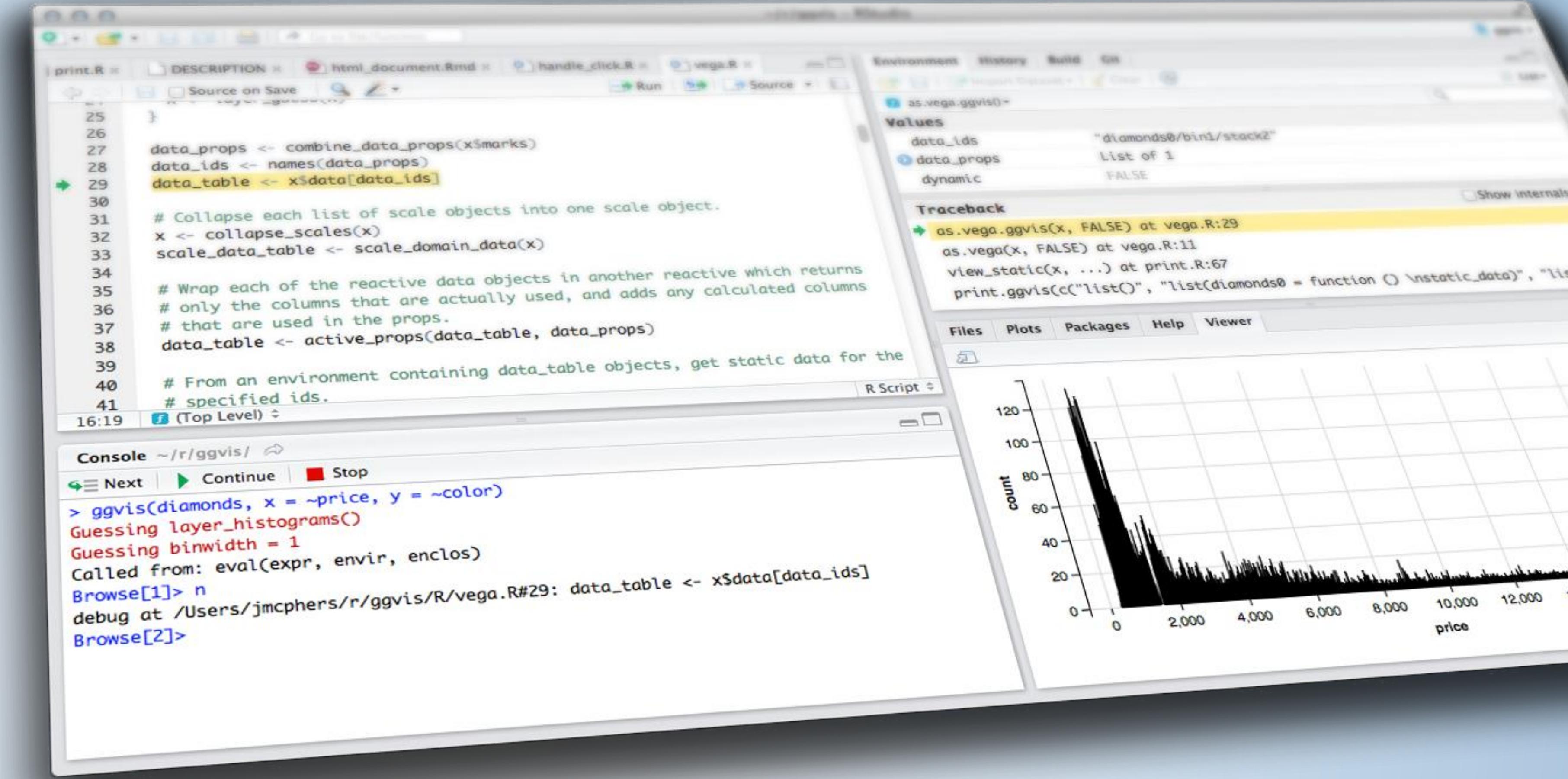


COURSE OVERVIEW

& INTRODUCTION TO GITHUB & SHINY



Shiny from 

OUTLINE

- ▶ Course Overview
 - ▶ Instructor
 - ▶ Course Schedule
- ▶ GitHub for Data Science
 - ▶ Read: Introduction to Github for Data Scientists by Rebecca Vickery
 - ▶ <https://towardsdatascience.com/introduction-to-github-for-data-scientists-2cf8b9b25fba>
- ▶ R Projects
- ▶ Shiny High level view
- ▶ Anatomy of a Shiny app
 - ▶ User interface
 - ▶ Server function
 - ▶ Running the app
- ▶ File Structure

Course Overview

HELLO

my name is

**GEOFFREY
ARNOLD**

geoffreylarnold
@twitter
gla@andrew.cmu.edu

ABOUT ME

- ▶ Coordinator of Strategic Analytics
 - ▶ Allegheny County
- ▶ MSPPM 2015
- ▶ Heinz College

COURSE SCHEDULE

Class 1 - 1/19 - Course Overview & Introduction to GitHub & Shiny

Class 2 - 1/26 - Reactive Programming & User Interfaces

Class 3 - 2/2 - Reactive Programming Pt. 2 & Dashboards

Class 4 - 2/9 - Interactive Visualizations & Advanced Reactivity

Class 5 - 2/16 - Leaflet & LeafletProxy

Class 6 - 2/23 - Bookmarking & Final Project Work

Class 7 - 3/2 - Connecting to Databases & API's

ASSIGNMENTS

- ▶ Homework 1: Create a basic ShinyApp
 - ▶ Due: 2/4
- ▶ Homework 2: Create a Dashboard
 - ▶ Due: 2/18
- ▶ Final Project: Create a ShinyApp with an Interactive Map
 - ▶ Due: 3/4

OFFICE HOURS

- ▶ Offer Regular Zoom help sometime during the week
- ▶ Offer a Course Slack Channel for “on-demand” help

Intro to Github



*“Experience with version control is fast
becoming a requirement for all data
scientists”*

—Rebecca Vickery

WHAT IS GITHUB?

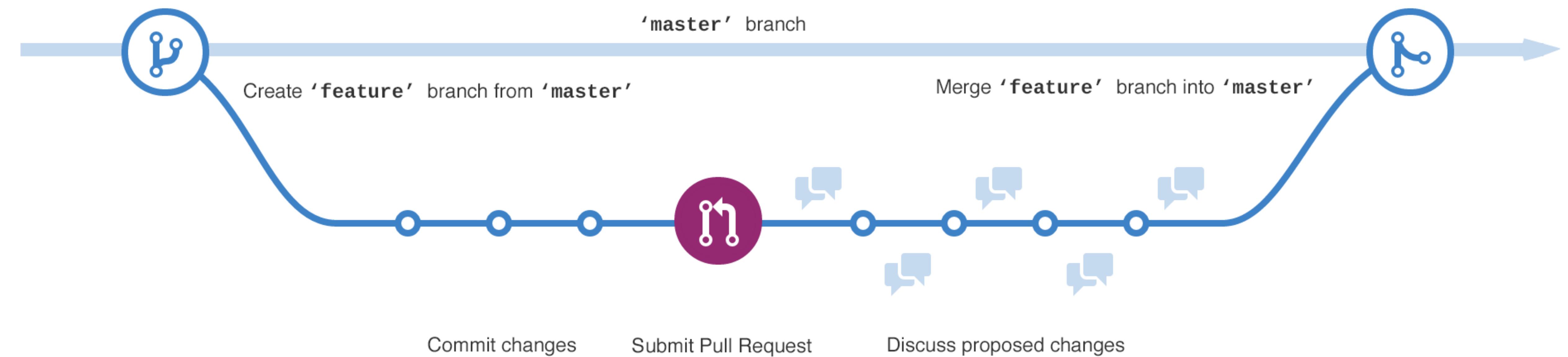
- Git is a Version Control Software
- Github stores the files for your project in a remote location and checks the differences as you change your code
- This allows you to roll back to previous versions of your project if you need to go back
- Makes sharing and collaboration much easier using the Github website

OTHER VERSION CONTROL

There are other kinds of version control software, GitLab also uses git.



We will be using Github in this course, but if in a future life, you might use these others.



Github Desktop

and the Web



EXERCISE

- ▶ Download Github Desktop: <https://desktop.github.com/>
- ▶ Sign up for Github: <https://github.com/join>
- ▶ Got to course page:
<https://github.com/orgs/RforOperations2022/>
 - ▶ Clone Class 2 repo:
<https://github.com/RforOperations2022/Class-2>
 - ▶ Create your own branch as your CMU username

5m 00s

Github and Projects in RStudio

“R Projects are great.”

–Geoffrey Arnold

R PROJECTS

- ▶ So what is all this?
 - ▶ Avoid messy environment
 - ▶ Keep custom functions in check
 - ▶ Don't lose your work just because you want to do something else
- ▶ Info: <https://support.rstudio.com/hc/en-us/articles/200526207-Using-Projects>

HOW DO PROJECTS WORK?

- ▶ R typically saves your environment information in a default location (typically your Documents folder)
- ▶ When you create a project it gets its own .RData file for the project in the Directory/folder you created
- ▶ This is also the default working directory for your project, so no need to put all of the folders its in
 - ▶ Simply load objects by name if they're in the project folder



EXERCISE

- ▶ Create a “New Project”
 - ▶ Select “New Directory”
 - ▶ Select “New Project”
 - ▶ Make sure the “Create a git repository” is selected
 - ▶ Give the project any name you want
 - ▶ Click “Create Project”
 - ▶ Look at the “Git” tab

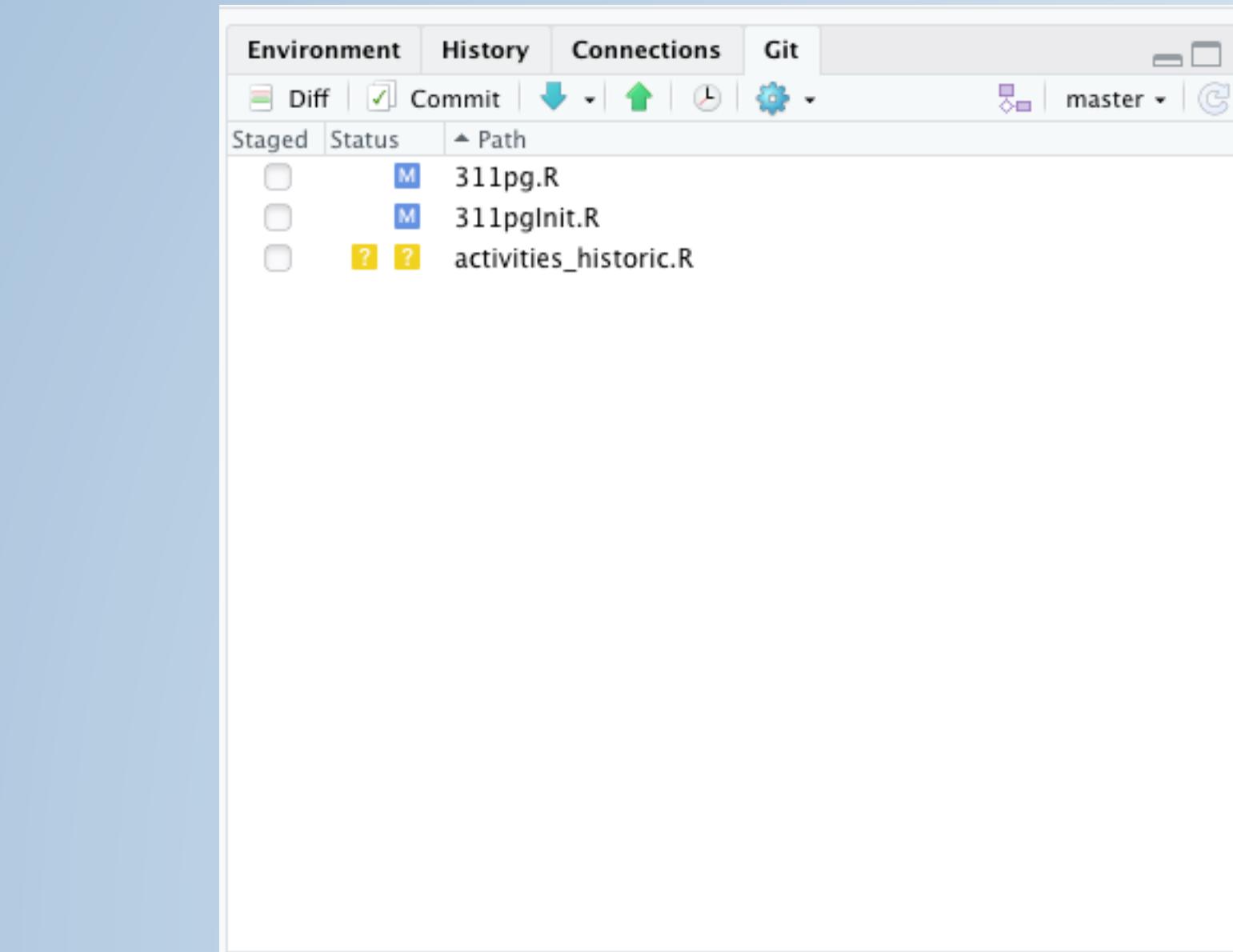
5m 00s



EXERCISE

- ▶ Click “File”
 - ▶ Click “New File”
 - ▶ Select “Shiny Web App”
 - ▶ Give the application a name and click “Create”
 - ▶ Click the “Git” tab
 - ▶ What’s change?

5m 00s



RStudio: Review Changes

Changes History master Stage Revert Ignore Pull Push

Staged	Status	Path
<input type="checkbox"/>	M	311pg.R
<input type="checkbox"/>	M	311pgInit.R
<input type="checkbox"/>	?	activities_historic.R

Commit message

Show Staged Unstaged Context 5 line ▲ Ignore Whitespace

```
@@ -0,0 +1,36 @@
1 require(RPostgreSQL)
2 require(jsonlite)
3 require(dplyr)
4
5 # PG Credentials
6 pg <- fromJSON("pg_creds.json")
7 api <- fromJSON('qalert.json')$key
8
9 # Connection
10 conn <- dbConnect(drv = "PostgreSQL", host = "pg.city.pittsburgh.pa.us", dbname = "postgres", port = 5432, user = pg$pgUser,
11 password = pg$pgPW)
12 sql <- 'SELECT DISTINCT(req.id)
13 FROM qalert.requests req
14 LEFT JOIN qalert.activity act
15     ON req.id = act."requestId"
16
17 WHERE req.id IS NOT NULL AND act.requestId IS NULL'
18
19 # Write new activities
20 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activity, append = TRUE)
21 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activity, append = TRUE, row.names = FALSE)
22
23 delete <- paste(unlist(unique(activity$id)), collapse = ", ") # Include Id's for new requests & non-master requests
24 sql <- paste0("DELETE FROM qalert.activity WHERE id IN (", delete, ")");
25 del <- RPostgreSQL::dbSendQuery(conn, sql) # Run delete statement
26
27 # Write new activities
28 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activity, append = TRUE)
29 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activity, append = TRUE, row.names = FALSE)
30
31 delete <- paste(unlist(unique(activities$id)), collapse = ", ") # Include Id's for new requests & non-master requests
32 sql <- paste0("DELETE FROM qalert.activity WHERE id IN (", delete, ")");
33 del <- RPostgreSQL::dbSendQuery(conn, sql)
34
35 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activities, row.names = FALSE, append = TRUE)
36 Sys.sleep(3)
```

Amend previous commit Commit

Show Staged Unstaged Context 5 line ▲ Ignore Whitespace

```
@@ -79,8 +79,8 @@ activity <- since$activity %>%
79 79 delete <- paste(unlist(unique(since$activity$id)), collapse = ", ") # Include Id's for new requests & non-master requests
80 80 sql <- paste0("DELETE FROM qalert.activity WHERE id IN (", delete, ")");
81 81 del <- RPostgreSQL::dbSendQuery(conn, sql) # Run delete statement
82 82
83 83 # Write new activities
84 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activity, append = TRUE)
85 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activity, append = TRUE, row.names = FALSE)
86
87 RPostgreSQL::dbDisconnect(conn)
88
89 No newline at end of file
```

Stage chunk Discard chunk

(conn, sql)\$id
https://pittsburghpa.qscend.com/qalert/api/v1/activities/get?key=' , api, "&reqid=" , id)
fromJSON(url) %>%
s") %>
e = as.POSIXct(actDateUnix, origin = "1970-01-01"))
20 delete <- paste(unlist(unique(activities\$id)), collapse = ", ") # Include Id's for new requests & non-master requests
21 sql <- paste0("DELETE FROM qalert.activity WHERE id IN (", delete, ")");
22 del <- RPostgreSQL::dbSendQuery(conn, sql)
23
24 RPostgreSQL::dbWriteTable(conn, c("qalert", "activity"), activities, row.names = FALSE, append = TRUE)
25 Sys.sleep(3)
26
27 dbDisconnect(conn)
28
29 No newline at end of file



EXERCISE

- ▶ Go to “Global Options”
 - ▶ Click “Git/SVN”
 - ▶ Ensure “Enable version control interface for Studio projects” is selected
 - ▶ Click “Create RSA Key...”
 - ▶ Click “Create”
 - ▶ Click “View public key” and copy key
 - ▶ Go to <https://github.com/settings/keys>
 - ▶ Click “New SSH key”
 - ▶ Paste key in text box and give your key a name
 - ▶ Click “Add SSH Key”
 - ▶ If you have two factor authorization turned on for GitHub (people with previous GitHub accounts may have this turned on) you will need your Personal Access Token to login later
 - ▶ Everyone else, your GitHub login and password will be important when logging in later.

5m 00s



EXERCISE

- ▶ Click the “Git” tab
 - ▶ Click “Commit”
 - ▶ Type a message into the “Commit message” box
 - ▶ Stage the files by making sure they are selected on the left
 - ▶ Click “Commit”
 - ▶ Click “Push”
 - ▶ Login to GitHub with either your password or personal access token

5m 00s

Github Desktop

The screenshot shows the GitHub desktop application interface. At the top, the menu bar includes File, Edit, View, Repository, Branch, and Help. The title bar displays the current repository as "desktop" and the current branch as "esc-pr" with a green checkmark and the number "#3972". A "Fetch origin" button indicates the last fetch was 2 minutes ago.

The main area has two tabs: "Changes" and "History". The "History" tab is selected, showing a list of commits:

- Appease linter
- Add event handler to dropdown component
- Move escape behavior to correct component
- Remove event handler from the branches..
- Merge branch 'master' into esc-pr
- Merge pull request #4044 from desktop/...
- Merge pull request #4070 from desktop/...
- bump to beta3
- Merge pull request #4057 from desktop/...
- Merge pull request #4067 from desktop/...
- Release to 1.1.0-beta2

Details for the "Add event handler to dropdown component" commit are expanded:

Commit Details: iAmWillShepherd and Markus Olsson committed c79e71c 1 changed file
Co-Authored-By: Markus Olsson <niik@users.noreply.github.com>

File: app\src\ui\toolbar\dropdown.tsx

Diff View:

Line	Line	Text
145	145	@@ -145,6 +145,10 @@ export class ToolbarDropdown extends React.Component<
146	146	this.state = { clientRect: null }
147	147	}
148	148	+ private get isOpen() {
149	149	+ return this.props.dropdownState === 'open'
150	150	+ }
151	151	+
148	152	152 private dropdownIcon(state: DropdownState): OcticonSymbol {
149	153	153 // @TODO: Remake triangle octicon in a 12px version,
150	154	154 // right now it's scaled badly on normal dpi monitors.
249	253	@@ -249,6 +253,13 @@ export class ToolbarDropdown extends React.Component<
250	254	}
251	255	}
256	256	+ private onFoldoutKeyDown = (event: React.KeyboardEvent<HTMLElement>) => {
257	257	+ if (!event.defaultPrevented && this.isOpen && event.key === 'Escape') {
258	258	+ event.preventDefault()

Github in the command line / terminal

WHAT'S THE COMMAND LINE

- ▶ Command or terminal git commands are how git was first used.
- ▶ You don't need to know how to do these things as either the “Git” tab in RStudio or the Github desktop program provides a GUI (gooey user interface) for you.
- ▶ However, knowing the hard way to do something never hurt anybody.



EXERCISE

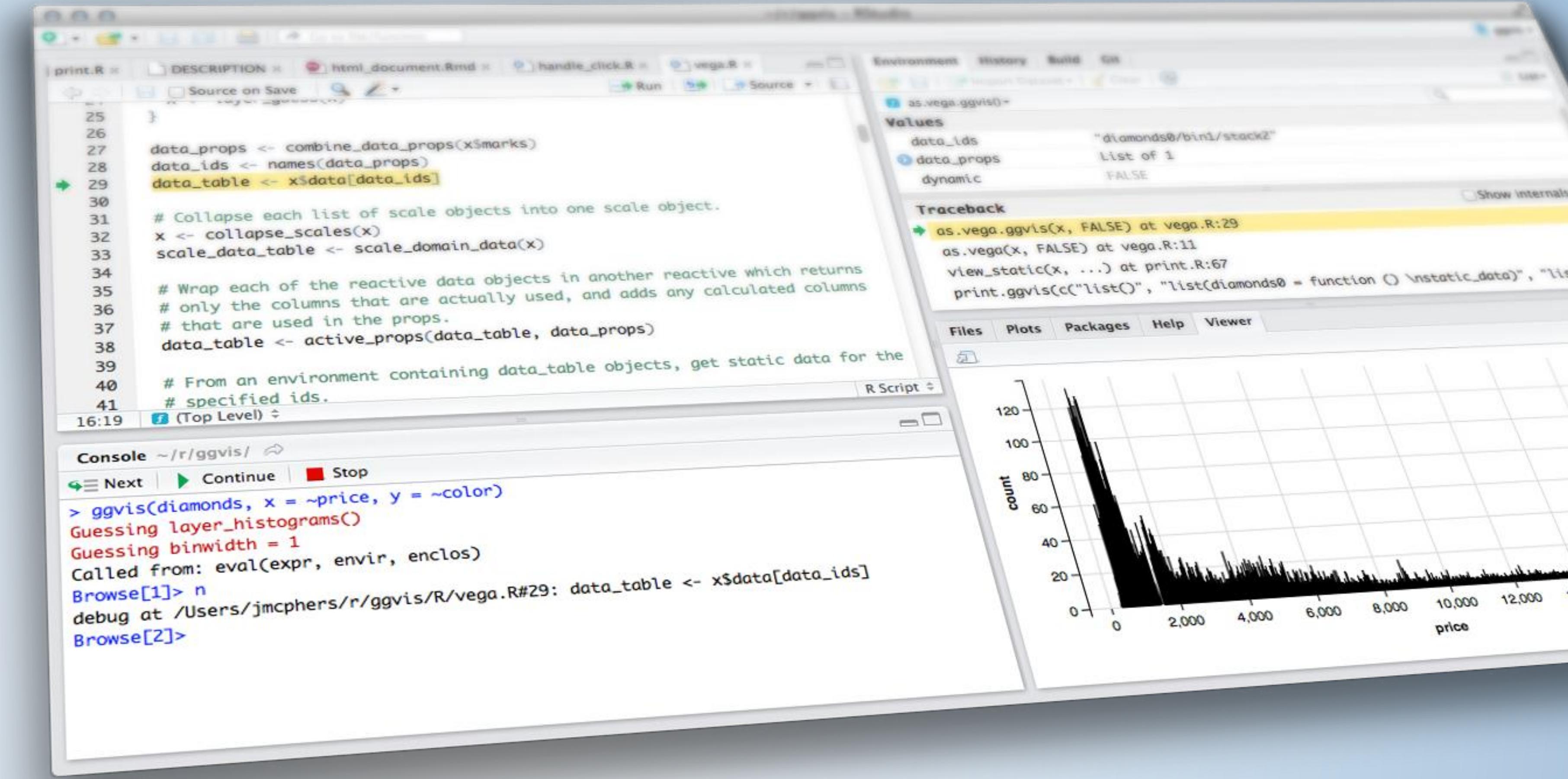
- ▶ <https://learngitbranching.js.org/>
- ▶ Complete Introduction Sequences
 - ▶ Git Commits
 - ▶ Branching Git
 - ▶ Merging in Git

5_m 00_s

Shiny Examples

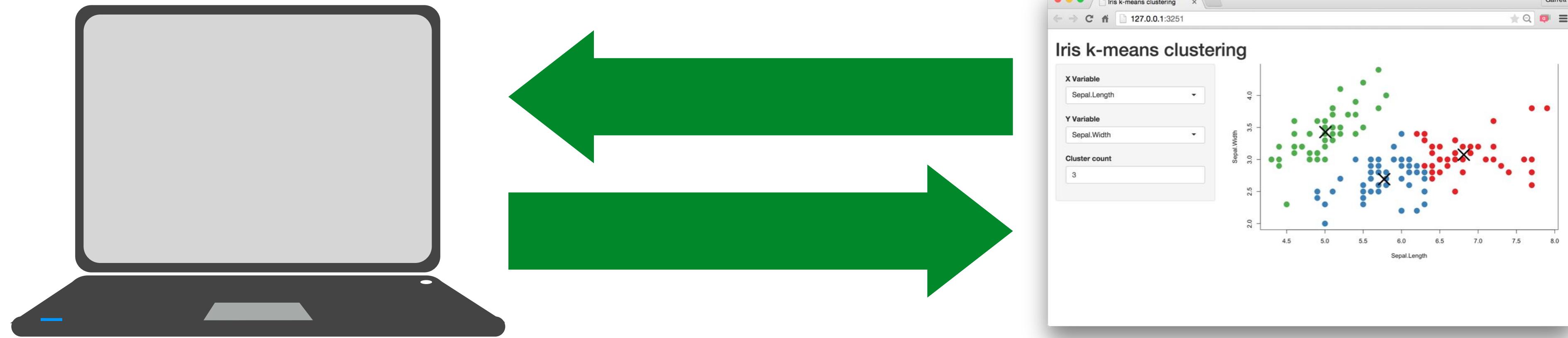
- [Burghs Eye View](#)
- [Covid-19 Tracker](#)
- [Port Authority Bus Tracker](#)
- [British Columbia CCISS Tool](#)
- [Commute Explorer](#)

CLASS BREAK

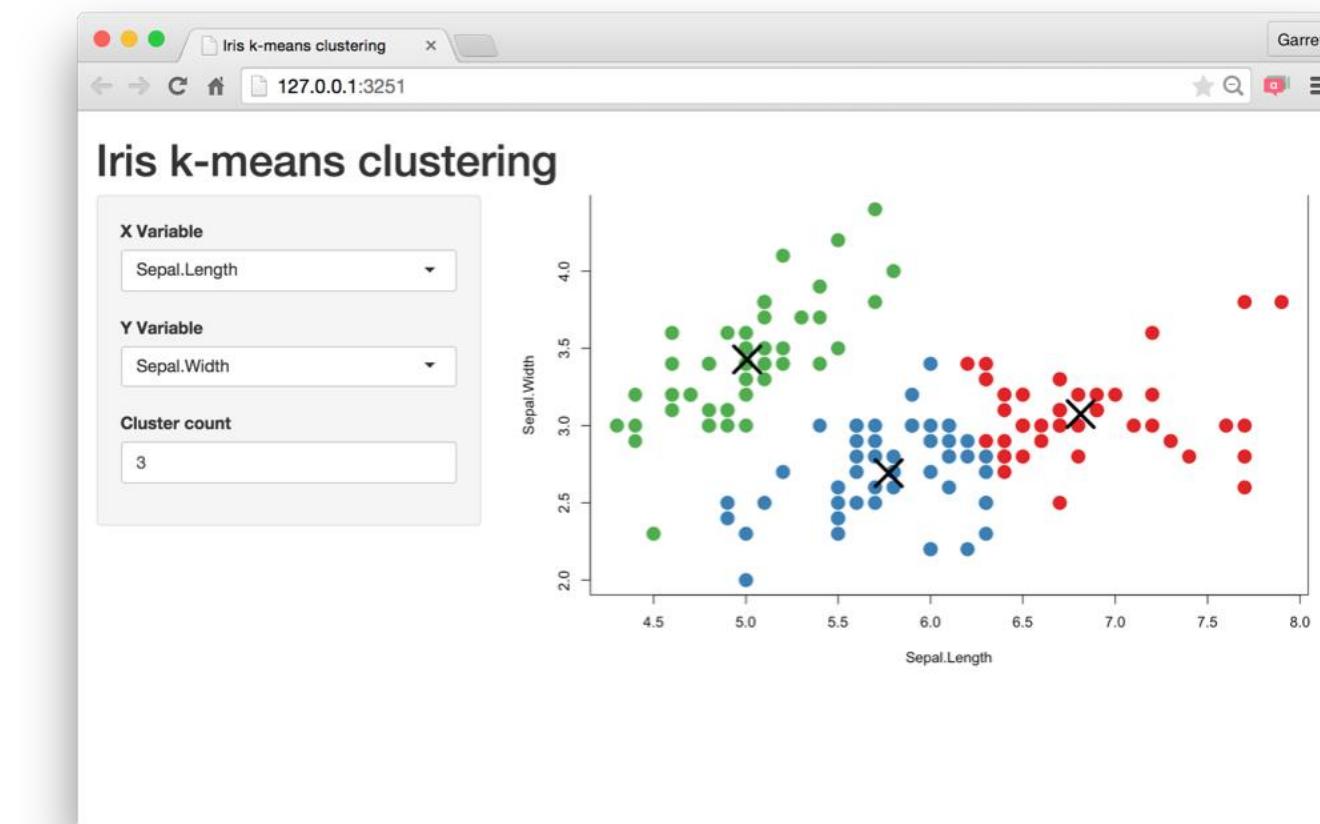
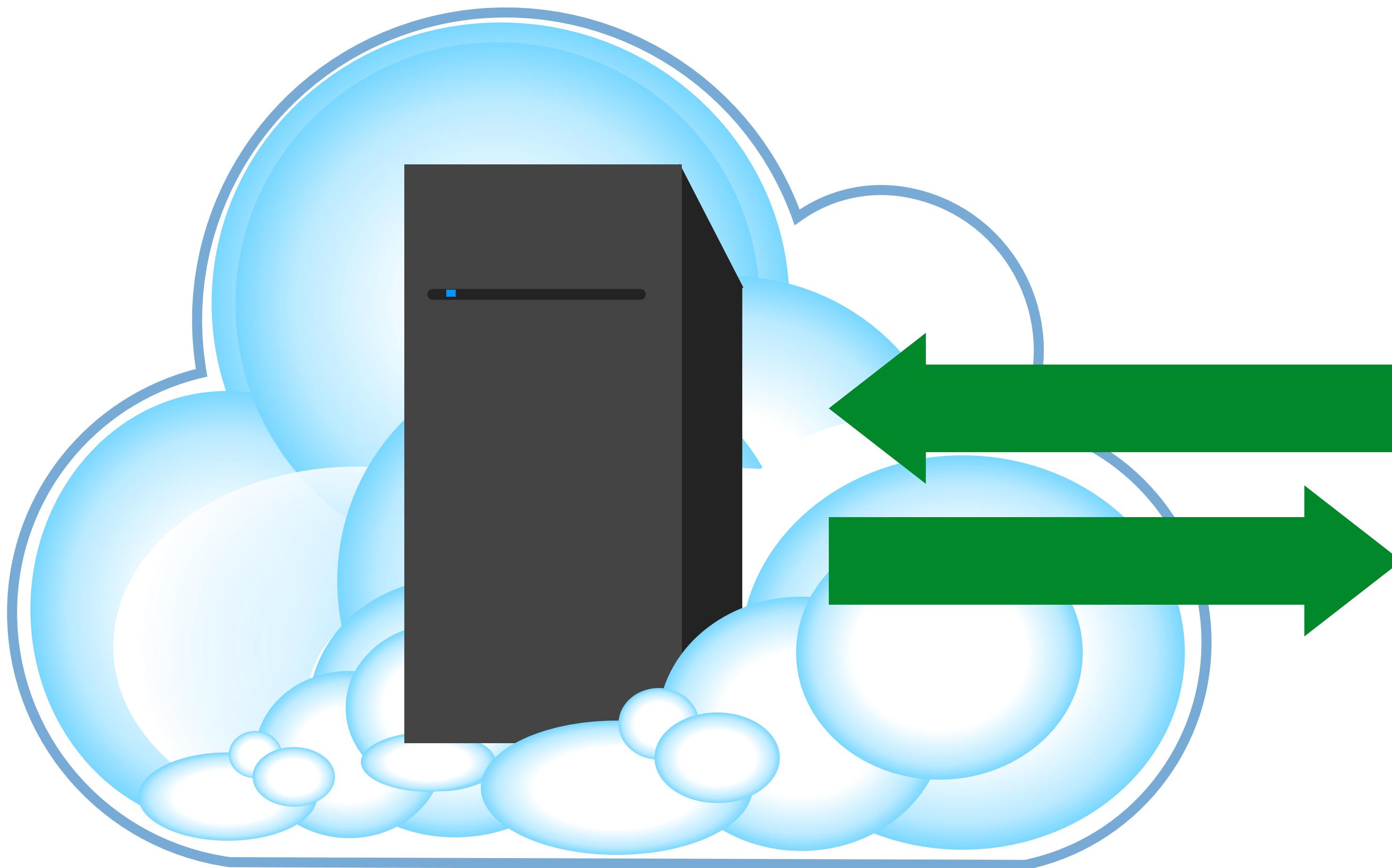


Shiny High level
view

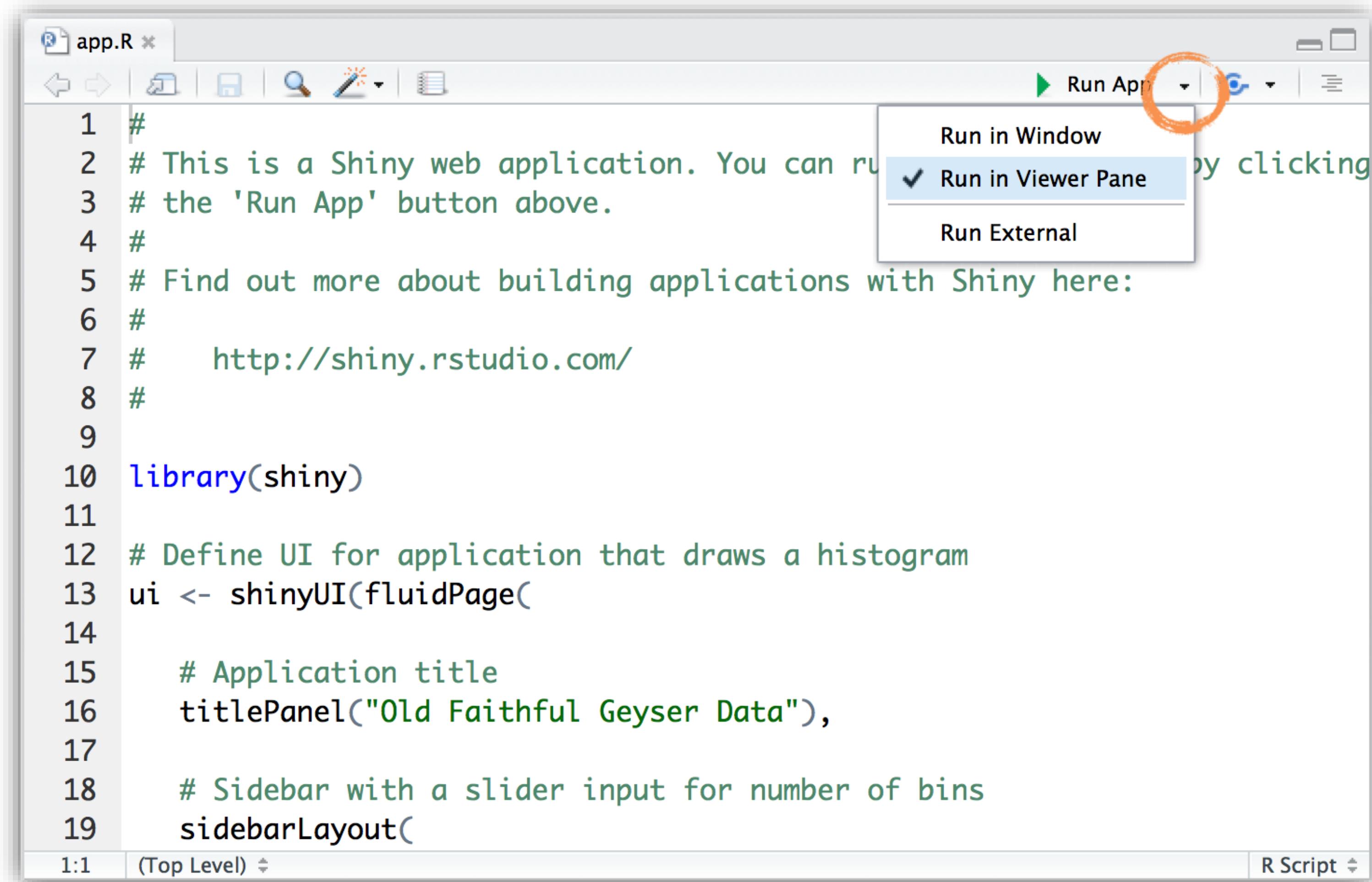
Every Shiny app is maintained by a computer running R



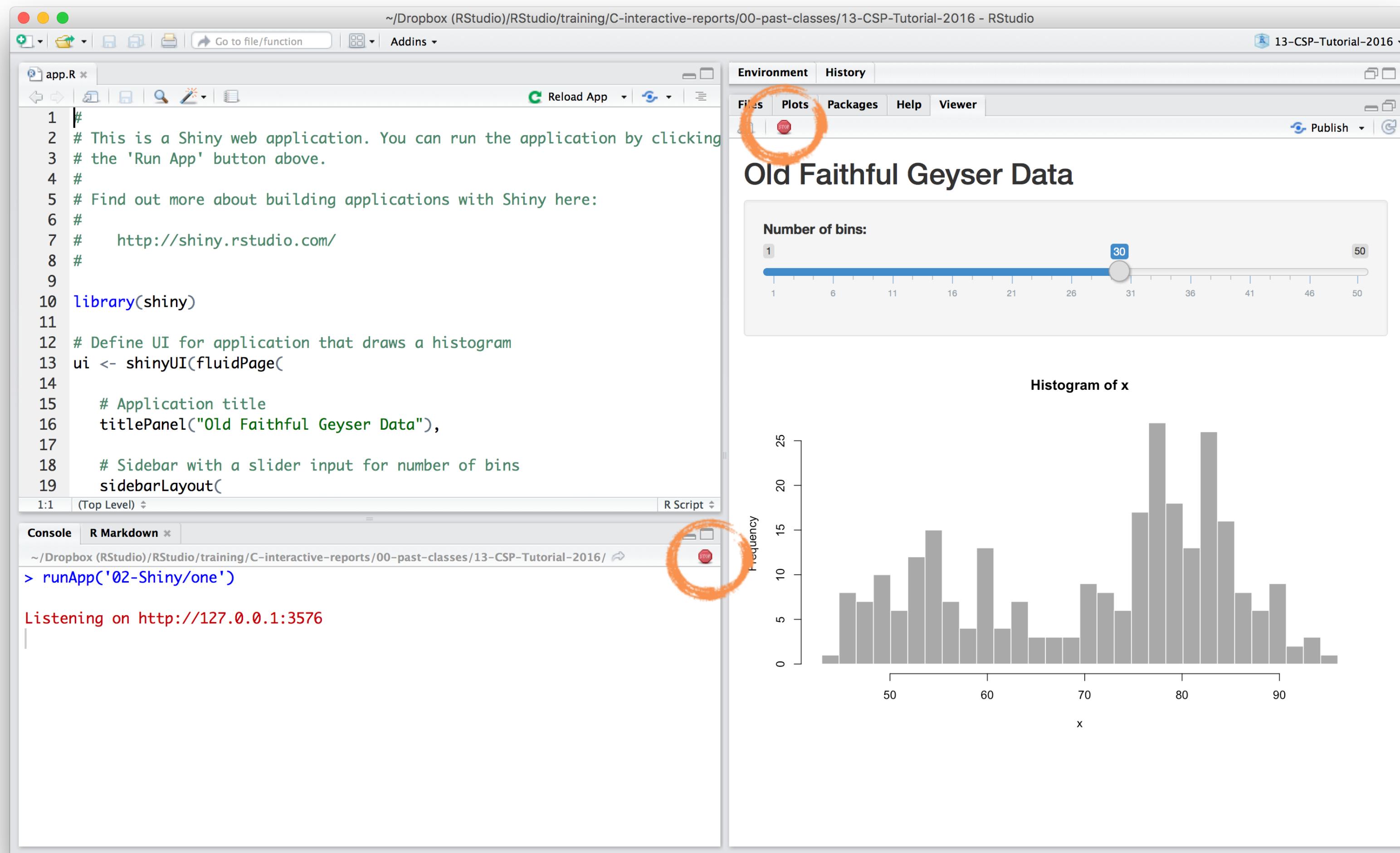
Every Shiny app is maintained by a computer running R



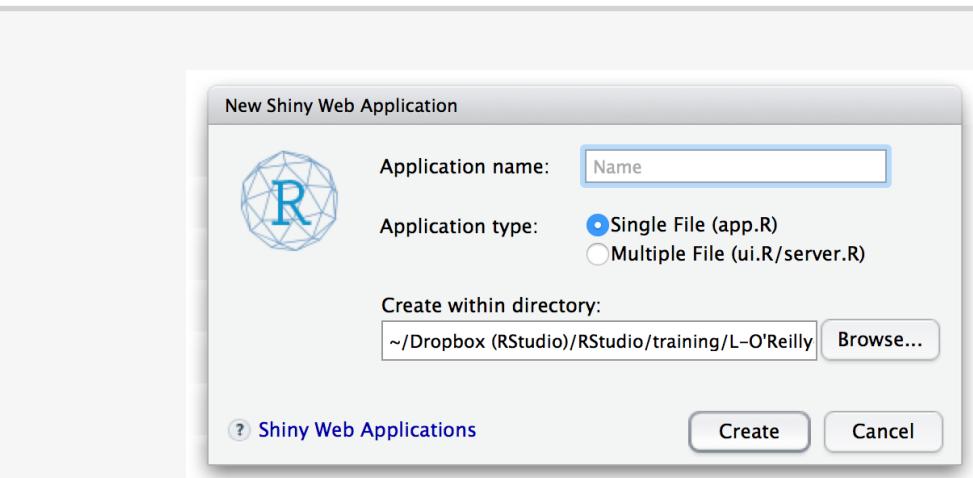
Change display



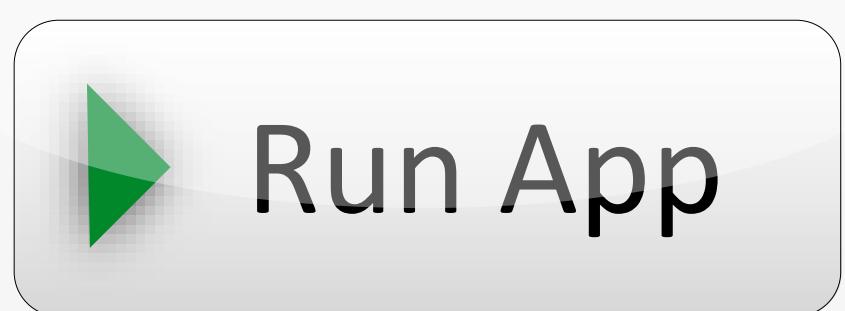
Close an app



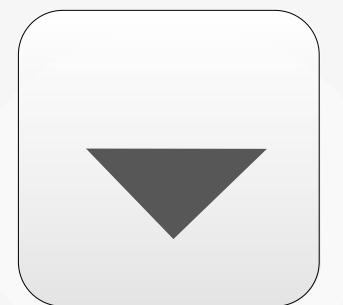
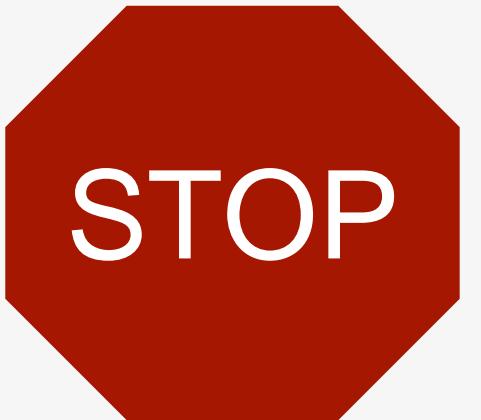
EXERCISE



Open a new Shiny app with
File ➔ New File ➔ Shiny Web App...



Launch the app by opening app.R and
clicking **Run App**



Close app by clicking the stop sign icon

Select view mode in the drop down
menu next to Run App

3m 00s

Anatomy of a Shiny app

WHAT'S IN AN APP?

```
library(shiny)  
ui <- fluidPage()
```

```
server <- function(input, output) {}
```

```
shinyApp(ui = ui, server = server)
```

User interface

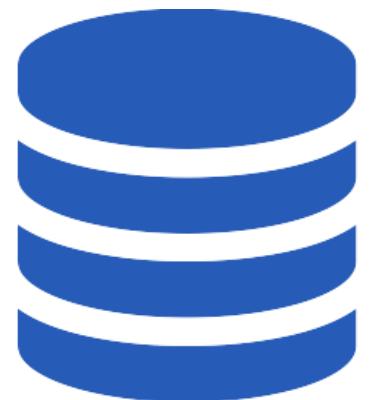
controls the layout and appearance of app

Server function

contains instructions needed to build app

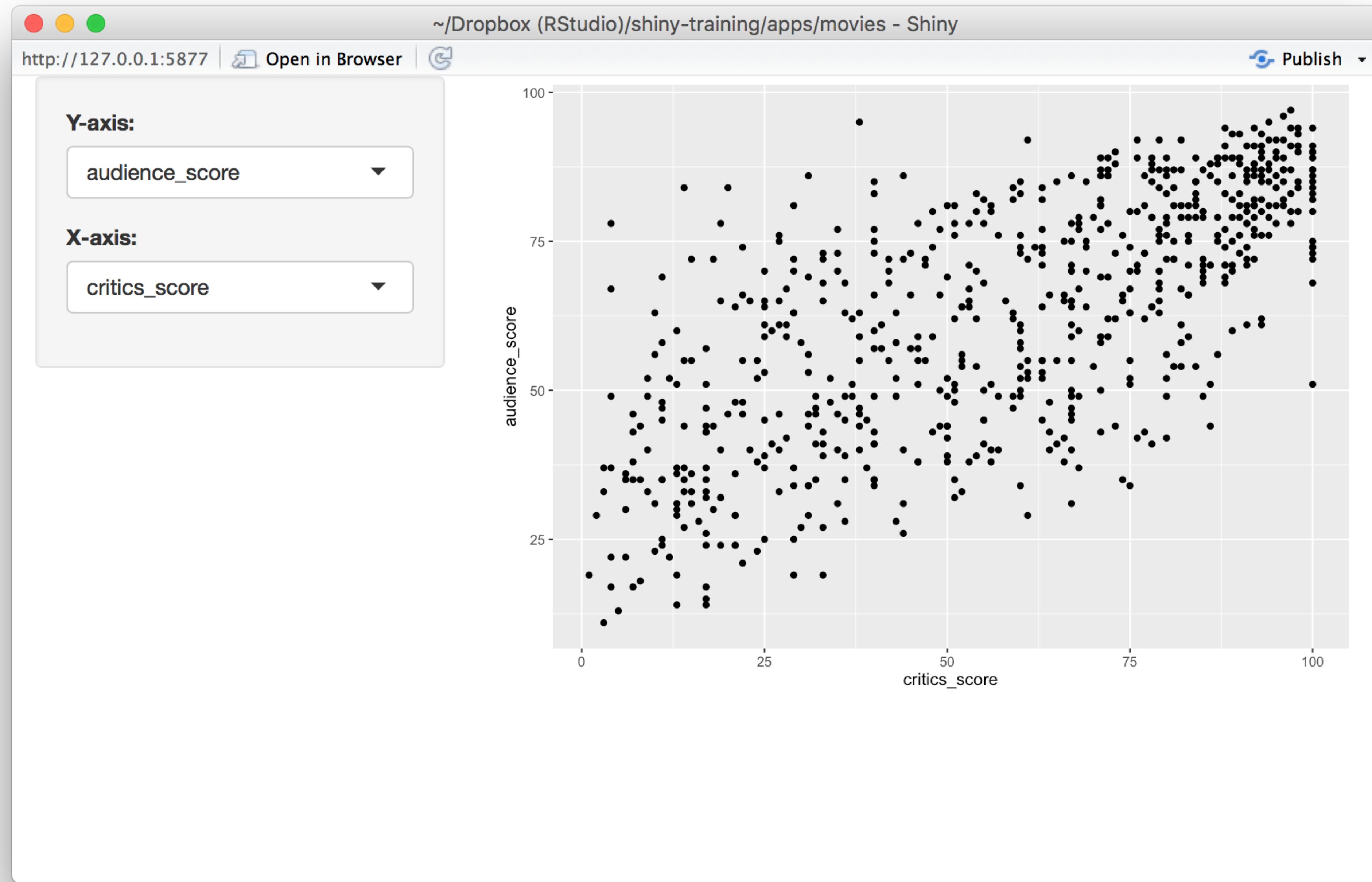


Let's build a simple movie browser app!



movies.Rdata

Data from IMDB and Rotten Tomatoes on random sample of 651 movies released in the US between 1970 and 2014

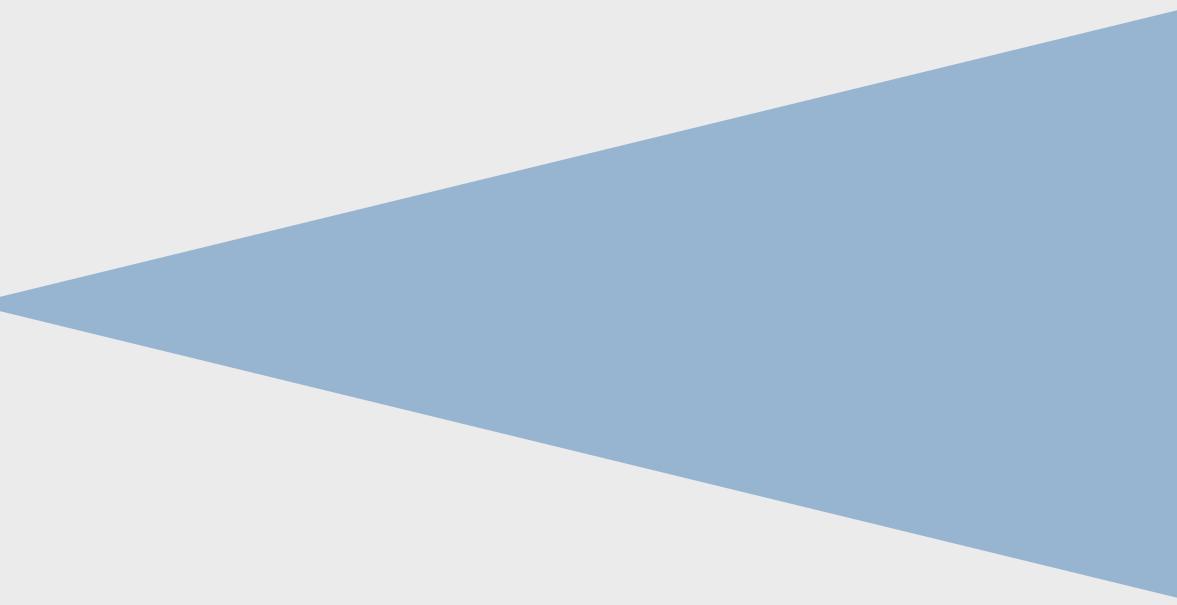


APP TEMPLATE

```
library(shiny)  
library(ggplot2)  
load("movies.Rdata")  
ui <- fluidPage()
```

```
server <- function(input, output) {}
```

```
shinyApp(ui = ui, server = server)
```



Dataset used for this app

User interface

```
# Define UI for application that plots features of movies
ui <- fluidPage(

  # Sidebar layout with a input and output definitions
  sidebarLayout(
    # Inputs: Select variables to plot
    sidebarPanel(
      # Select variable for y-axis
      selectInput(inputId = "y", label = "Y-axis:",
                  choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
                  selected = "audience_score"),
      # Select variable for x-axis
      selectInput(inputId = "x", label = "X-axis:",
                  choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
                  selected = "critics_score")
    ),
    # Output: Show scatterplot
    mainPanel(
      plotOutput(outputId = "scatterplot")
    )
  )
)
```

```
# Define UI for application that plots features of movies
ui <- fluidPage(
  # Sidebar layout with a input and output definitions
  sidebarLayout(
    # Inputs: Select variables to plot
    sidebarPanel(
      # Select variable for y-axis
      selectInput(inputId = "y", label = "Y-axis:",
                  choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
                  selected = "audience_score"),
      # Select variable for x-axis
      selectInput(inputId = "x", label = "X-axis:",
                  choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
                  selected = "critics_score")
    ),
    # Output: Show scatterplot
    mainPanel(
      plotOutput(outputId = "scatterplot")
    )
  )
)
```

Create fluid page layout

```
# Define UI for application that plots features of movies
ui <- fluidPage

# Sidebar layout with a input and output definitions
sidebarLayout(
  # Inputs: Select variables to plot
  sidebarPanel(
    # Select variable for y-axis
    selectInput(inputId = "y", label = "Y-axis:",
               choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
               selected = "audience_score"),
    # Select variable for x-axis
    selectInput(inputId = "x", label = "X-axis:",
               choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
               selected = "critics_score")
  ),
  # Output: Show scatterplot
  mainPanel(
    plotOutput(outputId = "scatterplot")
  )
)
```

Create a layout with a sidebar and main area

```
# Define UI for application that plots features of movies
ui <- fluidPage(
  # Sidebar layout with a input and output definitions
  sidebarLayout(
    # Inputs: Select variables to plot
    sidebarPanel(
      # Select variable for y-axis
      selectInput(inputId = "y", label = "Y-axis:",
                 choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
                 selected = "audience_score"),
      # Select variable for x-axis
      selectInput(inputId = "x", label = "X-axis:",
                 choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
                 selected = "critics_score")
    ),
    # Output: Show scatterplot
    mainPanel(
      plotOutput(outputId = "scatterplot")
    )
  )
)
```

Create a sidebar panel containing **input** controls that can in turn be passed to **sidebarLayout**

```
# Define UI for application that plots features of movies
ui <- fluidPage

# Sidebar layout with a input and output definitions
sidebarLayout(
  # Inputs: Select variables to plot
  sidebarPanel(
    # Select variable for y-axis
    selectInput(inputId = "y", label = "Y-axis:",
               choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
               selected = "audience_score"),
    # Select variable for x-axis
    selectInput(inputId = "x", label = "X-axis:",
               choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
               selected = "critics_score")
  ),
  # Output: Show scatterplot
  mainPanel(
    plotOutput(outputId = "scatterplot")
  )
)
```

The screenshot shows a Shiny application interface. On the left is a sidebar titled "Inputs: Select variables to plot". It contains two dropdown menus. The top dropdown, labeled "Y-axis:", has "audience_score" selected. The bottom dropdown, labeled "X-axis:", has "critics_score" selected. Both dropdowns have arrows pointing up and down, indicating they are interactive. The background of the sidebar is light gray, while the dropdown boxes are white with a thin gray border. The overall interface is clean and modern.

```
# Define UI for application that plots features of movies
ui <- fluidPage

# Sidebar layout with a input and output definitions
sidebarLayout(
  # Inputs: Select variables to plot
  sidebarPanel(
    # Select variable for y-axis
    selectInput(inputId = "y", label = "Y-axis:",
               choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
               selected = "audience_score"),
    # Select variable for x-axis
    selectInput(inputId = "x", label = "X-axis:",
               choices = c("imdb_rating", "imdb_num_votes", "critics_score", "audience_score", "runtime"),
               selected = "critics_score")
  ),
  # Output: Show scatterplot
  mainPanel(
    plotOutput(outputId = "scatterplot")
  )
)
```

Create a main panel containing **output** elements that get created in the server function can in turn be passed to sidebarLayout

Server function

```
# Define server function required to create the scatterplot
server <- function(input, output) {

  # Create the scatterplot object the plotOutput function is expecting
  output$scatterplot <- renderPlot({
    ggplot(data = movies, aes_string(x = input$x, y = input$y)) +
      geom_point()
  })
}
```

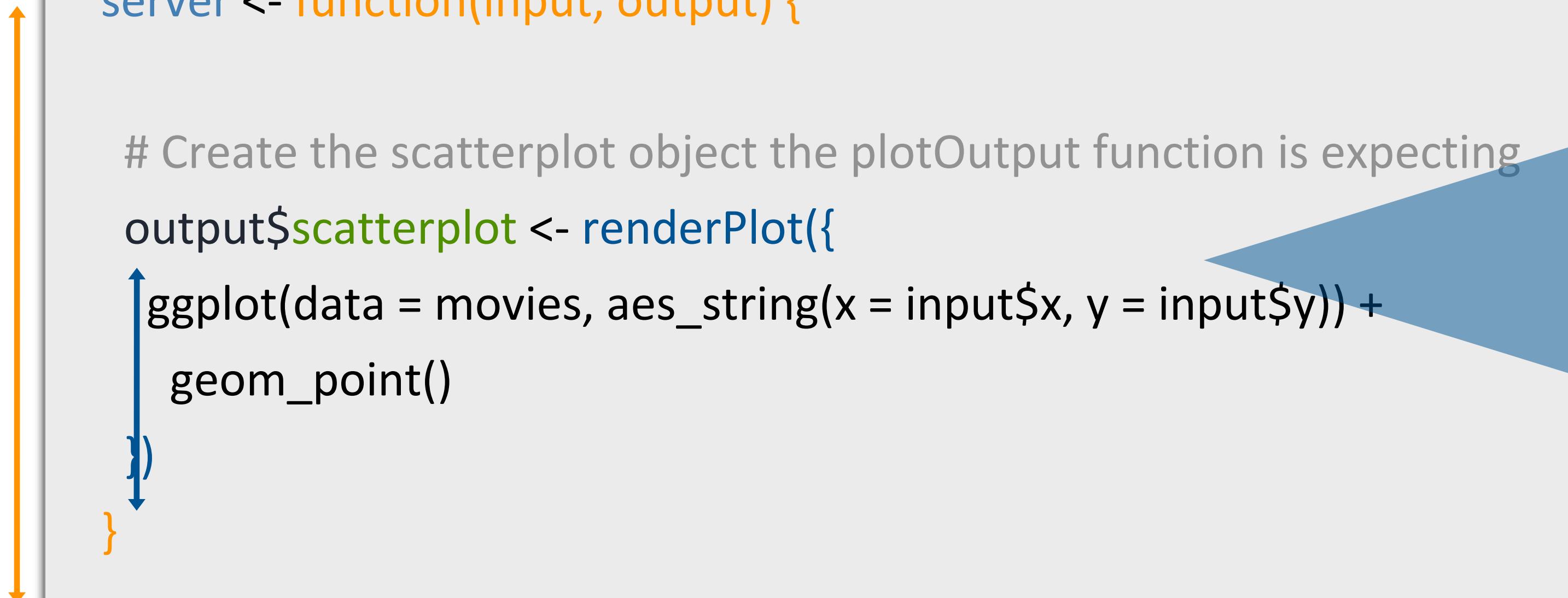
```
# Define server function required to create the scatterplot
server <- function(input, output) {
  # Create the scatterplot object the plotOutput function is expecting
  output$scatterplot <- renderPlot({
    ggplot(data = movies, aes_string(x = input$x, y = input$y)) +
      geom_point()
  })
}
```



Contains instructions
needed to build app

```
# Define server function required to create the scatterplot
server <- function(input, output) {

  # Create the scatterplot object the plotOutput function is expecting
  output$scatterplot <- renderPlot({
    ggplot(data = movies, aes_string(x = input$x, y = input$y)) +
      geom_point()
  })
}
```



Renders a **reactive** plot that is suitable for assigning to an output slot

```
# Define server function required to create the scatterplot
server <- function(input, output) {

  # Create the scatterplot object the plotOutput function is expecting
  output$scatterplot <- renderPlot({
    ggplot(data = movies, aes_string(x = input$x, y = input$y)) +
      geom_point()
  })
}
```

Good ol' ggplot2 code,
with **inputs** from UI

Running the app

```
# Run the application  
shinyApp(ui = ui, server = server)
```



DEMO

Putting it all together...

movies_01.R



EXERCISE

- ▶ Add new select menu to color the points by
 - ▶ `inputId = "z"`
 - ▶ `label = "Color by:"`
 - ▶ `choices = c("title_type", "genre", "mpaa_rating", "critics_rating", "audience_rating")`
 - ▶ `selected = "mpaa_rating"`
- ▶ Use this variable in the aesthetics of the `ggplot` function as the `color` argument to color the points by
- ▶ Run the app in the Viewer Pane
- ▶ Compare your code / output with the person sitting next to / nearby you

5m 00s

A large, light gray checkmark icon inside a circle, indicating a correct or completed status.

SOLUTION

Solution to the previous exercise

`movies_02.R`

INPUTS

Interactive Web Apps with shiny Cheat Sheet
learn more at shiny.rstudio.com

R Studio
Basics

A Shiny app is a web page (UI) connected to a computer running a live R session (Server)

Users can manipulate UI, which will cause the server to update the UI displays (by running R code).

App template
Begin writing a new app with this template. Preview the app by running the code at the command line.

```
library(shiny)
ui <- fluidPage()
server <- function(input, output) {
  shinyApp(ui = ui, server = server)
}
```

• ui - needs R functions that assemble an HTML user interface for your app

• server - a function with instructions on how to build and return the data you want displayed in the UI

• shinyApp - combines UI and server into a functioning app. Wrap with runApp() if calling from a sourced script or inside a function.

Share your app
1. Create a free or professional account at <http://shinyapps.io>
2. Click the Publish icon in the RStudio IDE (if >0.99) or run rsconnect::deployApp("path to directory")

Build or purchase your own Shiny Server at www.rstudio.com/products/shiny-server/

RSStudio® is a trademark of RStudio, Inc. • CC-BY-RStudio • info@rstudio.com • 844-448-3222 • studio.com

More cheat sheets at <http://www.rstudio.com/resources/cheatsheets/>

Learn more at shiny.rstudio.com/tutorial/shiny-0.12.0/ • updated: 01/26

Action

actionButton(inputId, label, icon, ...)

Link

actionLink(inputId, label, icon, ...)

- Choice 1
- Choice 2
- Choice 3

- Check me

checkboxInput(inputId, label, value)

dateInput(inputId, label, value, min, max, format, startview, weekstart, language)

dateRangeInput(inputId, label, start, end, min, max, format, startview, weekstart, language, separator)

fileInput(inputId, label, multiple, accept)

1

.....

- Choice A
- Choice B
- Choice C

Choice 1

Choice 1

Choice 2

0 5 10
0 2 4 6 8 10

Apply Changes

Enter text

numericInput(inputId, label, value, min, max, step)

passwordInput(inputId, label, value)

radioButtons(inputId, label, choices, selected, inline)

selectInput(inputId, label, choices, selected, multiple, selectize, width, size) (also **selectizeInput()**)

sliderInput(inputId, label, min, max, value, step, round, format, locale, ticks, animate, width, sep, pre, post)

submitButton(text, icon)

(Prevents reactions across entire app)

textInput(inputId, label, value)



EXERCISE

- ▶ Add new input variable to control the alpha level of the points
 - ▶ This should be a sliderInput
 - ▶ See shiny.rstudio.com/reference/shiny/latest/ for help
 - ▶ Values should range from 0 to 1
 - ▶ Set a default value that looks good
- ▶ Use this variable in the geom of the ggplot function as the alpha argument
- ▶ Run the app in a new window
- ▶ Compare your code / output with the person sitting next to / nearby you

5m 00s

A large, light gray checkmark icon inside a circle, positioned in the top-left corner.

SOLUTION

Solution to the previous exercise

`movies_03.R`

OUTPUTS

The banner contains several screenshots:

- Interactive Web Apps with shiny Cheat Sheet**: A screenshot of the RStudio interface showing the "shiny" cheat sheet.
- Building an App**: A screenshot of the RStudio interface showing the "Building an App" template.
- R logo**: A large blue R logo.
- renderImage(expr, env, quoted, deleteFile)**: A screenshot of a histogram.
- renderPlot(expr, width, height, res, ..., env, quoted, func)**: A screenshot of a histogram.
- renderPrint(expr, env, quoted, func, width)**: A screenshot of a table.
- renderTable(expr, ..., env, quoted, func)**: A screenshot of a table.
- foo**: A screenshot of a text input field.
- renderText(expr, env, quoted, func)**: A screenshot of a text input field.
- renderUI(expr, env, quoted, func)**: A screenshot of a slider input.

DT::renderDataTable(expr, options, callback, escape, env, quoted)

works with

dataTableOutput(outputId, icon, ...)

imageOutput(outputId, width, height, click, dblclick, hover, hoverDelay, hoverDelayType, brush, clickId, hoverId, inline)

plotOutput(outputId, width, height, click, dblclick, hover, hoverDelay, hoverDelayType, brush, clickId, hoverId, inline)

verbatimTextOutput(outputId)

tableOutput(outputId)

textOutput(outputId, container, inline)

uiOutput(outputId, inline, container, ...)

& htmlOutput(outputId, inline, container, ...)



EXERCISE

- ▶ Add a checkbox input to decide whether the data plotted should be shown in a data table
 - ▶ This should be a checkboxInput (see shiny.rstudio.com/reference/shiny/latest/ for help)
- ▶ Create a new output item using DT::renderDataTable, an if statement to check if the box is checked, and DT::datatable
 - ▶ Show first seven columns of movies data, show 10 rows at a time, and hide row names, e.g.
 - ▶ `data = movies[, 1:7]`
 - ▶ `options = list(pageLength = 10)`
 - ▶ `rownames = FALSE`
- ▶ Add a dataTableOutput to the main panel
- ▶ Run the app in a new Window, check and uncheck the box to test functionality
- ▶ Compare your code / output with the person sitting next to / nearby you
- ▶ **Optional:** If you finish early, move on to the next exercise

5m 00s

A large, light gray checkmark icon inside a circle, indicating a correct answer or solution.

SOLUTION

Solution to the previous exercise

`movies_04.R`



EXERCISE

Optional: If you finish the previous exercise early

- ▶ Add a title to your app with titlePanel, which goes before the sidebarLayout
- ▶ Prettify the variable names shown as input choices. *Hint:*
 - ▶ `choices = c("IMDB rating" = "imdb_rating", ...)`
- ▶ Prettify the axis and legend labels of your plot. *Hint:* You might use
 - ▶ `str_replace_all` from the `stringr` package
 - ▶ `toTitleCase` from the `tools` package

5m 00s

A large, light gray checkmark icon inside a circle, indicating a correct answer or solution.

SOLUTION

Solution to the previous exercise

`movies_05.R`

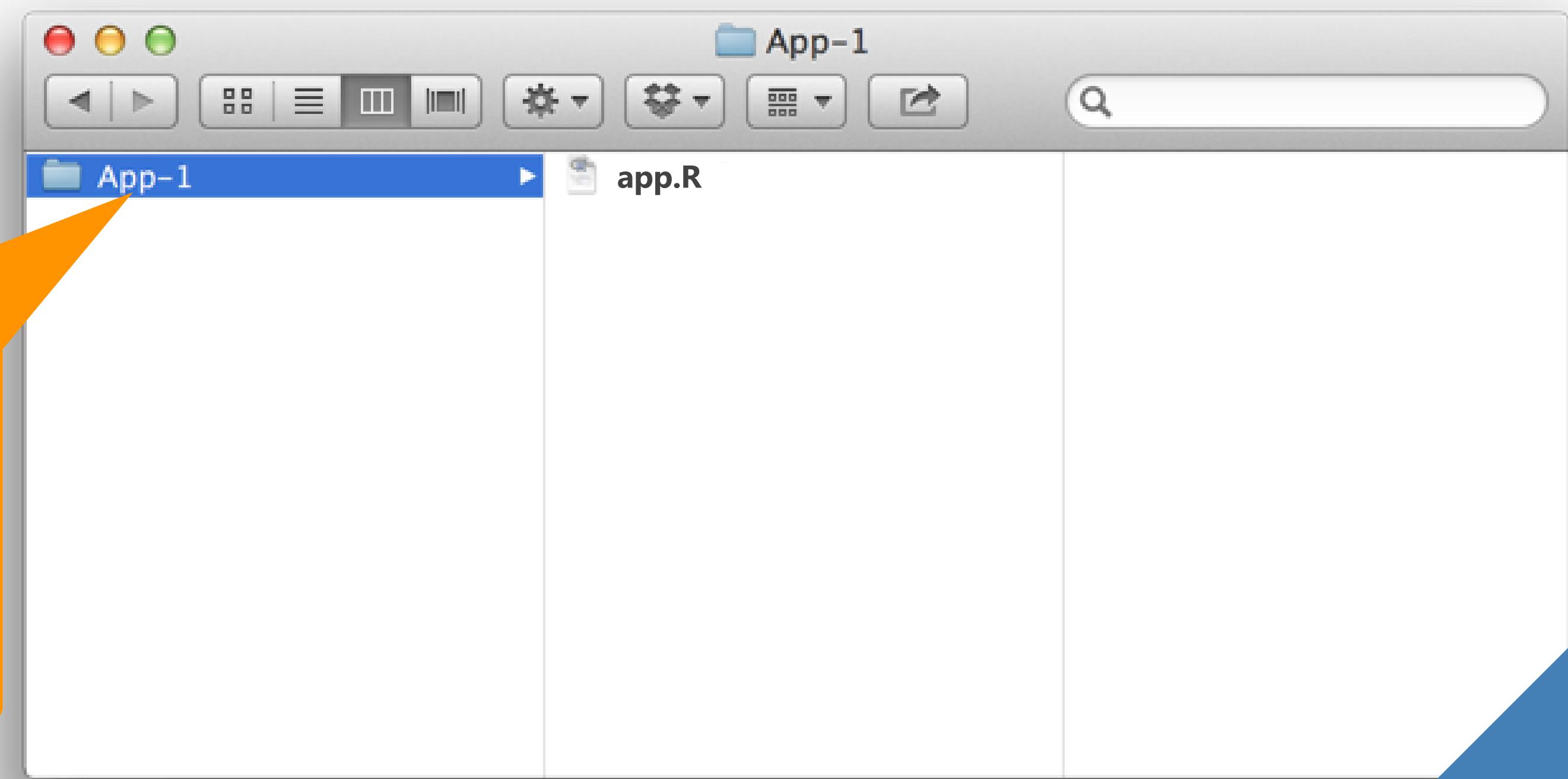
File structure

SAVING YOUR SINGLE FILE APP

One directory with every file the app needs:

- ▶ `app.R` (your script which ends with a call to `shinyApp()`)
- ▶ datasets, images, css, helper scripts, etc.

We will focus on
the single file
format throughout
the course

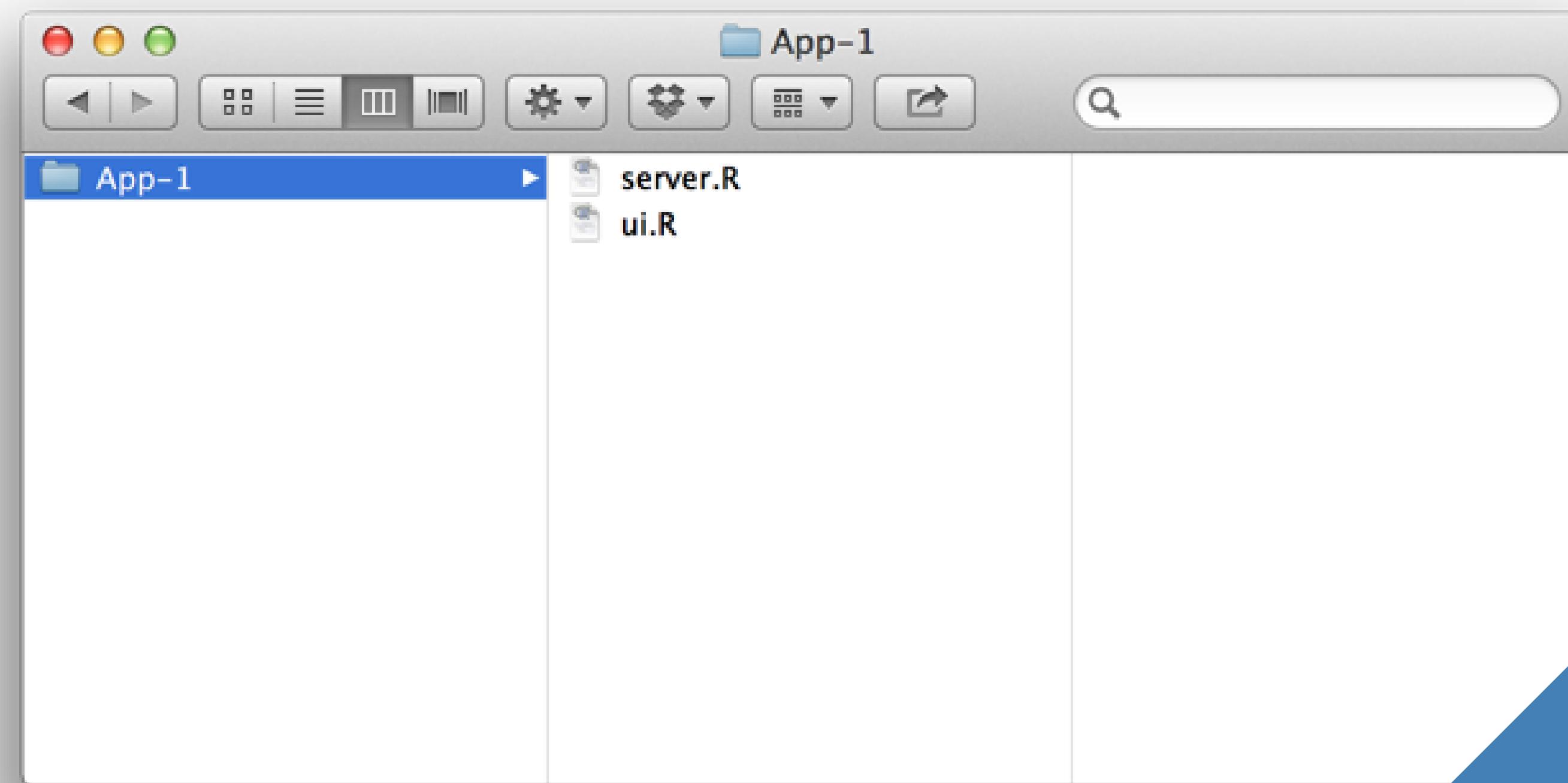


You must use this
exact name (`app.R`)
for deploying the app

SAVING YOUR MULTIPLE FILE APP

One directory with every file the app needs:

- ▶ ui.R and server.R
- ▶ datasets, images, css, helper scripts, etc.



You must use these
exact names

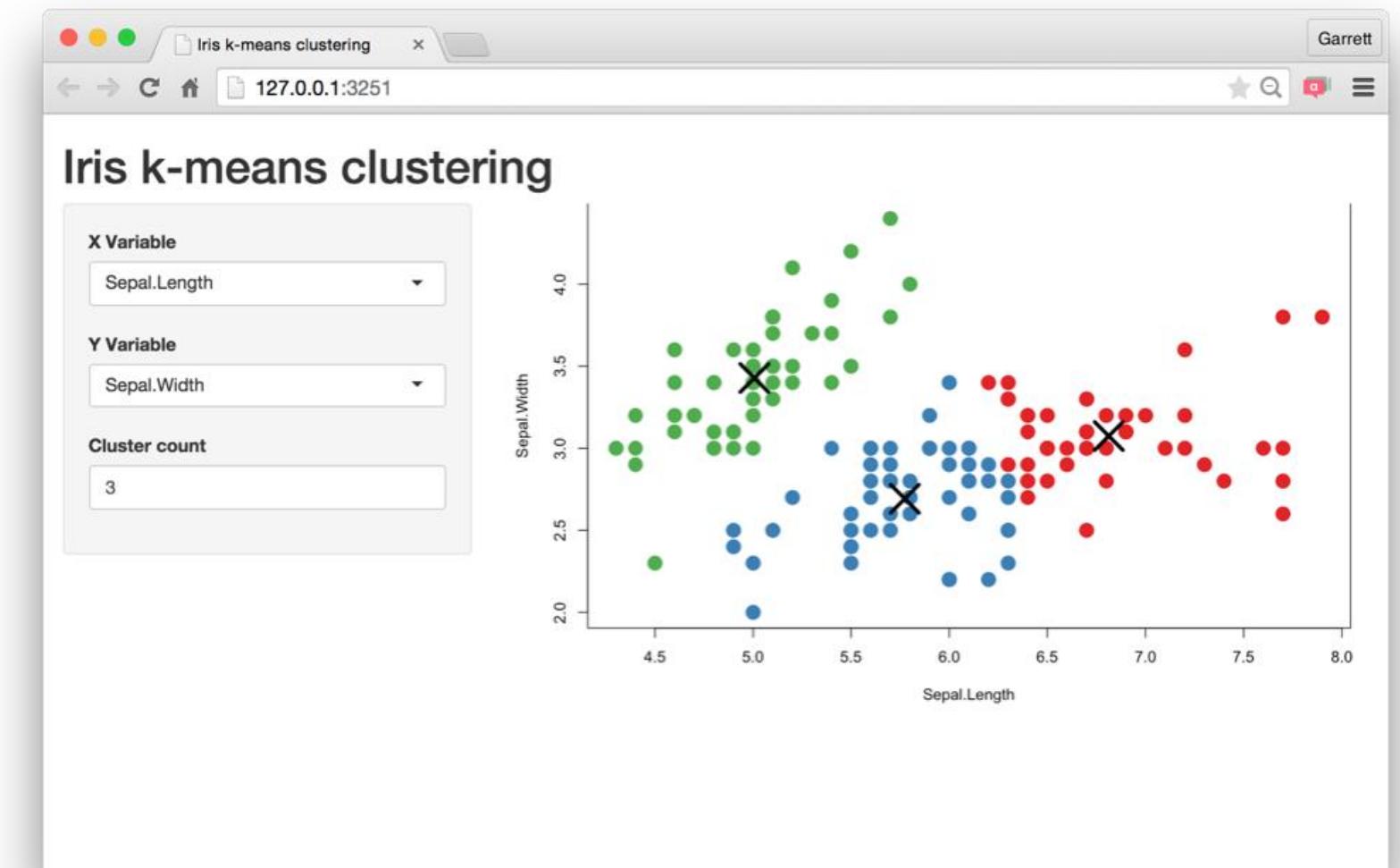
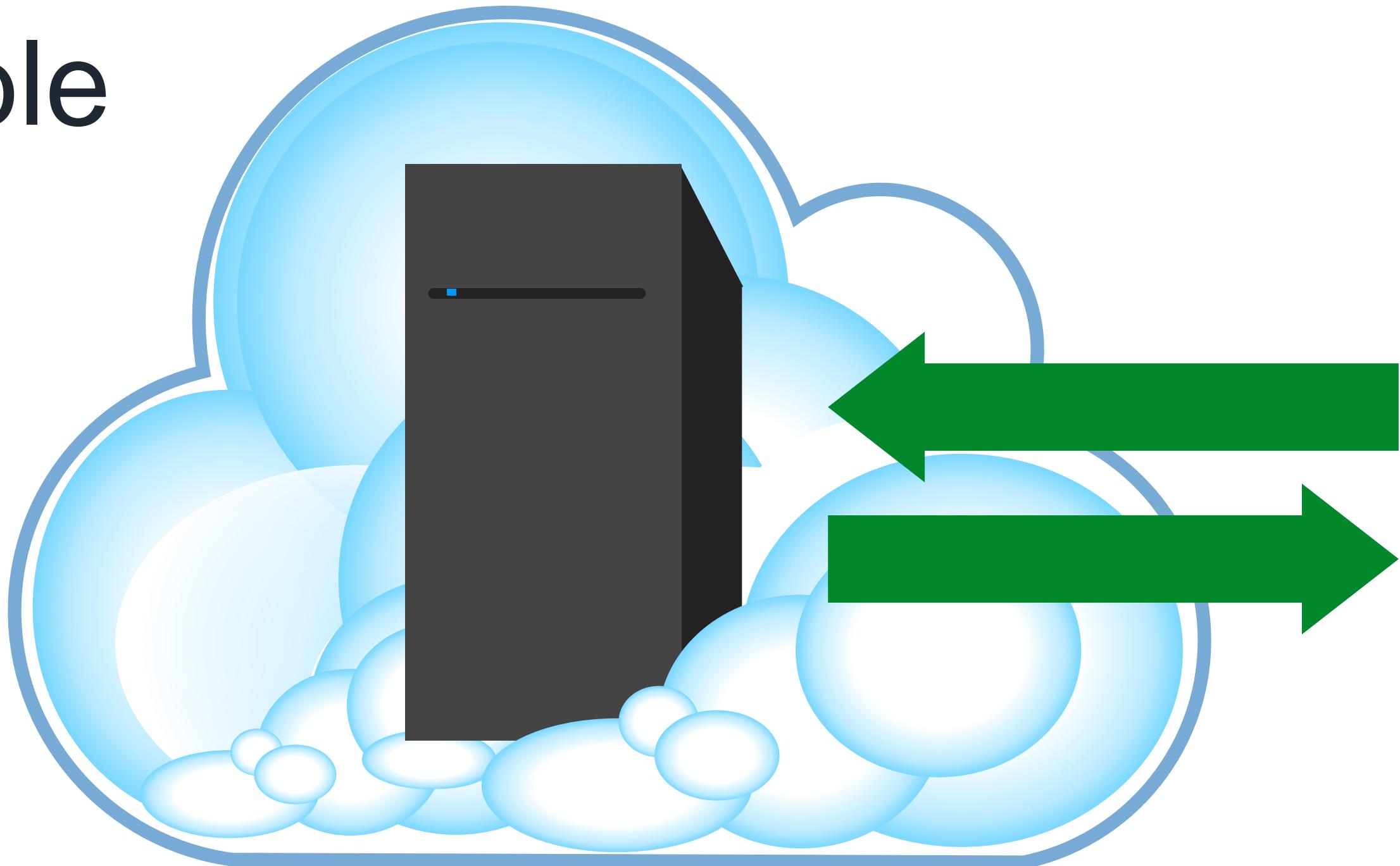
Sharing your app

shinyapps.io



A server maintained by RStudio

- ▶ easy to use
- ▶ secure
- ▶ scalable



HASSE-FREE CLOUD HOSTING FOR SHINY

shinyapps.io by RStudio

Home

Features

Pricing

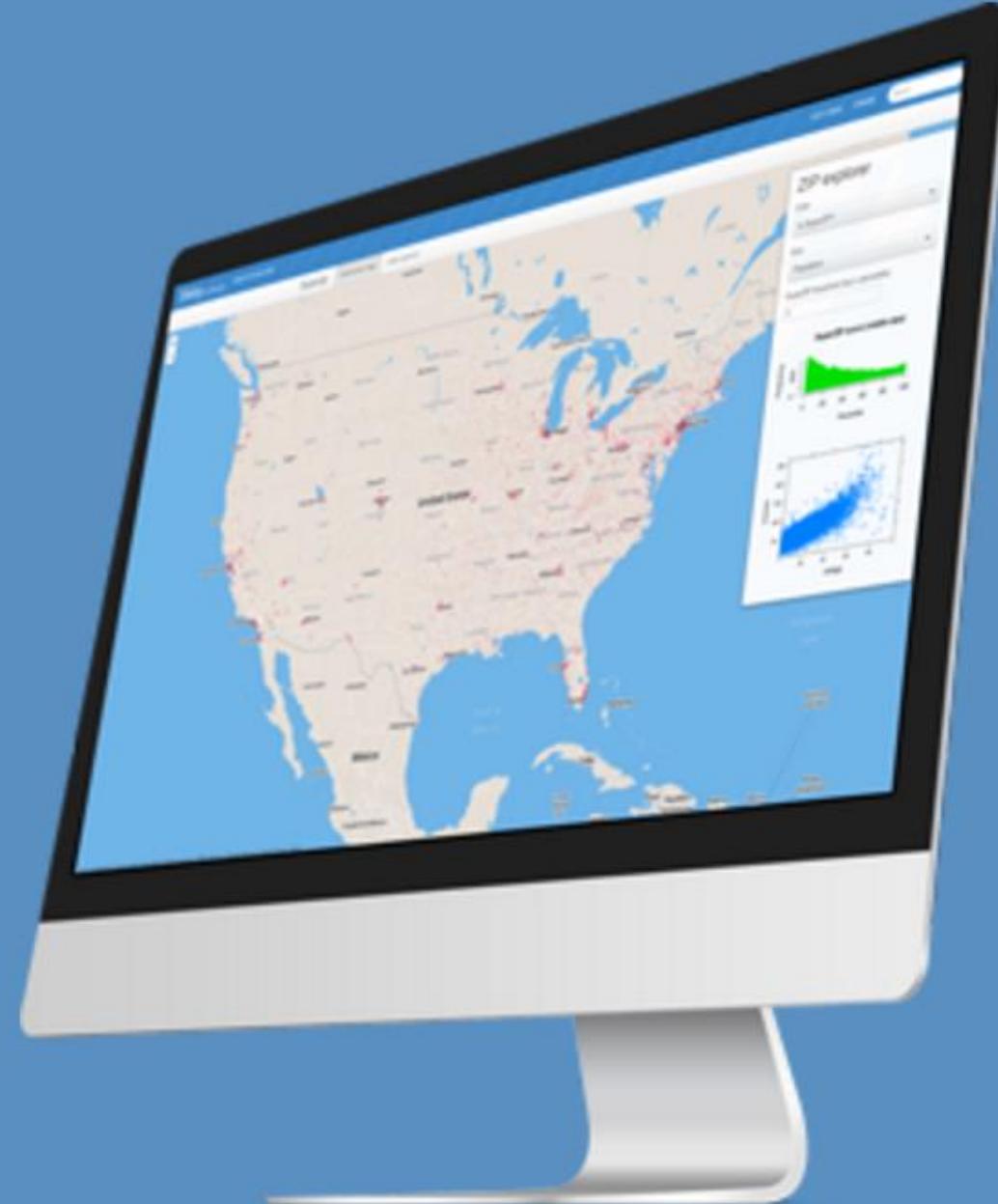
Support

Log In

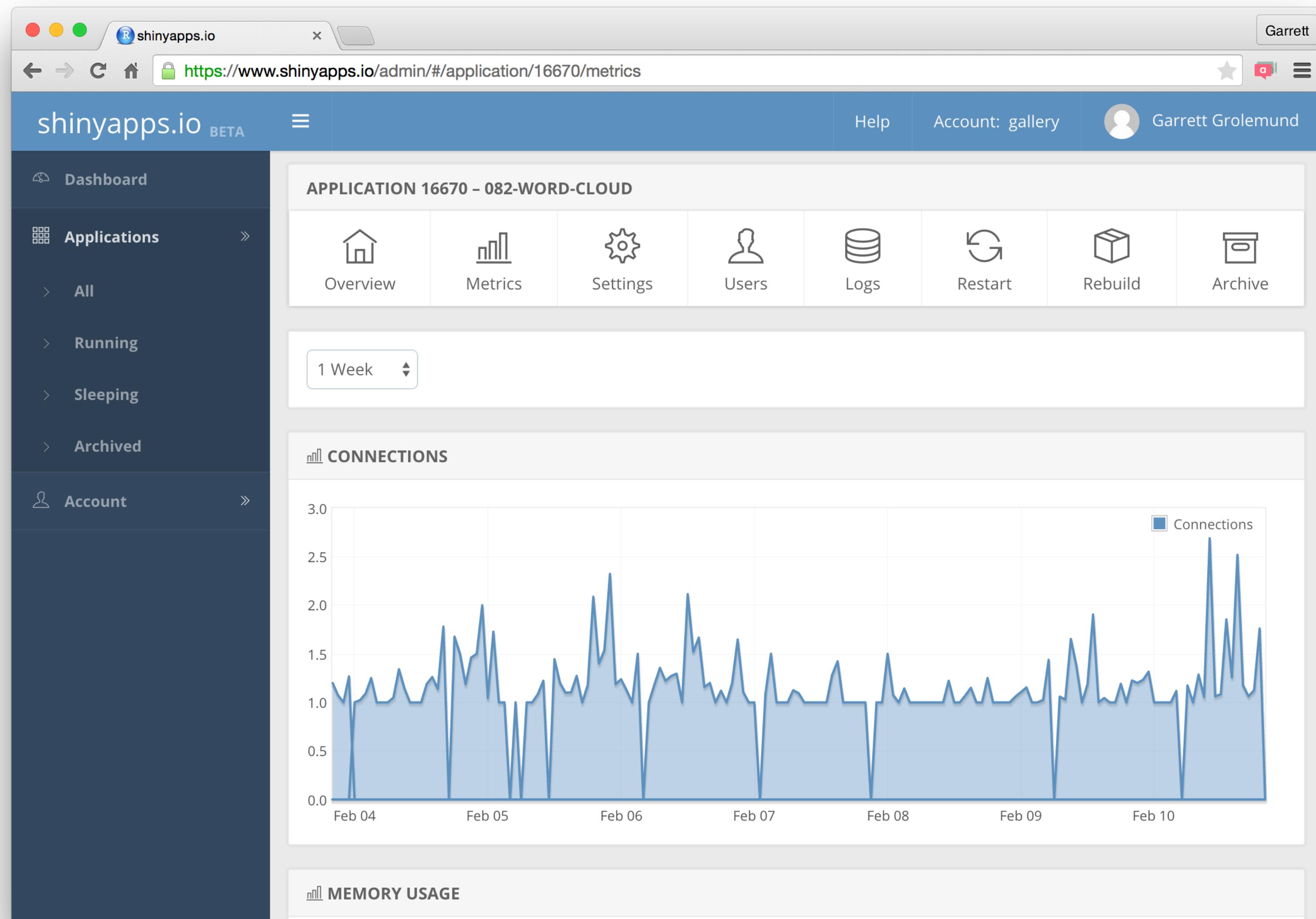
Share your Shiny
Applications Online

Deploy your Shiny applications on the Web in minutes

Sign Up



WITH BUILT-IN METRICS



MEMBERSHIP PRICING

FREE

\$ 0 /month

New to Shiny? Deploy your applications for FREE.

5 Applications

25 Active Hours

Community Support

RStudio Branding

STARTER

\$ 9 /month

(or \$100/year)

More applications. More active hours!

25 Applications

100 Active Hours

Premium Support

BASIC

\$ 39 /month

(or \$440/year)

Take your users to the next level!

Unlimited Applications

500 Active Hours

Performance Boost

Premium Support

STANDARD

\$ 99 /month

(or \$1,100/year)

Password protection? Authenticate your users!

Unlimited Applications

2,000 Active Hours

Authentication

Performance Boost

Premium Support

PROFESSIONAL

\$ 299 /month

(or \$3,300/year)

Professional has it all! Personalize your domains.

Unlimited Applications

10,000 Active Hours

Authentication

Account Sharing

Performance Boost

Custom Domains

Premium Support

Build your own
server

SHINY SERVER

rstudio.com/products/shiny/shiny-server/

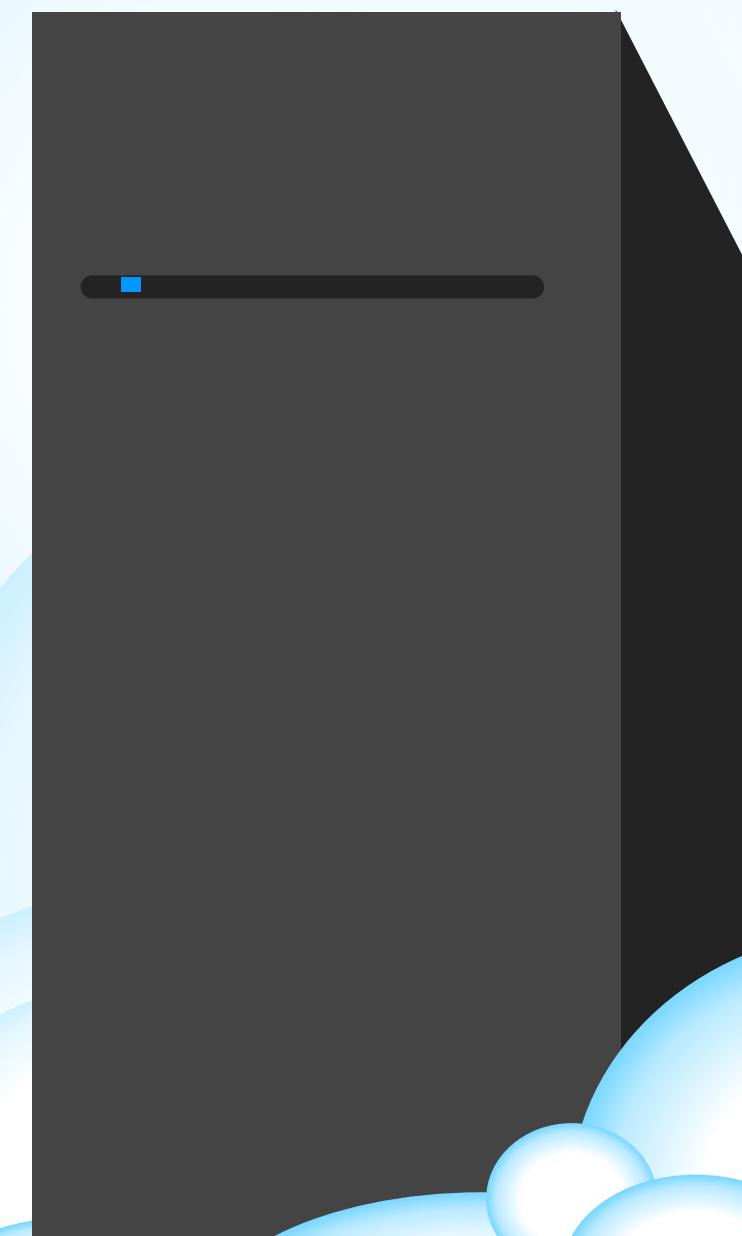


- ✓ Deploy Shiny apps to the internet
- ✓ Run on-premises
move computation closer to the data
- ✓ Host multiple apps on one server
- ✓ Deploy inside the firewall
- ✓ xcopy deployment



SHINY SERVER PRO

rstudio.com/products/shiny/shiny-server/



✓ **Secure access**

LDAP, GoogleAuth, SSL, and more

✓ **Performance**

fine tune at app and server level

✓ **Management**

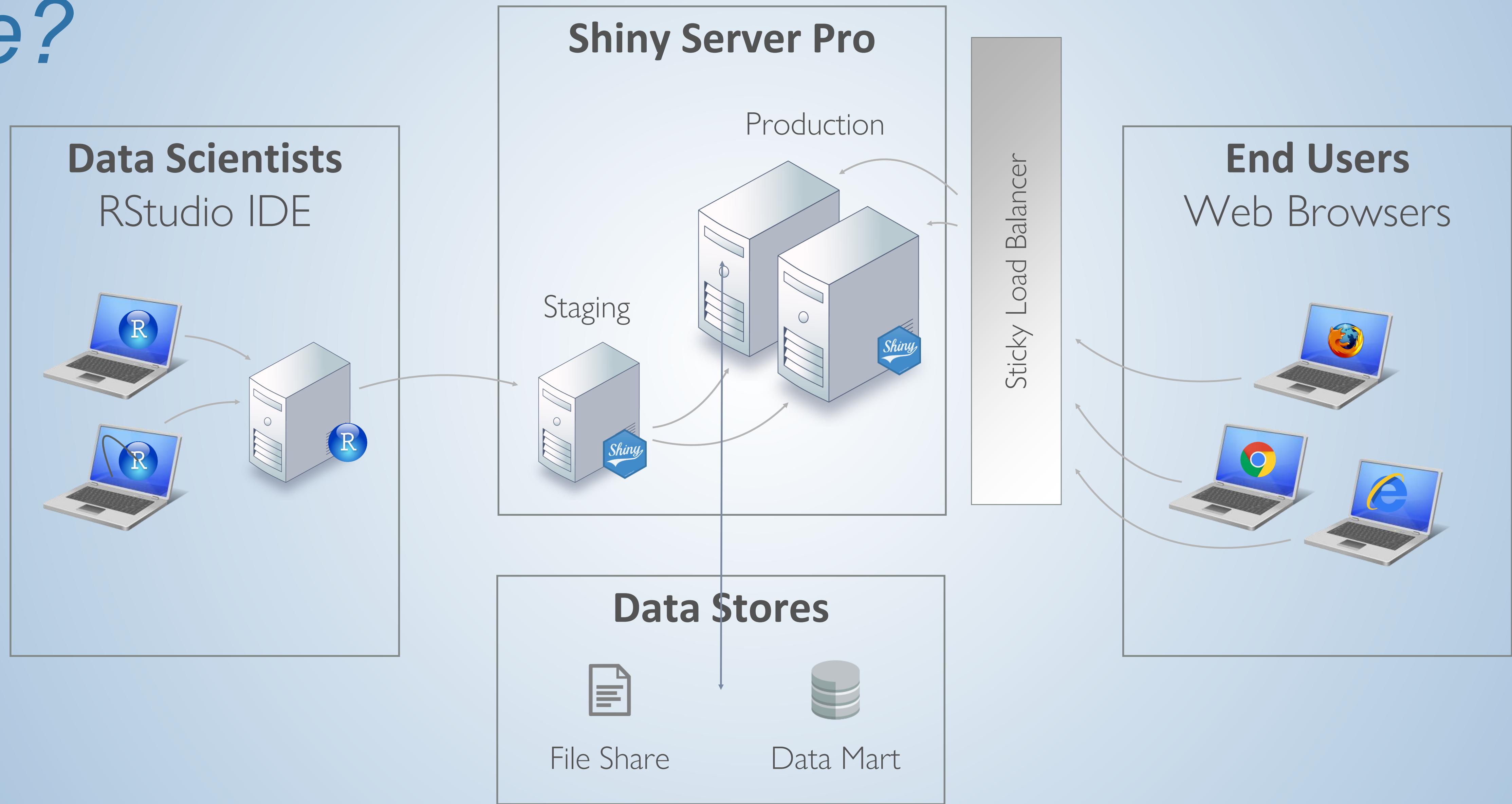
monitor and control resource use

✓ **Support**

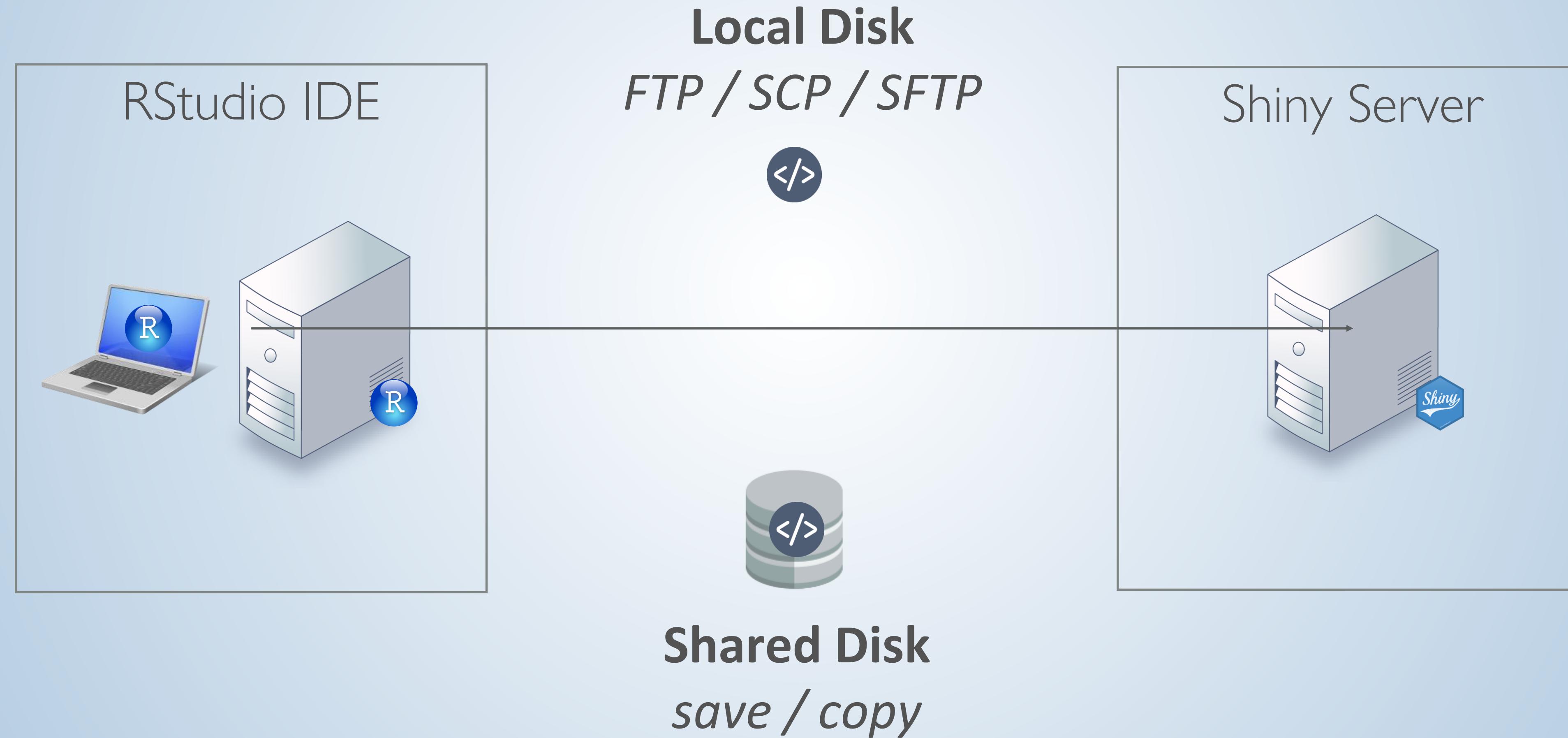
direct priority support



What does a typical setup with SSP look like?

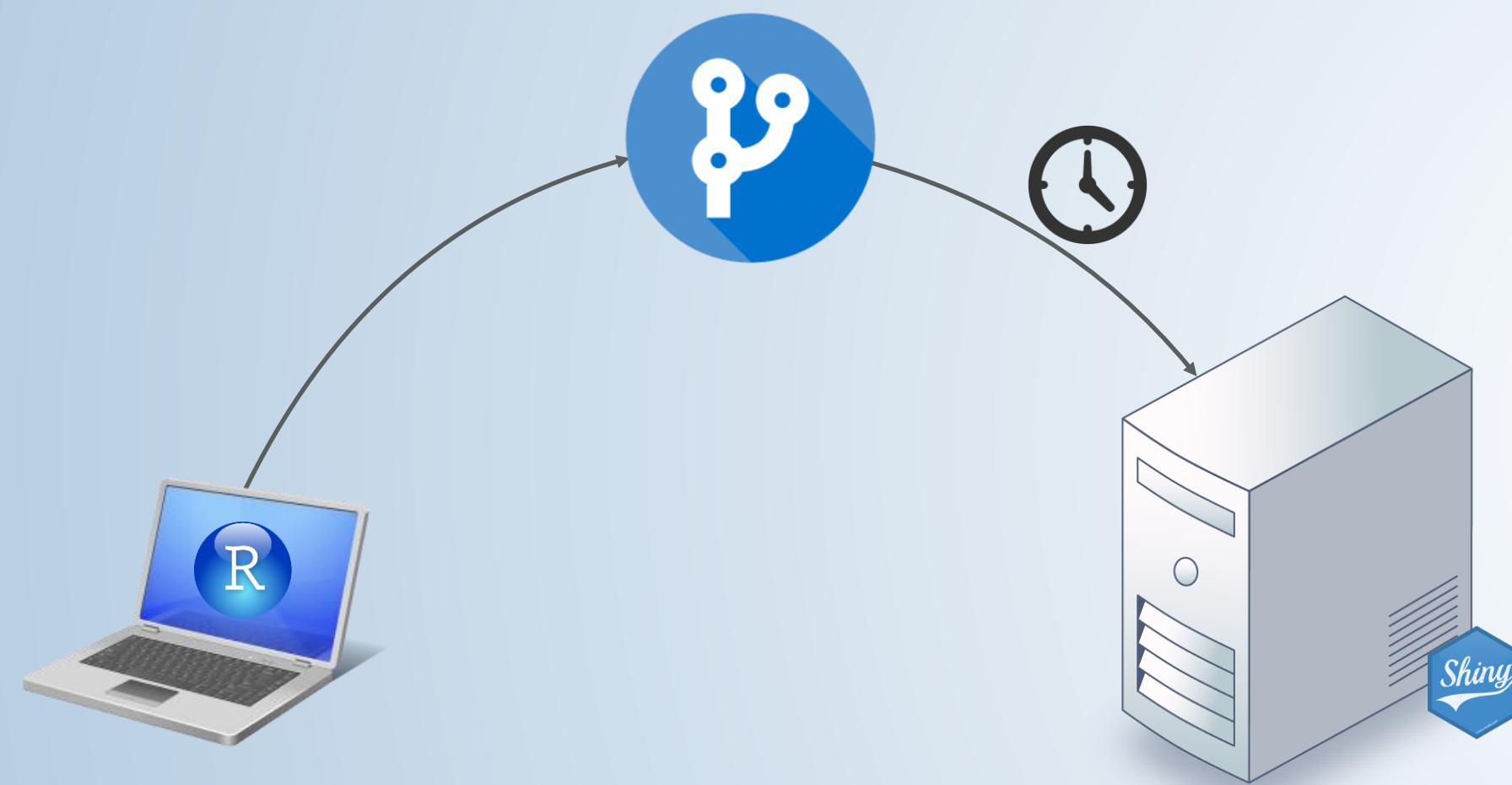


How do I deploy apps?



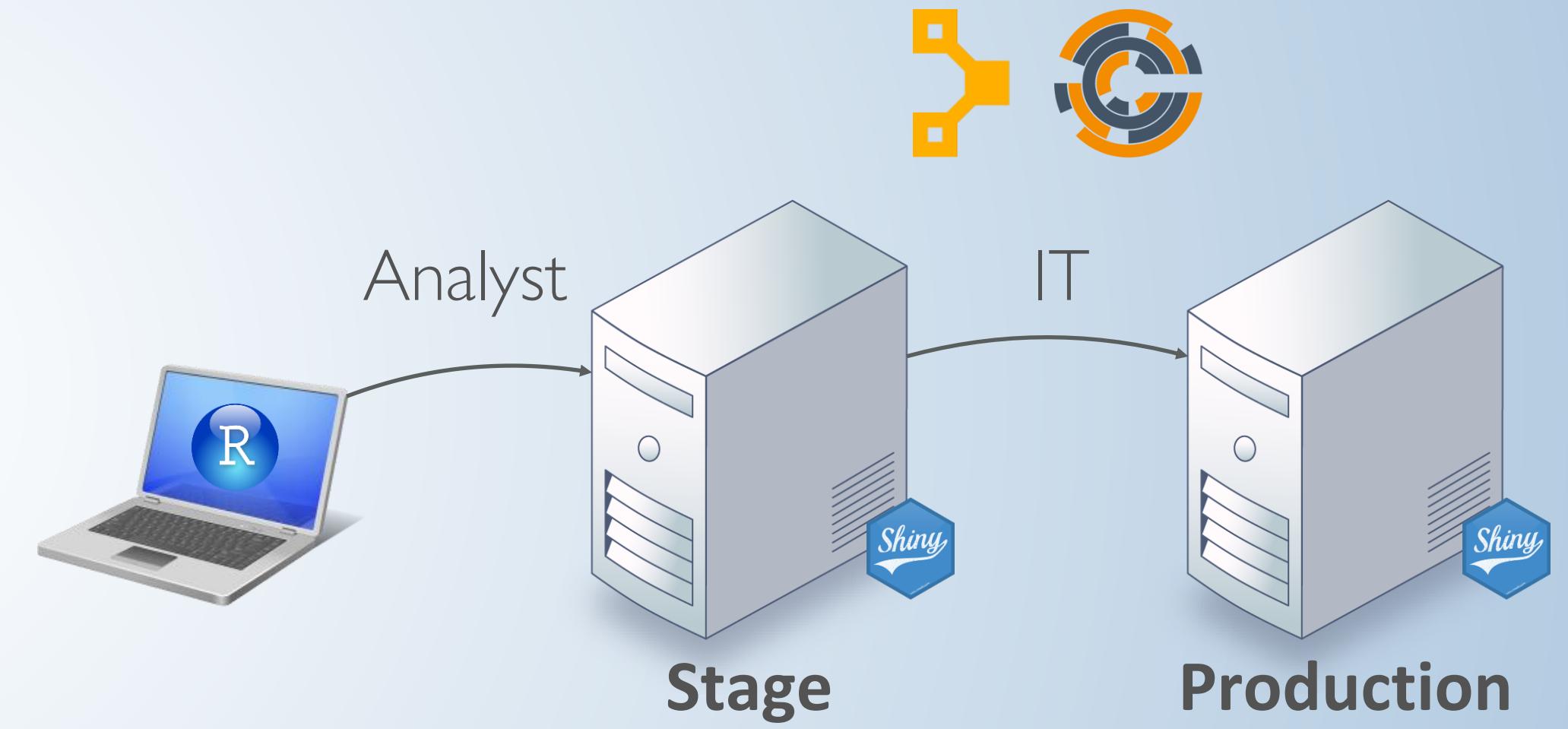
How do I deploy apps in production?

Version Control



Push to version control and
automate clones via a scheduler

Handoff



Analyst stage app
IT deploys to production

More information

- ▶ Sharing your apps tutorial:
<https://shiny.rstudio.com/tutorial/written-tutorial/lesson7/>
- ▶ Administering Shiny Server Pro webinar:
<https://www.rstudio.com/resources/webinars/administering-shiny-server-pro/>



EXERCISE

- ▶ Create a folder called movies in the ShinyApps folder
- ▶ Move any one of the movies app R scripts you worked on into this folder, and rename it as app.R
- ▶ Also move the movies.Rdata file into this folder
- ▶ Run the app
- ▶ Rstudio will take you to a browser or local view where you can interact with the deployed app

3m 00s

RSTUDIO CONNECT

rstudio.com/products/connect/

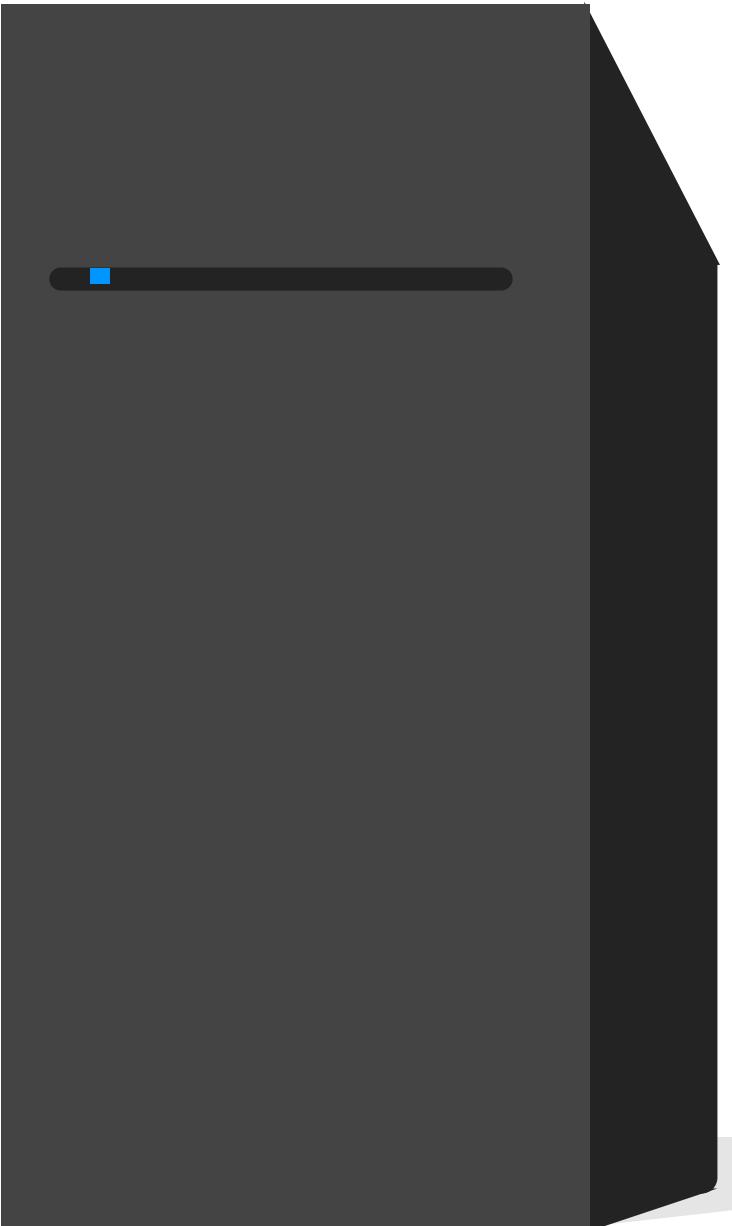


- ✓ **Push-button publish from RStudio**
Shiny apps, R Markdown docs, and more
- ✓ **Self-managed content**
content authors decide permissions
- ✓ **Scheduled reports**
automatically run and email Rmd
- ✓ **Support**
direct priority support

45 day evaluation free trial

SHINYPROXY

shinyproxy.io/



✓ **Secure access**

LDAP, GoogleAuth, SSL, and more

✓ **Management**

View open apps and generate usage statistics

✓ **Docker**

uses docker to maintain dedicated app instances

✓ **Open Source**

✓ **ACL's**

AD groups can restrict app access



More information

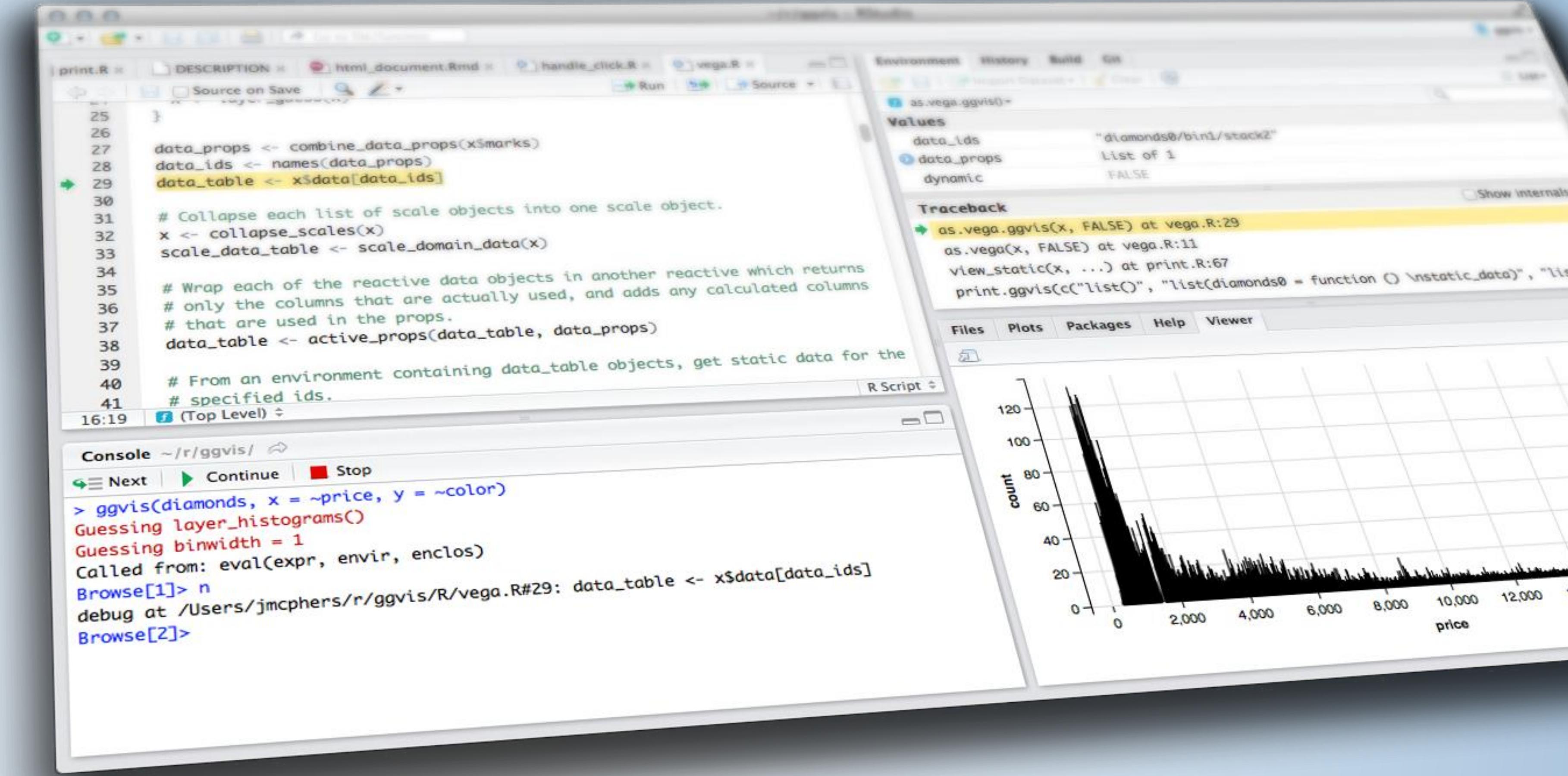
- ▶ Shinyproxy documentation:
<https://www.shinyproxy.io/deploying-apps/>
- ▶ Shinyproxy github repo:
<https://github.com/openanalytics/shinyproxy>

How do I deploy apps?



COURSE OVERVIEW

& INTRODUCTION TO GITHUB & SHINY



Shiny from 