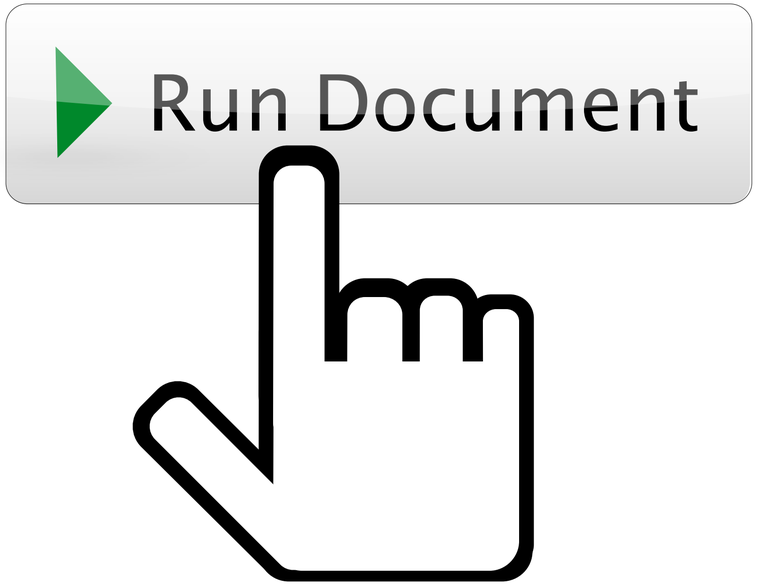
RStudio
250 Northern Ave, Boston, MA 02210
Phone: 844-448-1212
Email: info@rstudio.com
Web: http://www.rstudio.com

Embedding Shiny apps in R Markdown Documents

Introduction and possibilities



Garrett Grolemund
Data Scientist and Master Instructor
June 2014
Email: garrett@rstudio.com

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Can R Markdown embed Shiny apps into a report?

Why?

R Markdown

Analytic Power

+

Microsoft Word

Reveal.js
ioslides, Beamer

Report generation

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RStudio

Console ~/

```
> WorldPhones
     N.Amer Europe Asia S.Amer Oceania Africa Mid.Amer
1951  45939  21574 2876   1815    1646     89      555
1956  60423  29990 4708   2568    2366   1411      733
1957  64721  32510 5230   2695    2526   1546      773
1958  68484  35218 6662   2845    2691   1663      836
1959  71799  37598 6856   3000    2868   1769      911
1960  76036  40341 8220   3145    3054   1905     1008
1961  79831  43173 9053   3338    3224   2005     1076
>
>
> summary(iris$Sepal.Width)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  2.000   2.800   3.000   3.057   3.300   4.400
>
>
> lm(mpg ~ disp + hp, data = mtcars)

Call:
lm(formula = mpg ~ disp + hp, data = mtcars)

Coefficients:
(Intercept)         disp           hp
   30.73590     -0.03035     -0.02484

>
> hist(iris$Sepal.Width, border = "white", col = "darkgrey")
>
```

Environment | History

Import Dataset | Clear | Grid

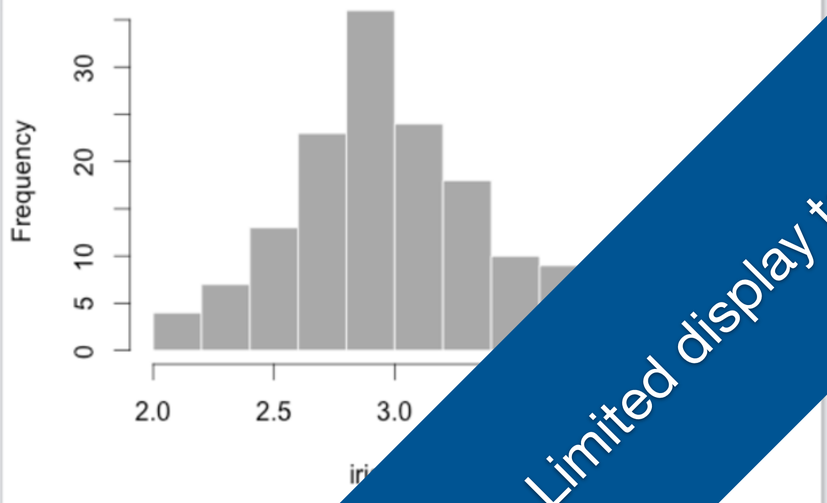
Global Environment

Name	Type	Length	Size	Value

Environment is empty

Files | Plots | Packages | Help | Viewer

Zoom | Export | Clear All



Limited display tools

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Shiny

+

Analytic Power

Display abilities and interactivity

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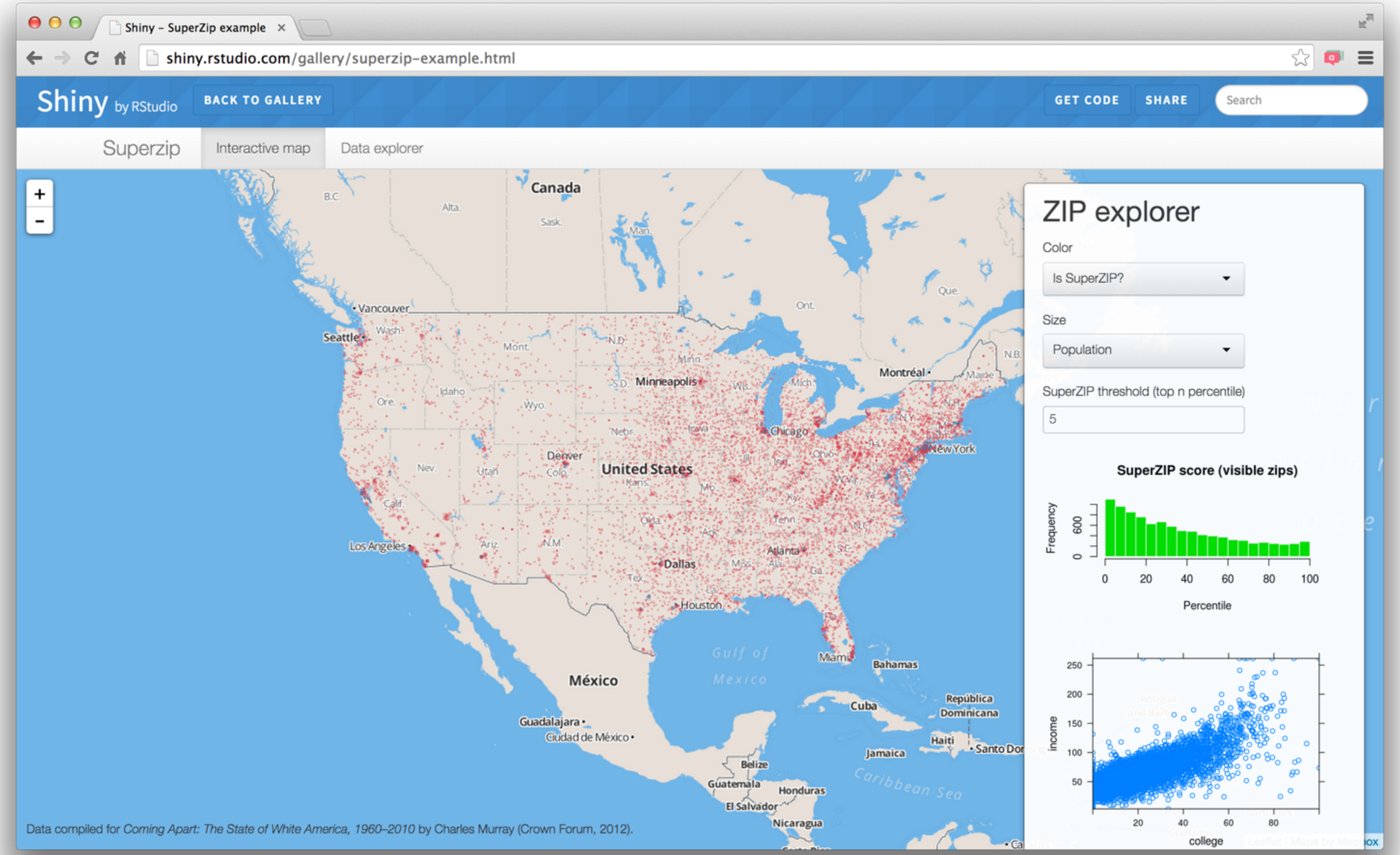

http://shiny.rstudio.com/gallery/superzip-example.html

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R Markdown

Analytic Power

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Microsoft Word

Reveal.js
ioslides, Beamer

Report generation

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Can R Markdown embed Shiny apps into a report?

Yes.

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Hurricanes demo

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How can knitr **convert** a .Rmd with a shiny element into an HTML file?

Typical Shiny App

server.R

+

ui.R

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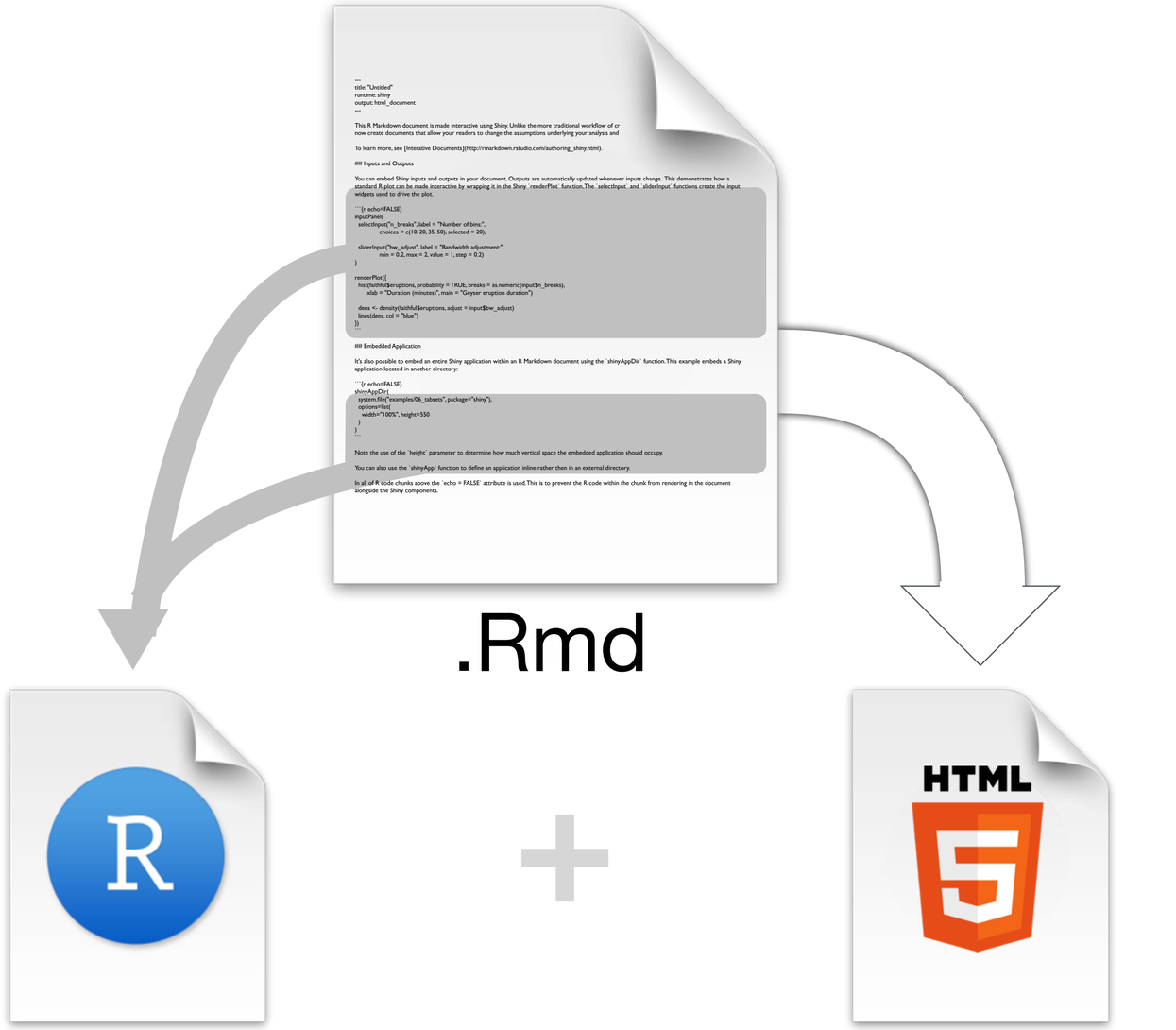

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How can interactive documents be deployed?

Shiny Server

Shiny Server Pro

ShinyApps.io

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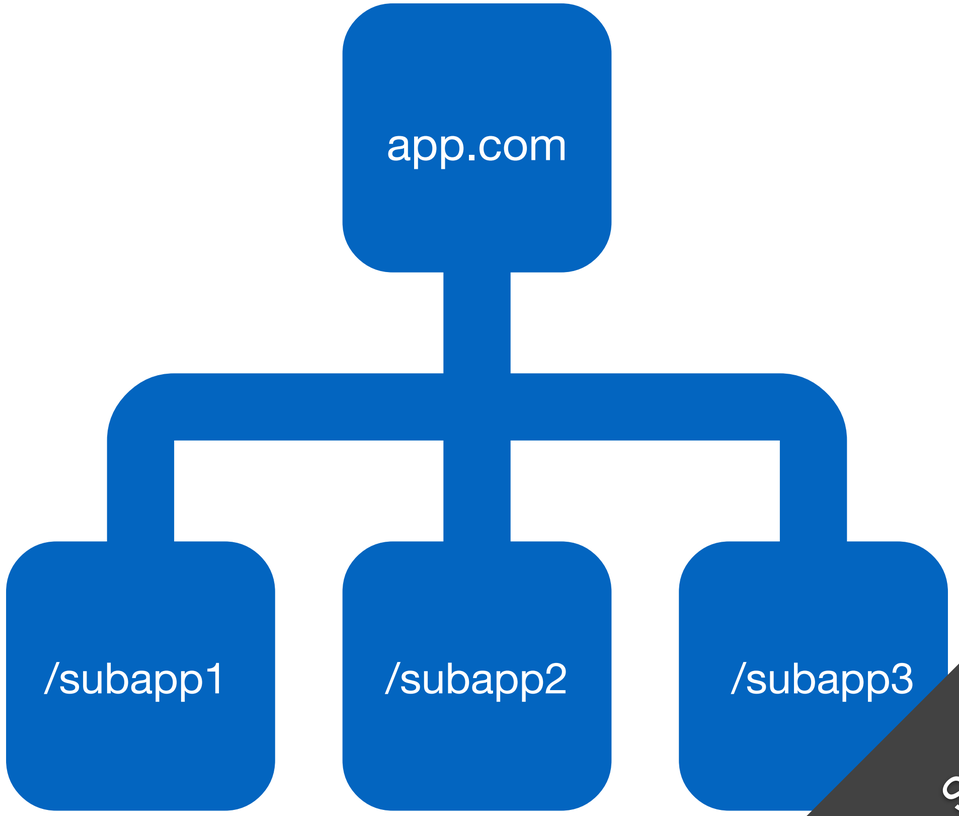
How to manage multiple apps in one R session?

shiny:::addSubApp



SubApps are aware of the parent app
can even share state

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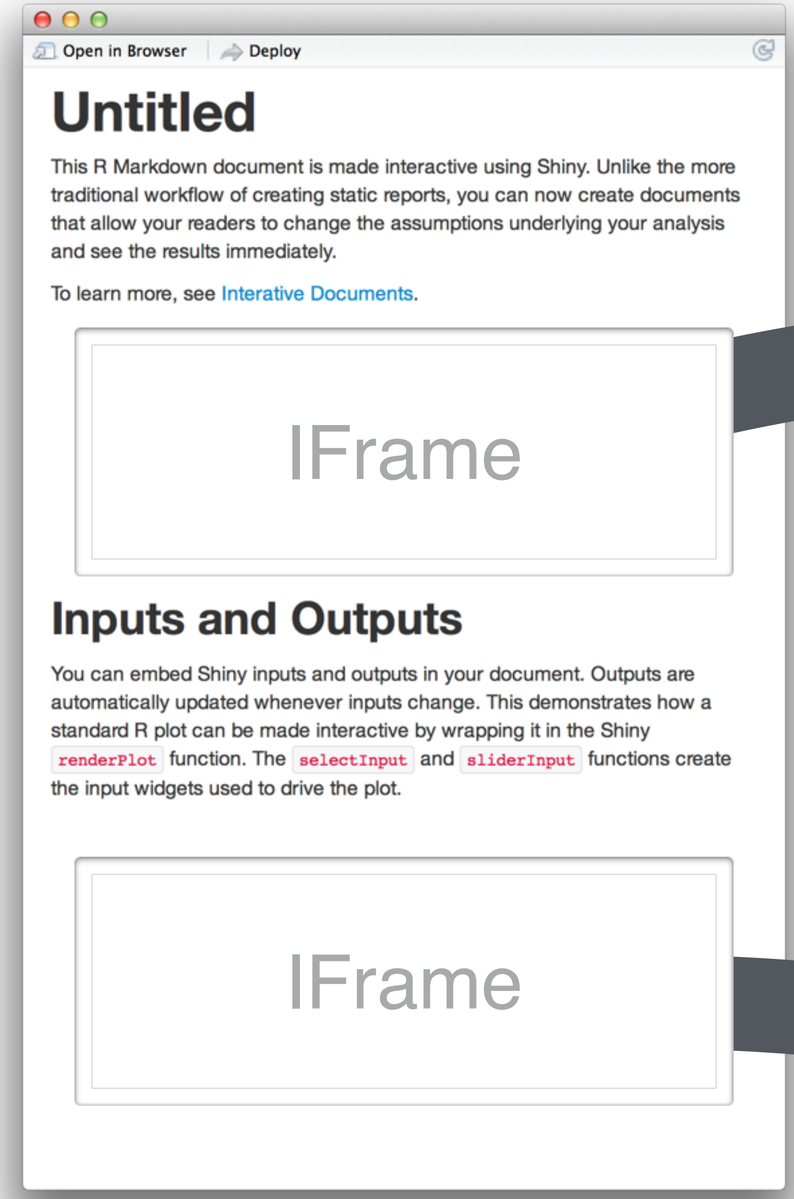

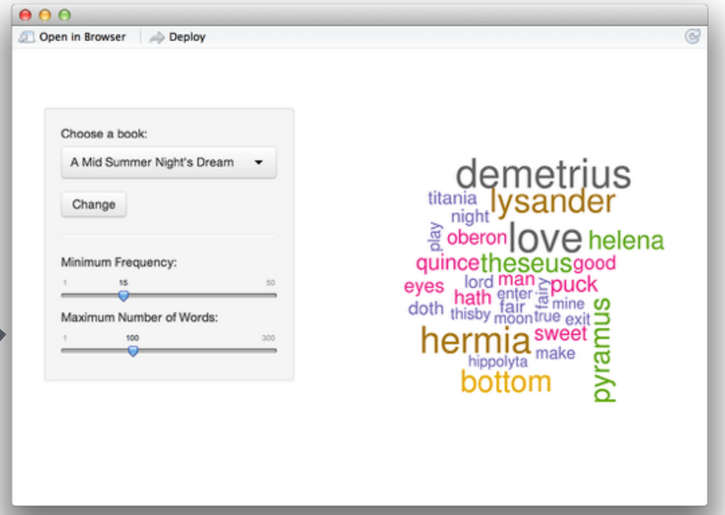

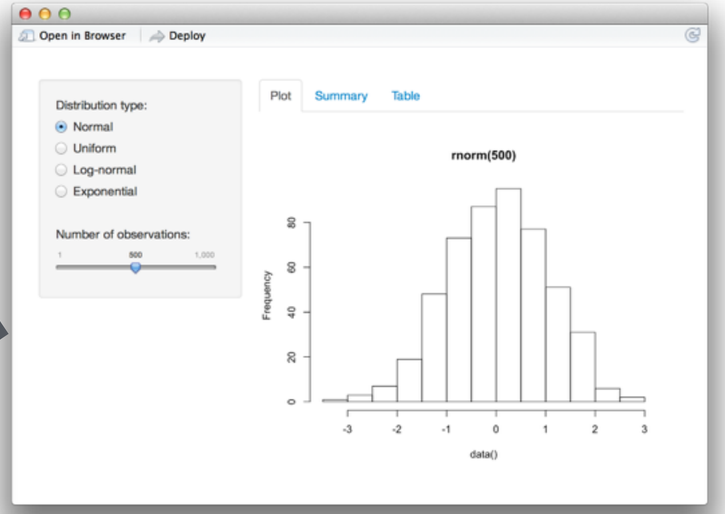

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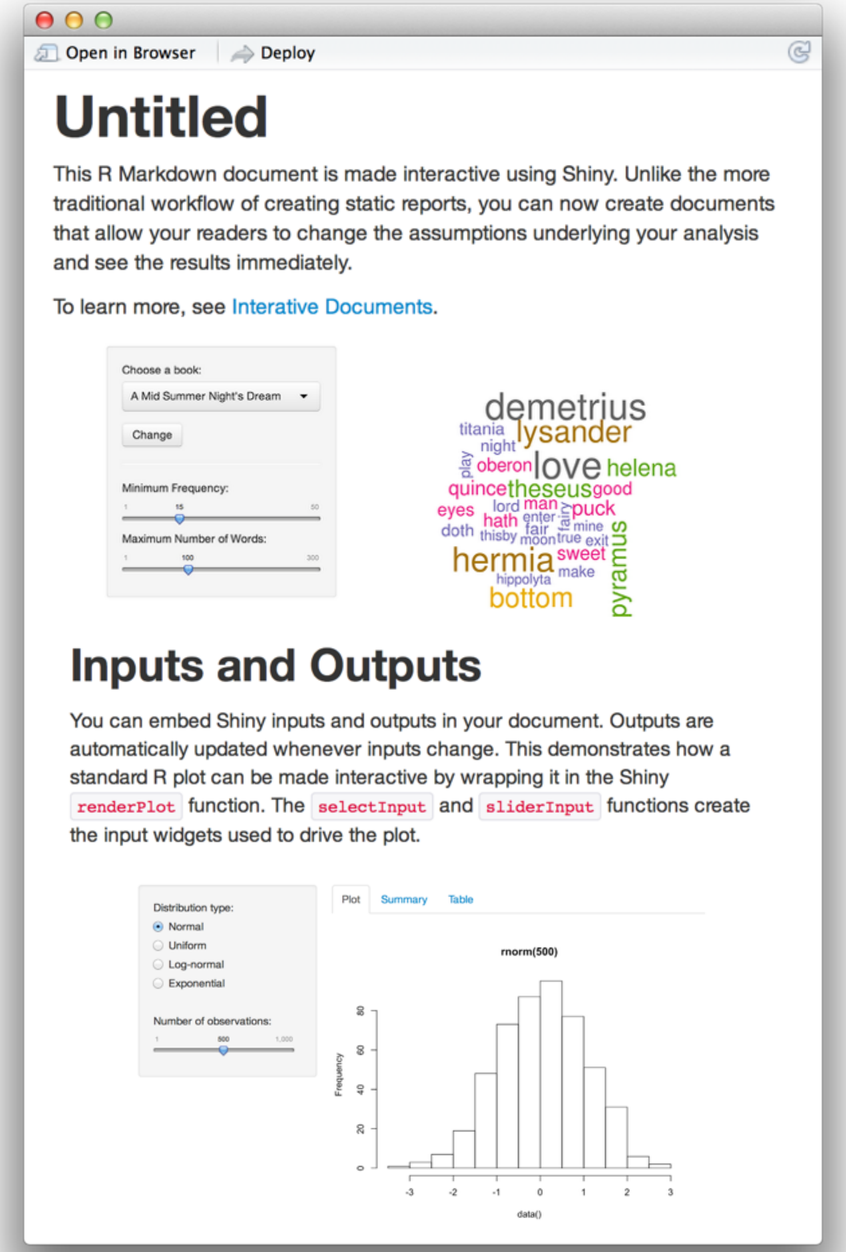

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How to include multiple shiny apps in one doc?

Typical Shiny App

server.R

+

ui.R

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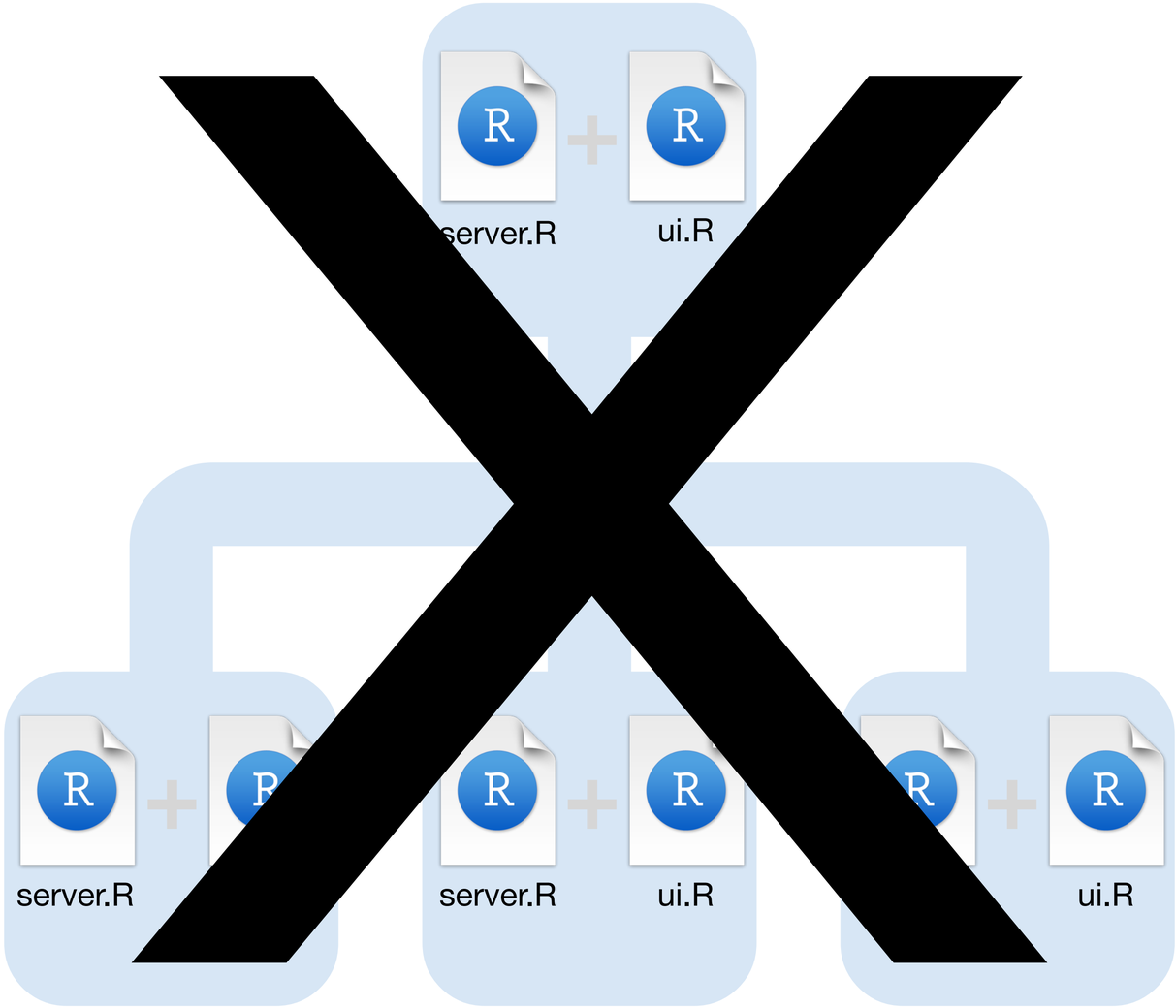

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shinyApp

```
shinyApp(
  ui = fluidPage(
    sliderInput("n", "Bins", 5, 100, 20),
    plotOutput("hist")
  ),
  server = function(input, output) {
    output$hist <- renderPlot(
      hist(faithful[[2]], breaks = input$n,
       col = "skyblue", border = "white")
    )
  }
)
```

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what if…?

```
shinyApp(
  ui = fluidPage(
    sliderInput("n", "Bins", 5, 100, 20),
    plotOutput("hist")
  ),
  server = function(input, output) {
    output$hist <- renderPlot(
      hist(faithful[[2]], breaks = input$n,
       col = "skyblue", border = "white")
    )
  }
)
```

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what if…?

```
binner <- function() {
  shinyApp(
    ui = fluidPage(
      sliderInput("n", "Bins", 5, 100, 20),
      plotOutput("hist")
    ),
    server = function(input, output) {
      output$hist <- renderPlot(
        hist(faithful[[2]], breaks = input$n,
          col = "skyblue", border = "white")
      )
    }
  )
}
```

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what if…?

```
binner <- function(data) {
  shinyApp(
    ui = fluidPage(
      sliderInput("n", "Bins", 5, 100, 20),
      plotOutput("hist")
    ),
    server = function(input, output) {
      output$hist <- renderPlot(
        hist(data[[2]], breaks = input$n,
          col = "skyblue", border = "white")
      )
    }
  )
}
```

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```
binner <- function(data) {
  shinyApp(
    ui = fluidPage(
      sliderInput("n", "Bins", 5, 100, 20),
      plotOutput("hist")
    ),
    server = function(input, output) {
      output$hist <- renderPlot(
        hist(data[[2]], breaks = input$n,
         col = "skyblue", border = "white")
      )
    }
  )
}
```

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A widget for .Rmd

```
library(rmdexamples)
kmeans_cluster(iris)
```

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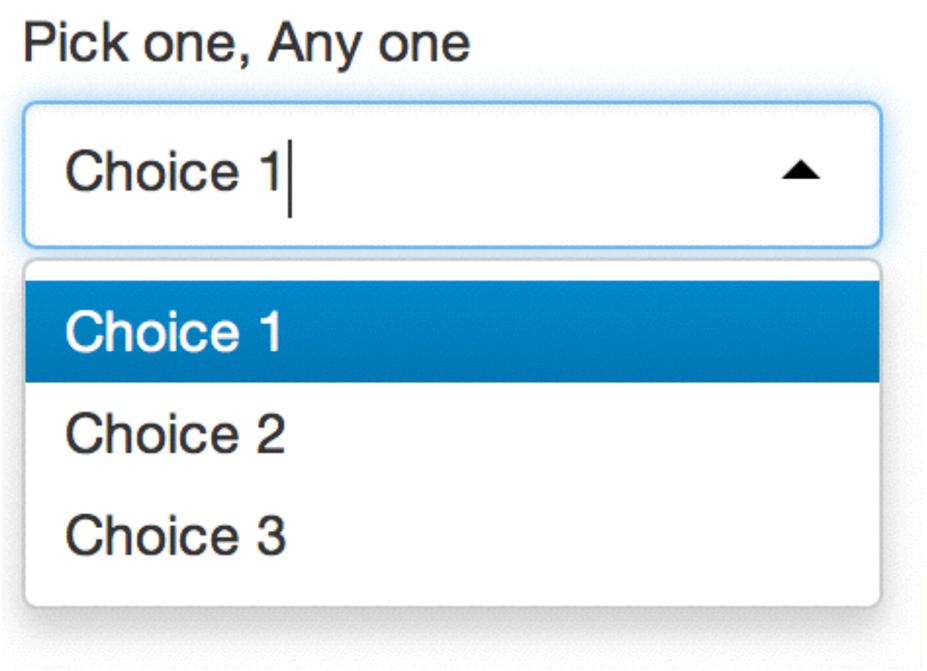
How can we let users know they have an interactive document?



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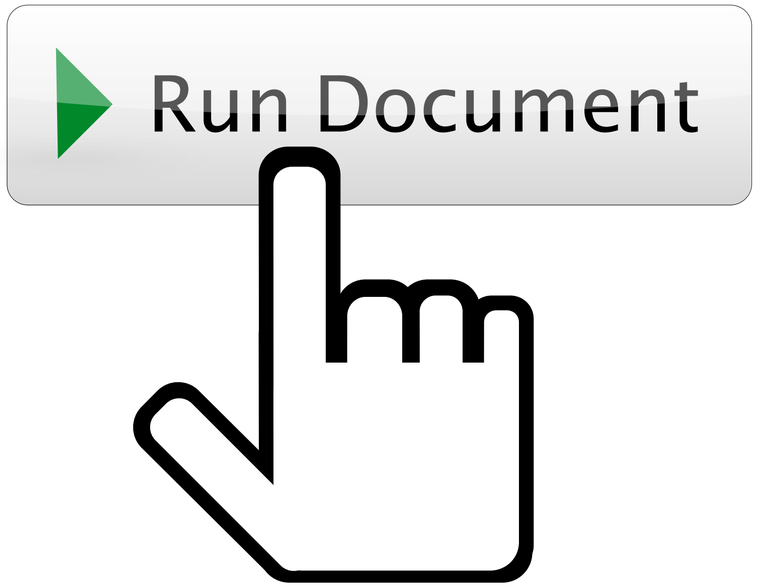

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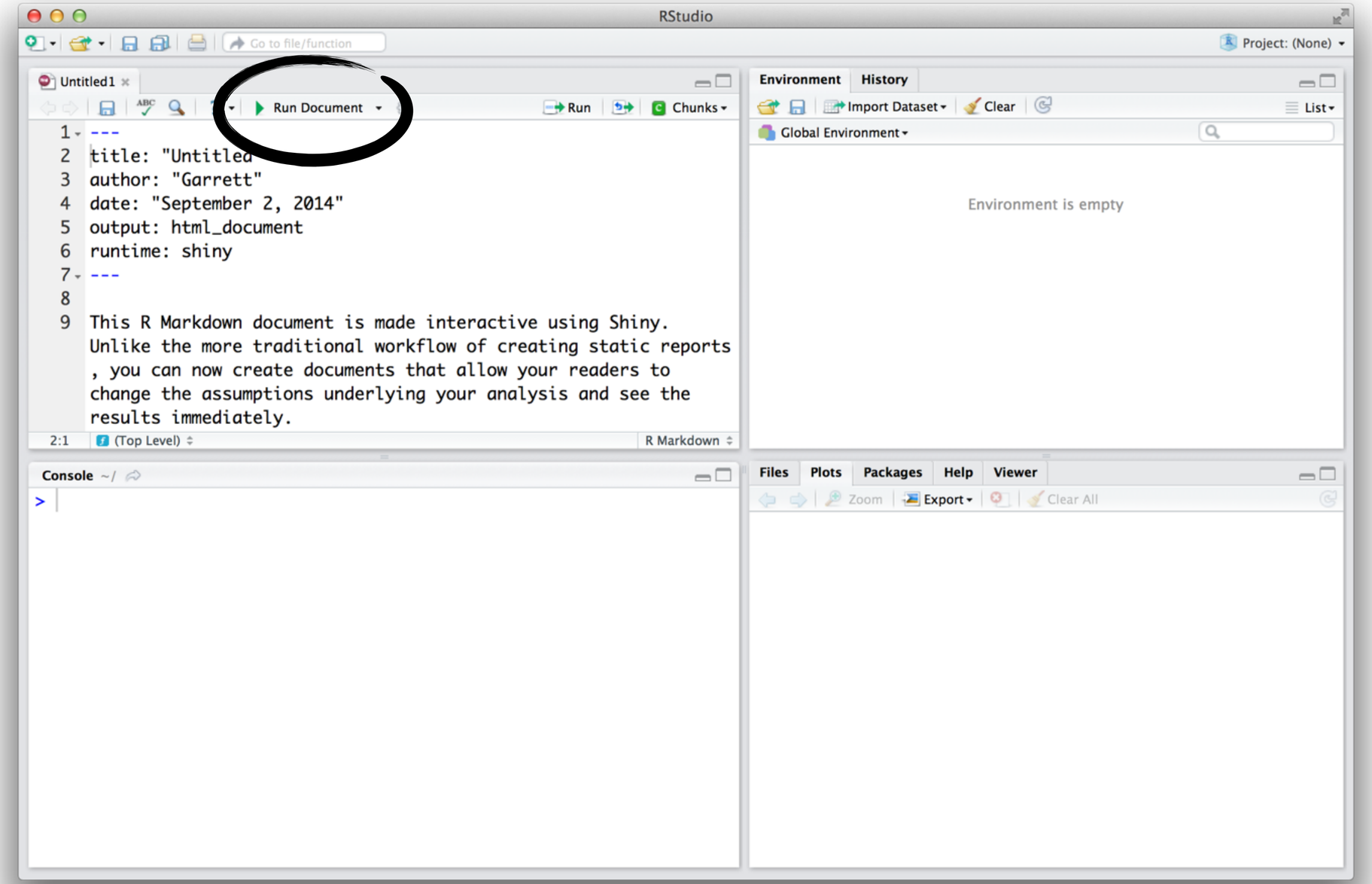

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Can the document share CSS with embedded apps?

Yes. Link to the same CSS file in each.

http://shiny.rstudio.com/articles/css.html

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But can they just… cascade?

No.

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Possibilities

1

The easiest way to use Shiny.

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Names demo

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2

Works with ggvis.

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Grand tour demo

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3

Make (and share) widgets.

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RStudio

Stocks demo

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R Markdown — Dynamic Documents for R

R Markdown is an authoring format that enables easy creation of dynamic documents, presentations, and reports from R. It combines the core syntax of markdown (an easy-to-write plain text format) with embedded R code chunks that are run so their output can be included in the final document. R Markdown documents are fully *reproducible* (they can be automatically regenerated whenever underlying R code or data changes).

This website describes R Markdown v2, a next generation implementation of R Markdown based on knitr and pandoc. This implementation brings many enhancements to R Markdown, including:

- Create HTML, PDF, and MS Word documents as well as Beamer, ioslides and reveal.js presentations.
- New markdown syntax including expanded support for tables and bibliographies.
- Hooks for customizing HTML and PDF output (include CSS, headers, and footers).
- Include raw LaTeX within markdown for advanced customization of PDF output.
- Compile HTML, PDF, or MS Word notebooks from R scripts.
- Extensiblity: create custom templates and even entirely new output formats.
- Create interactive R Markdown documents using Shiny

Note that PDF output (including Beamer slides) requires an installation of TeX. On Windows, MiKTeX should be used rather than TeX Live.

Installing R Markdown

You can use R Markdown either through the integrated support provided by RStudio or by directly using the rmarkdown package:

1. RStudio — Install the latest version of RStudio (v0.98.932).
2. Other environments — Install the rmarkdown package.

rmarkdown.rstudio.com

Quick Tour

Shiny

by RStudio

A web application framework for R

Turn your analyses into interactive web applications

No HTML, CSS, or JavaScript knowledge required

TUTORIAL ARTICLES GALLERY REFERENCE DEPLOY HELP

Get inspired
(gallery)

Get started
(tutorial)

Go deeper
(articles)

shiny.rstudio.com

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THANKS FOR ATTENDING

Learn more about Shiny Server & RStudio

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