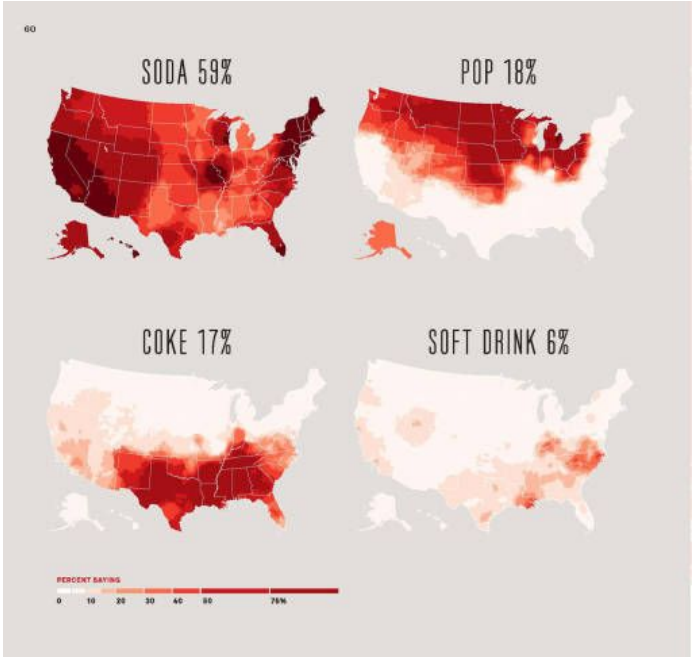
Scaling Shiny

10,000 User App

When Shiny was just a glimmer…

Josh Katz, NY Times: “How Y’all, Youse, and You Guys Talk”



Scaling 101

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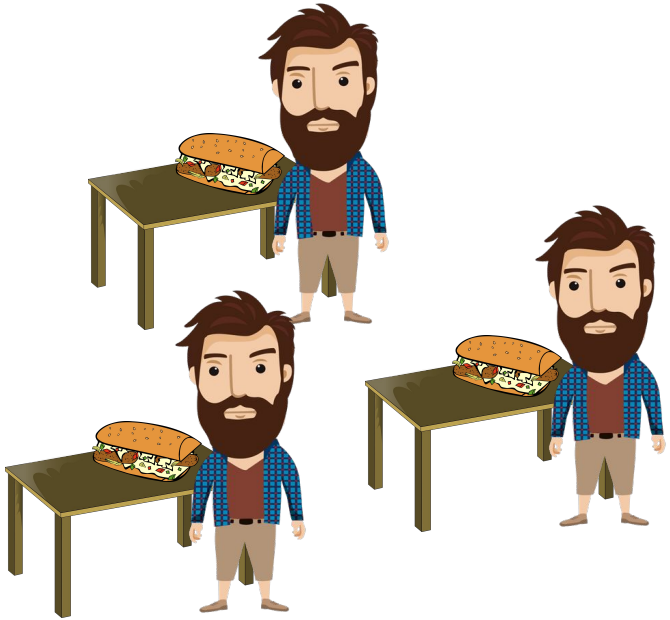
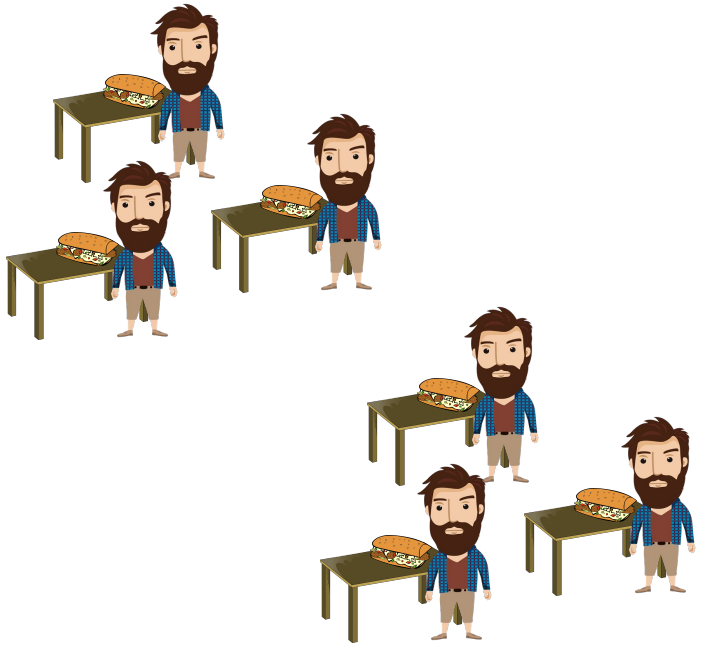
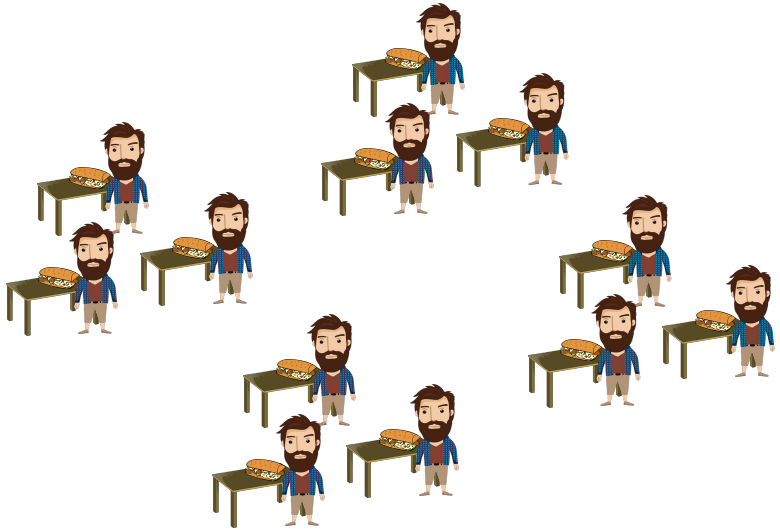


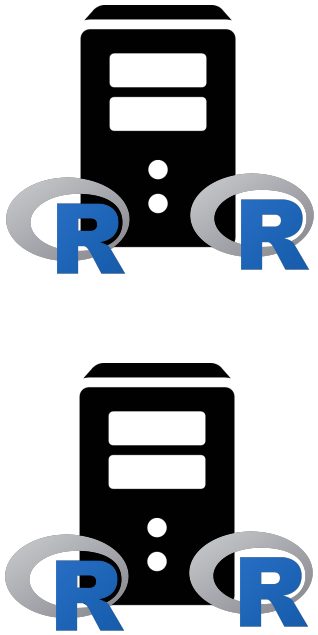
Scaling 101

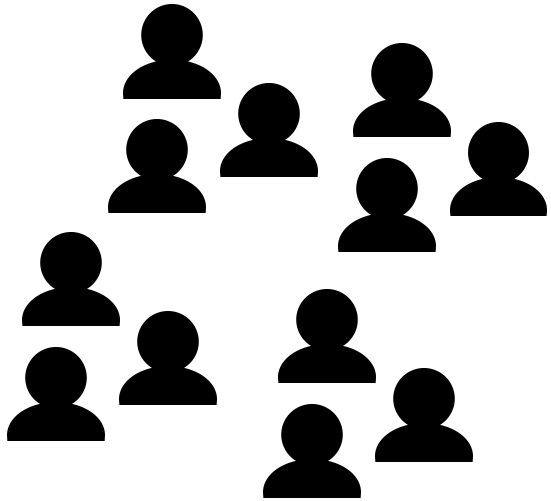


Scaling 101



Scaling 101





Our Stack

PostgresSQL DB (RDS)

Shared File System (EFS)

RStudio Connect Cluster (ASG)

Sticky Load Balancer (ALB)

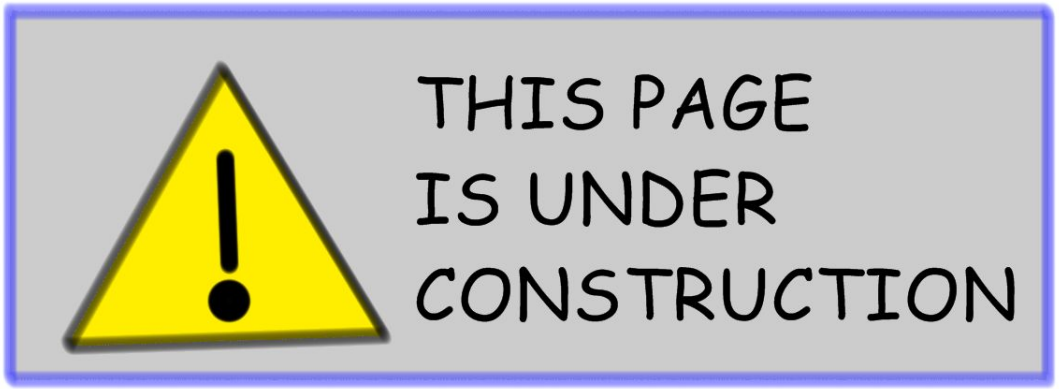
Tools for Load Testing

Goals:

1. Easy, interactive test recording
2. Playback recording, with an average machine simulating 1K users
3. **Support for websockets and Shiny** ✨

Demo

Where can I get these tools?



Writing a “Real” Load Test

```
library(beepr)

start <- Sys.time()
end <- start + lubridate::dminutes(30)

while(Sys.time() < end) {
  Sys.sleep(rnorm(1,25))
  beep() #change an input
}

beep(3)
```

Our Testing Stack

PostgresSQL DB (RDS)

Shared File System (EFS)

RStudio Connect Cluster (ASG)

Metrics Server (Prometheus & Grafana)

Sticky Load Balancer (ALB)

Load Testing Client (ASG)

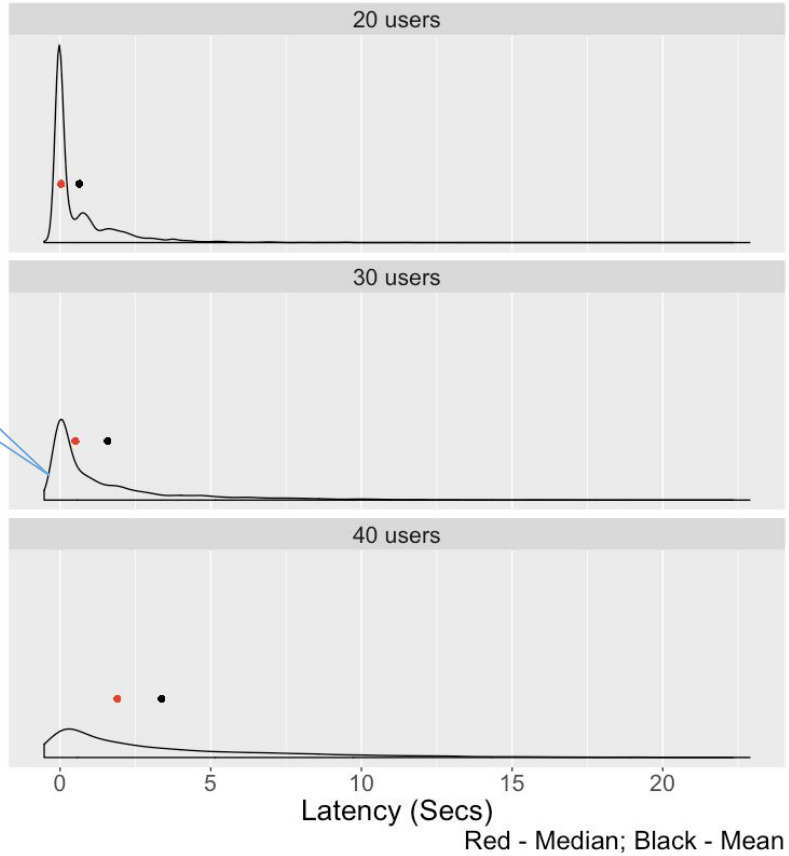
Me! Orchestrating the Stack (Python's Fabric)

Our Stack

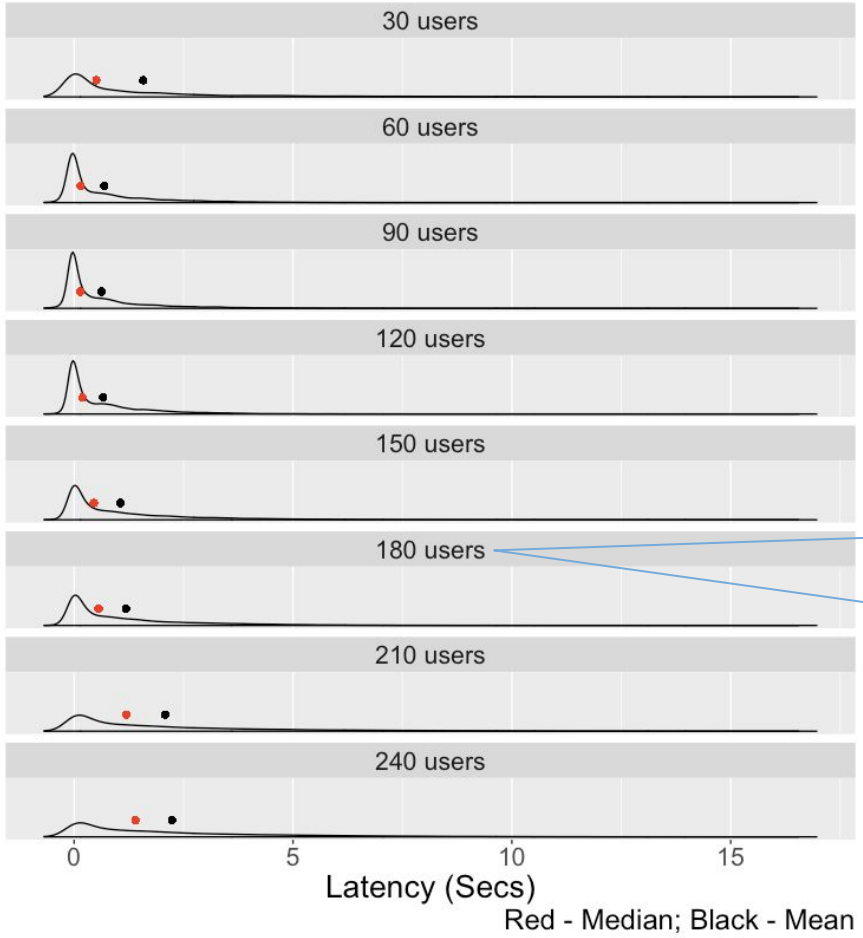
How many users per R process?

30 Users. 1 R process.

< 1 second median latency



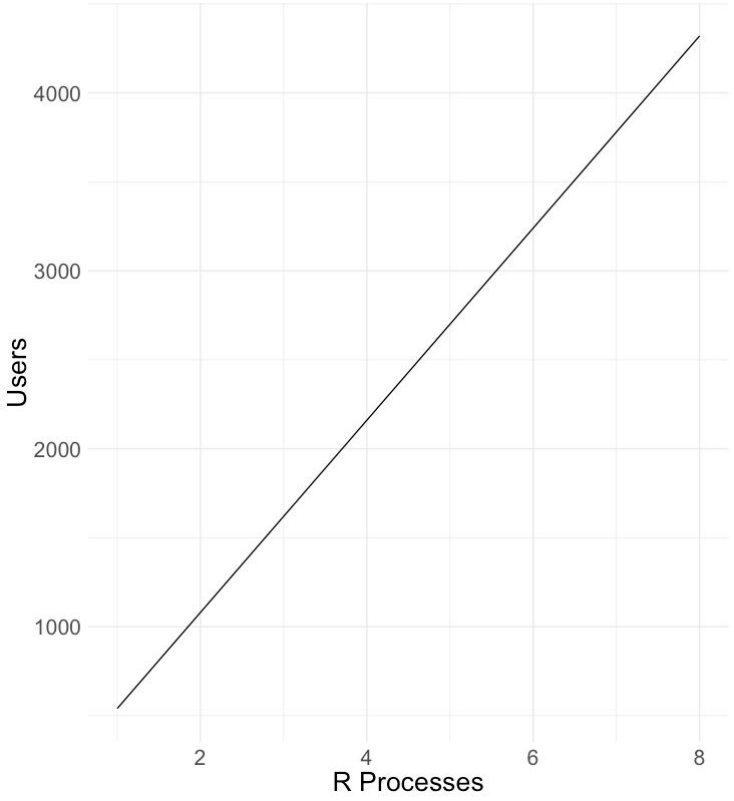
How many R processes per node?

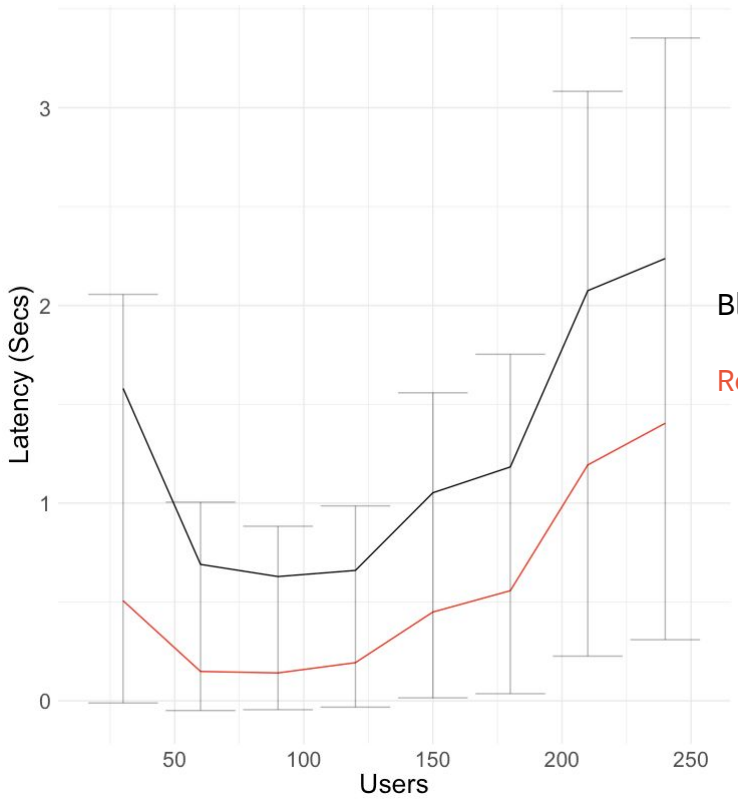


180 Users. 6 R processes.

< 1 second median latency

Linear Scaling



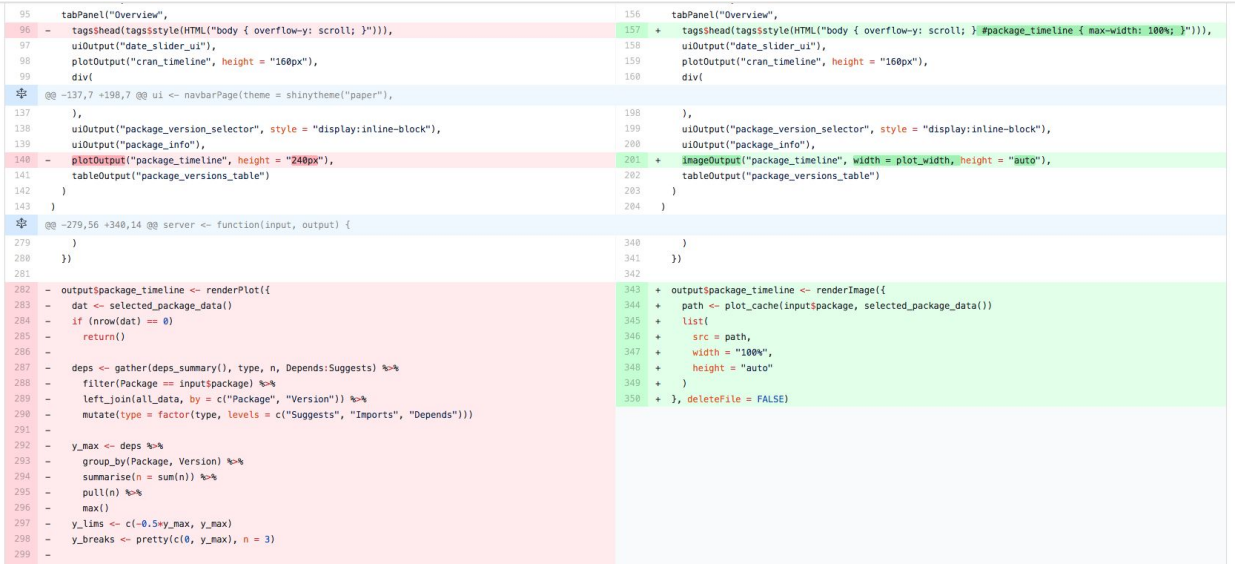


Black - Mean

Red - Median

App Optimization

All about the coefficients



```
 95    tabPanel("Overview",
96 -    tags$head(tags$style(HTML("body { overflow-y: scroll; }"))),
97      uiOutput("date_slider_ui"),
98      plotOutput("cran_timeline", height = "160px"),
99      div(
@@ -137,7 +198,7 @@ ui <- navbarPage(theme = shinytheme("paper"),
137     ),
138     uiOutput("package_version_selector", style = "display:inline-block"),
139     uiOutput("package_info"),
140 -   plotOutput("package_timeline", height = "240px"),
141     tableOutput("package_versions_table")
142   )
143 )
@@ -279,56 +340,14 @@ server <- function(input, output) {
279     )
280   })
281
282 - output$package_timeline <- renderPlot({
283 -   dat <- selected_package_data()
284 -   if (nrow(dat) == 0)
285 -     return()
286 -
287 -   deps <- gather(deps_summary(), type, n, Depends:Suggests) %>%
288 -     filter(Package == input$package) %>%
289 -     left_join(all_data, by = c("Package", "Version")) %>%
290 -     mutate(type = factor(type, levels = c("Suggests", "Imports", "Depends")))
291 -
292 -   y_max <- deps %>%
293 -     group_by(Package, Version) %>%
294 -     summarise(n = sum(n)) %>%
295 -     pull(n) %>%
296 -     max()
297 -   y_lims <- c(-0.5*y_max, y_max)
298 -   y_breaks <- pretty(c(0, y_max), n = 3)
299 -
```

```
156     tabPanel("Overview",
157 +     tags$head(tags$style(HTML("body { overflow-y: scroll; } #package_timeline { max-width: 100%; }"))),
158     uiOutput("date_slider_ui"),
159     plotOutput("cran_timeline", height = "160px"),
160     div(
198     ),
199     uiOutput("package_version_selector", style = "display:inline-block"),
200     uiOutput("package_info"),
201 +   imageOutput("package_timeline", width = plot_width, height = "auto"),
202     tableOutput("package_versions_table")
203   )
204 )
340     )
341   })
342
343 + output$package_timeline <- renderImage({
344 +   path <- plot_cache(input$package, selected_package_data())
345 +   list(
346 +     src = path,
347 +     width = "100%",
348 +     height = "auto"
349 +   )
350 + }, deleteFile = FALSE)
```

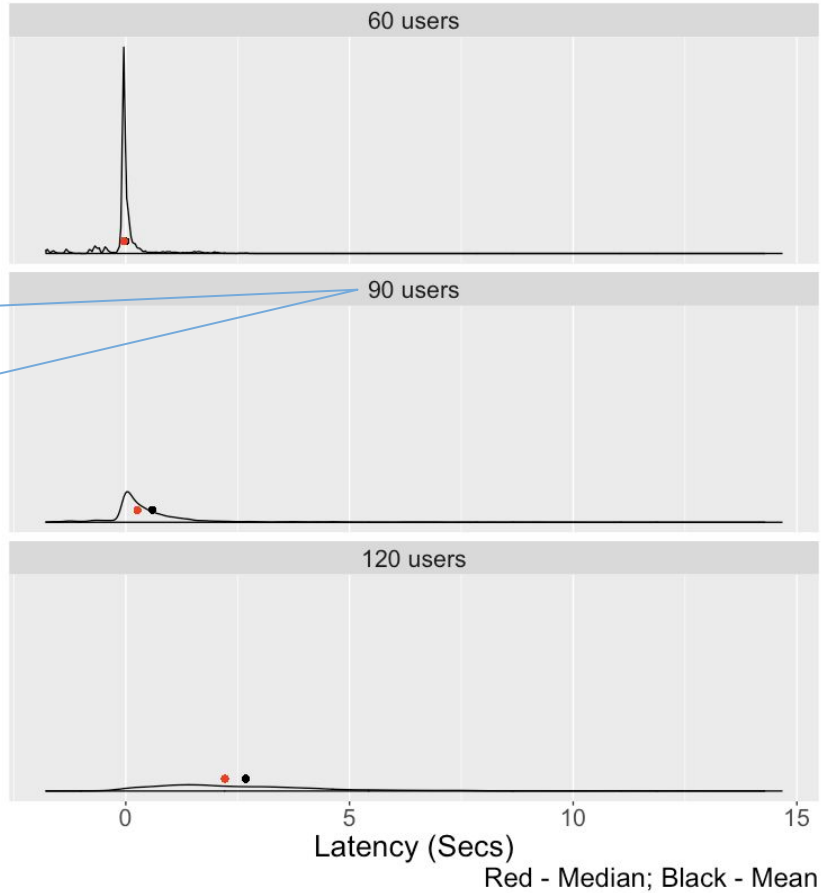
https://github.com/wch/shiny_demo/commit/f0ab6220b17490380e458e2b37f27018fdcbe2c2

How many users per R process (take 2)

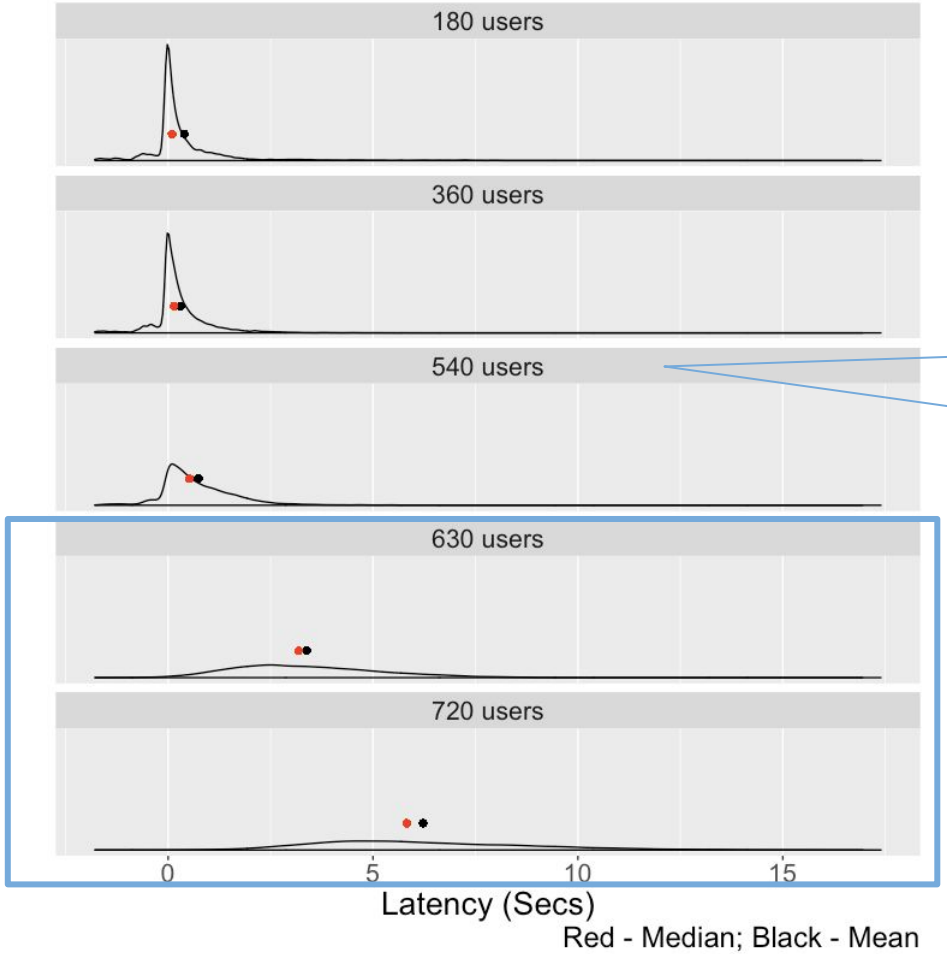
90 Users. 1 R process.

< 1 second median latency

3X Caching Improvement



How many R processes per node?

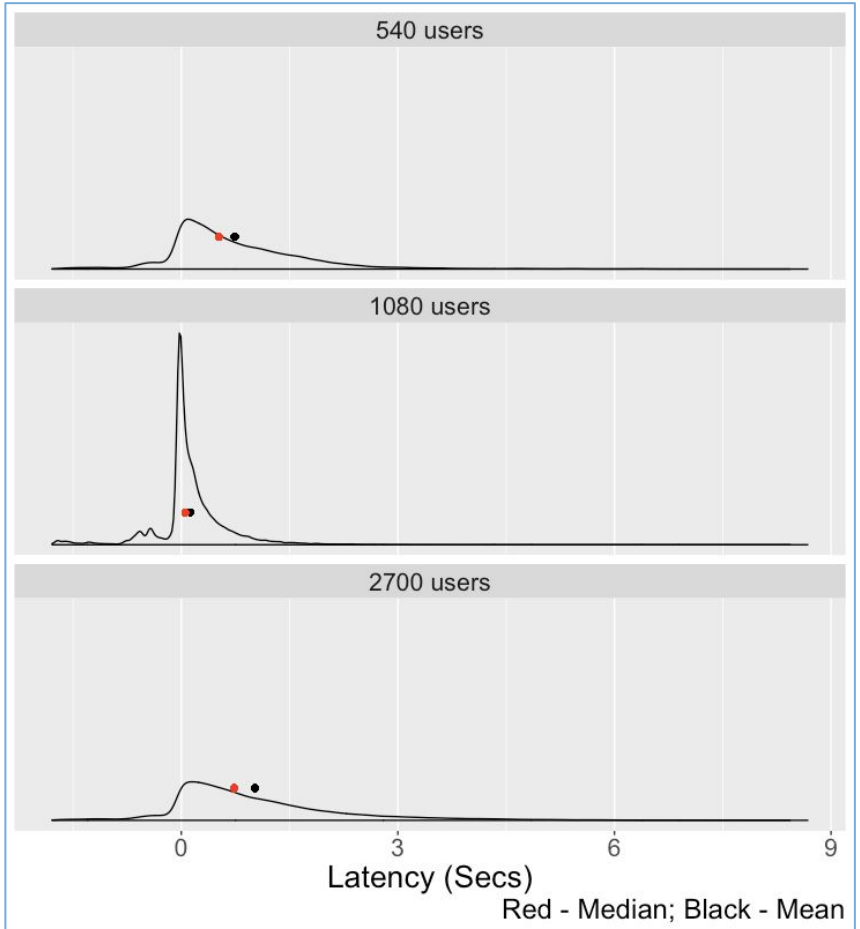


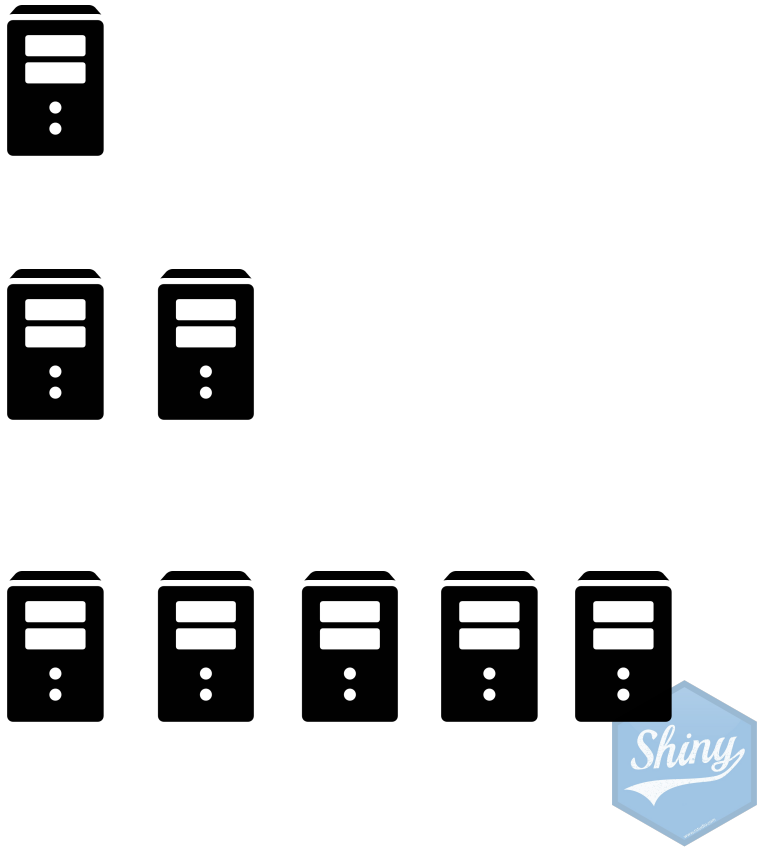
540 Users. 6 R processes.

3x Caching Improvement

CPU utilization over 100%

Can we scale across nodes?





10,000 User Demo

20 node cluster of c4.2xlarge (8 core)

Thanks!

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