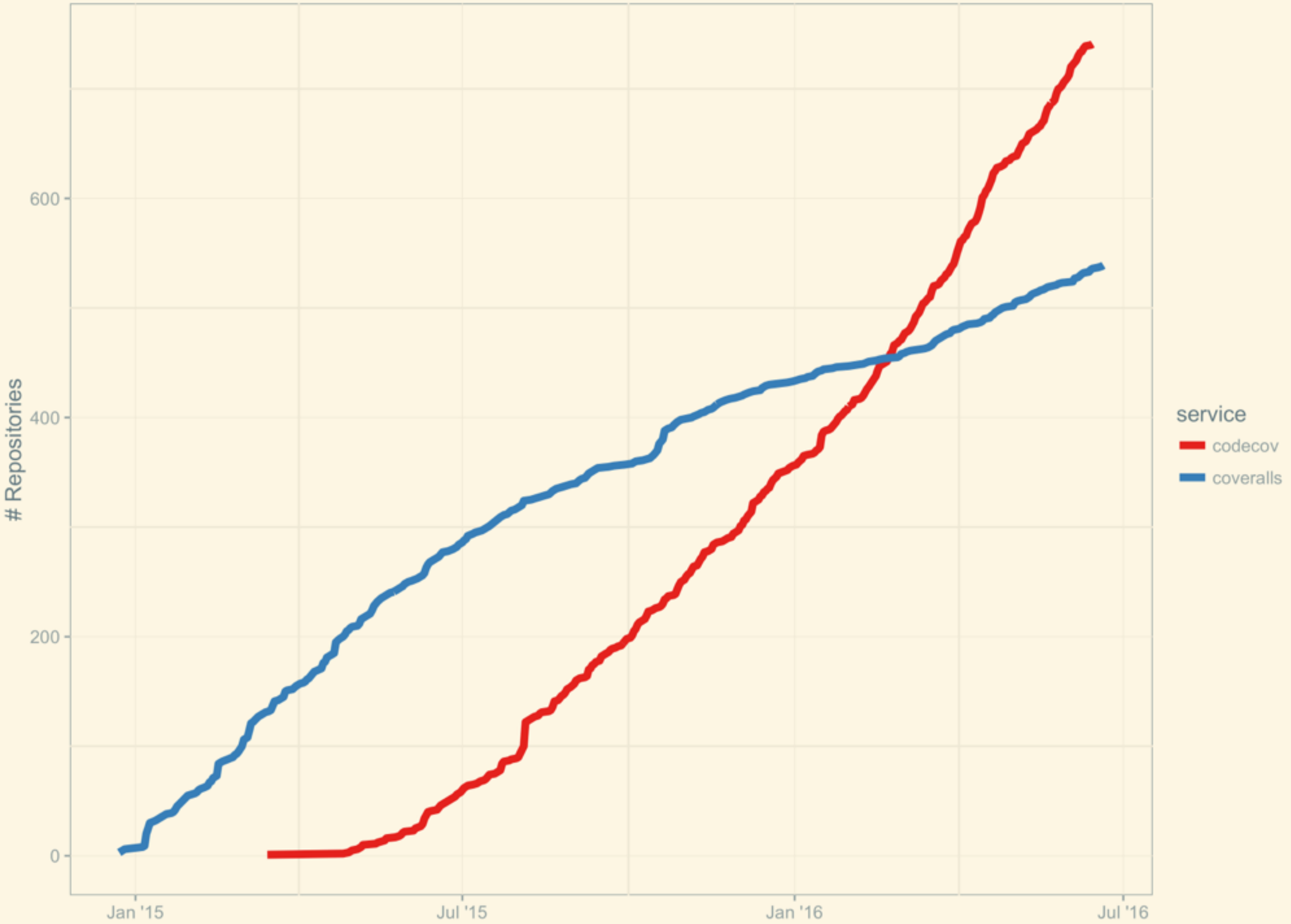
- Tracks of code tested by tests
- **Tracks code not tested by tests**

Covr

- R package (Dec 2014)
- Local
- Continuous Integration (Travis)
- R, C, C++, Fortran
- Tests, Examples, Vignettes

Everyone Tests


Repositories
1000
500
0
Jan '15
Jul '15
Jan '16
Jul '16


600
400
200
0
Repositories
Jan '15
Jul '15
Jan '16
Jul '16
service
codecov
coveralls

Code Coverage Working group

- Meets Bi-weekly (Open Invitation)
- 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

CCWG - Future Work

- Branch coverage
- Parallel code execution
- Intel compiler compatibility
- Solaris SPARC, AIX support
- Jenkins reports
- https://wiki.r-consortium.org/view/Code_Coverage_Tool_for_R

- devtools::use_test()
- devtools::use_coverage()
- covr::package_coverage()
- covr::report()
- Rscript -e ‘covr::codecov()’

Compiled

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

Install

- install.packages(repo = NULL, lib.loc = tempfile())
- Makevars
  - CFLAGS = "-O0 -coverage”
- setHook(packageEvent(pkg, "onLoad"), function(...) covr:::trace_environment(ns))
- reg.finalizer(ns, function(...) { covr:::save_trace(lib) }, 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() # summation

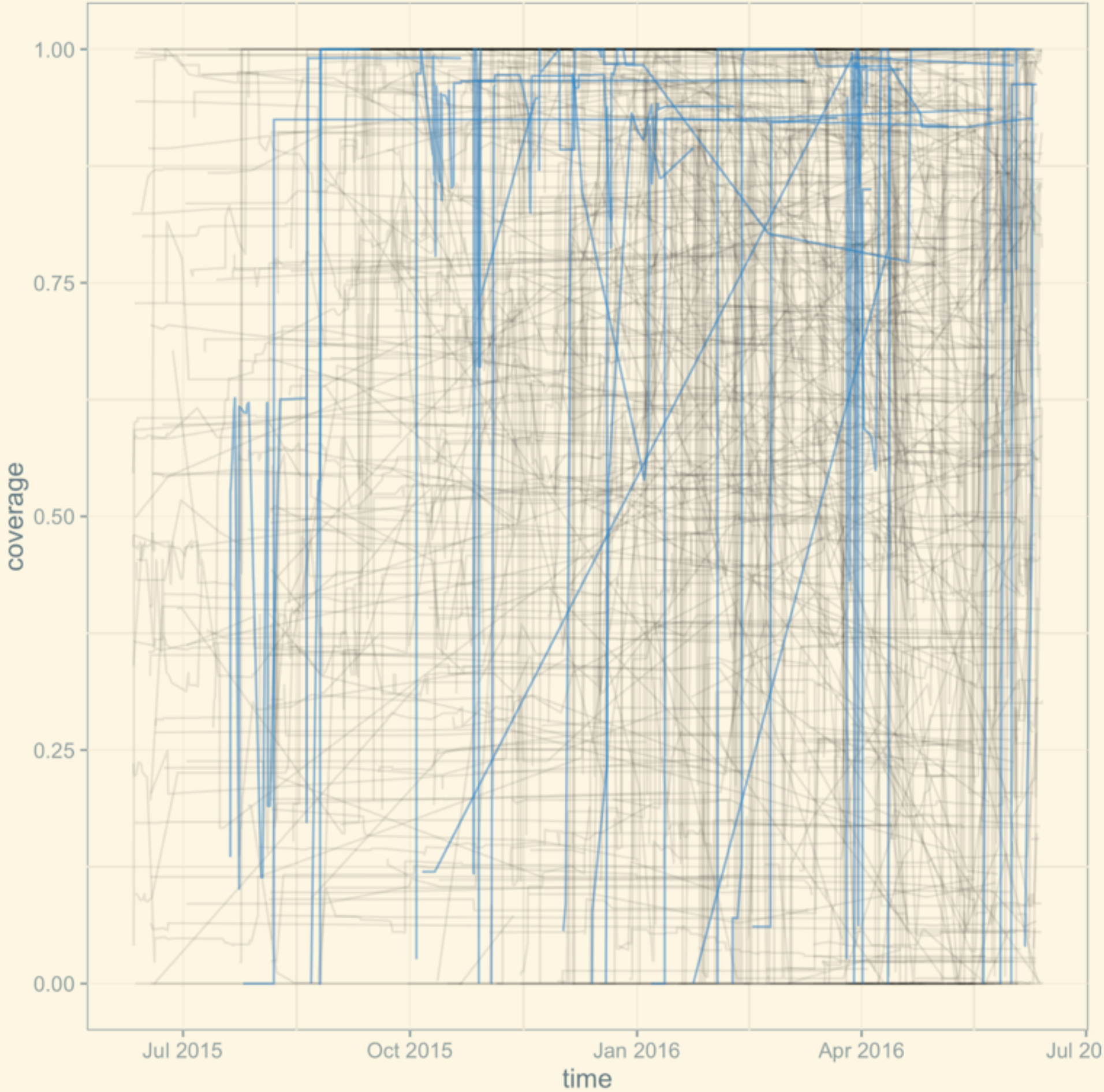
mcexit()

- Multicore 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)

External Nodes

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

Benchmarks


1.00
0.75
0.50
0.25
0.00
coverage
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 20
time