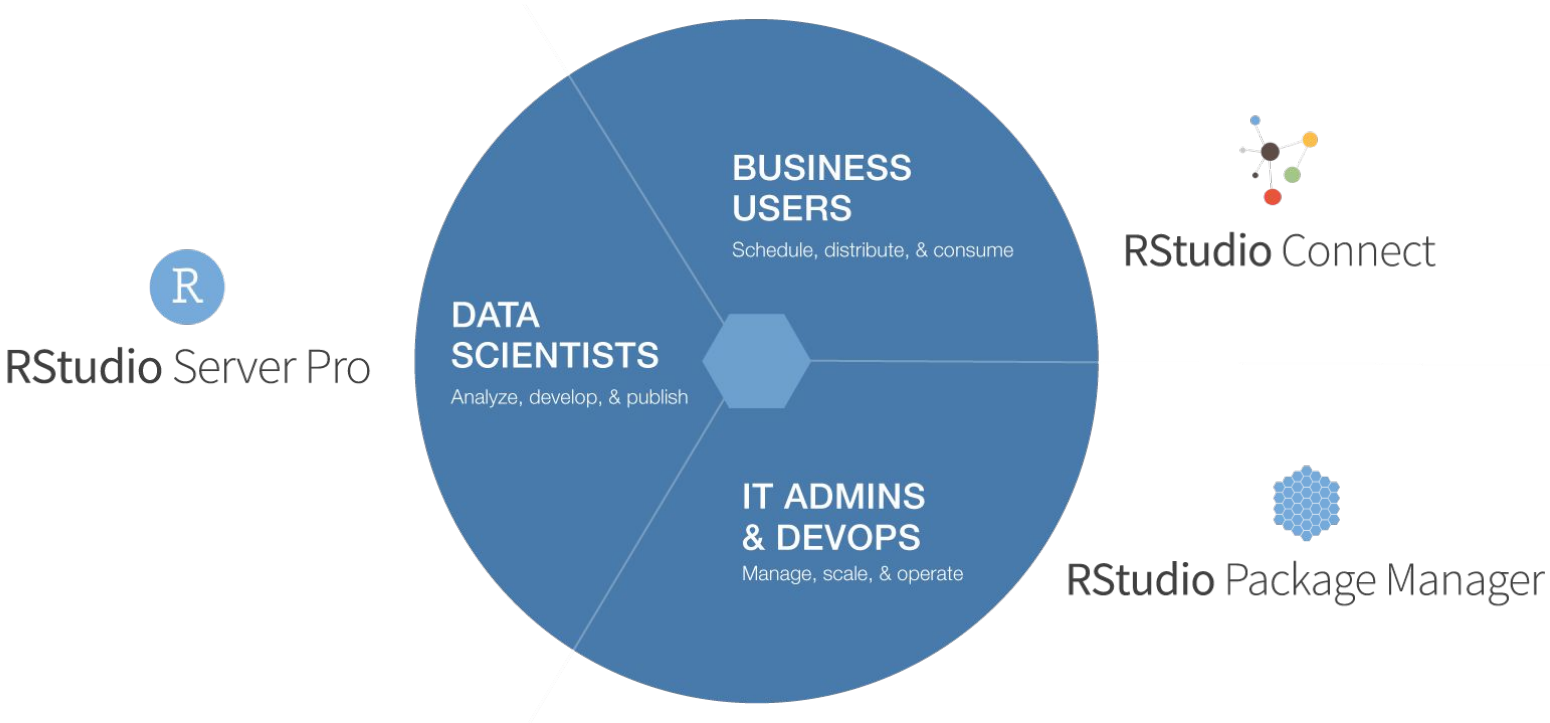
Art of the Feature Toggle

Patterns for maintaining and improving Shiny applications over time

Solutions Engineering at RStudio



Shiny in Production Workshop - 2019

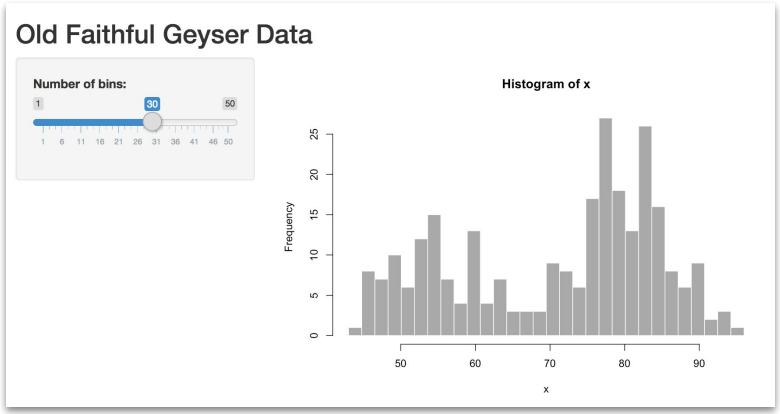
Chapter 12 - DevOps Philosophy and Tooling

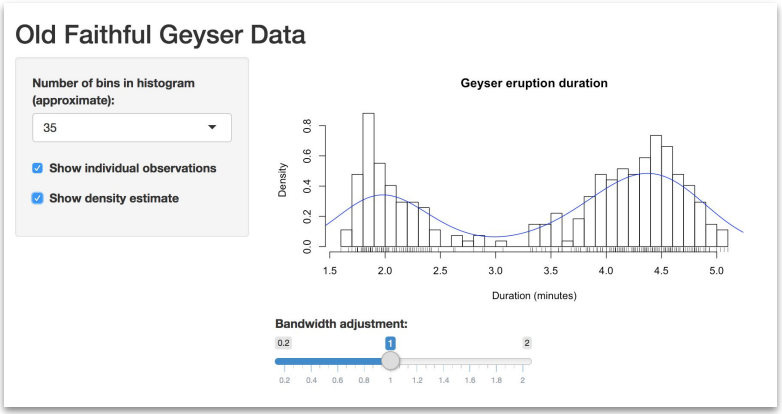
- "Production" has many meanings
- Are there lessons can be learned from the DevOps community?

[Bookdown: Shiny in Production](#) (RStudio Conference 2019)

Introducing new features over time
Shiny Applications in Production

Adding new features to Shiny in Production

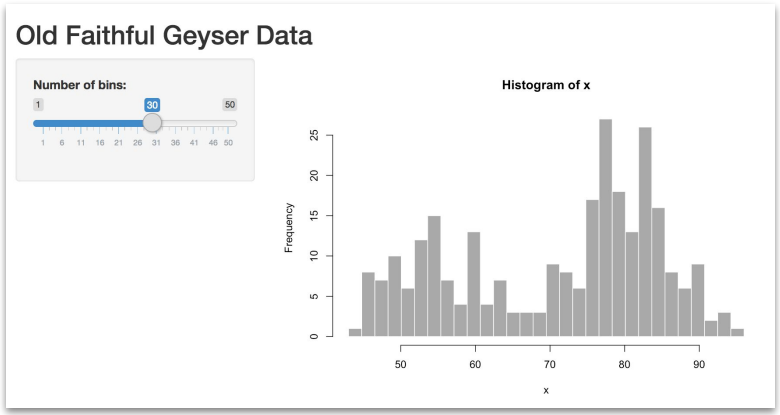


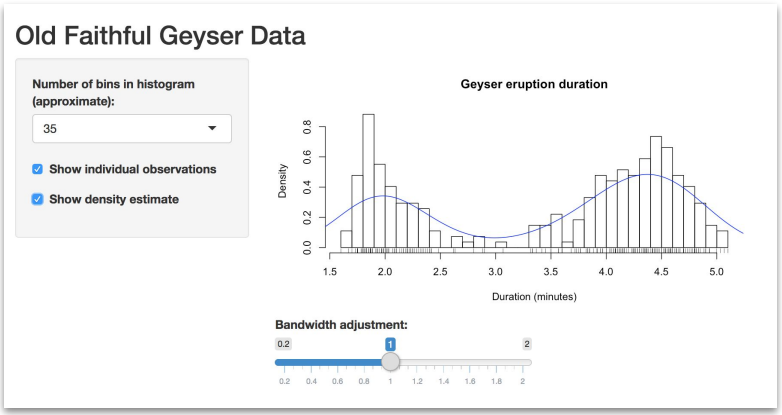


Version 1

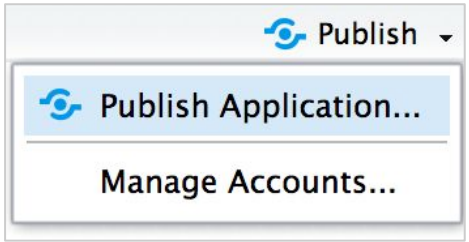
Version 2

Adding new features to Shiny in Production



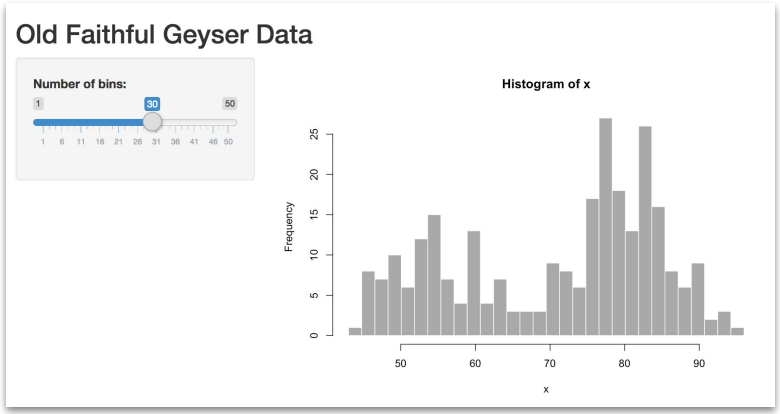


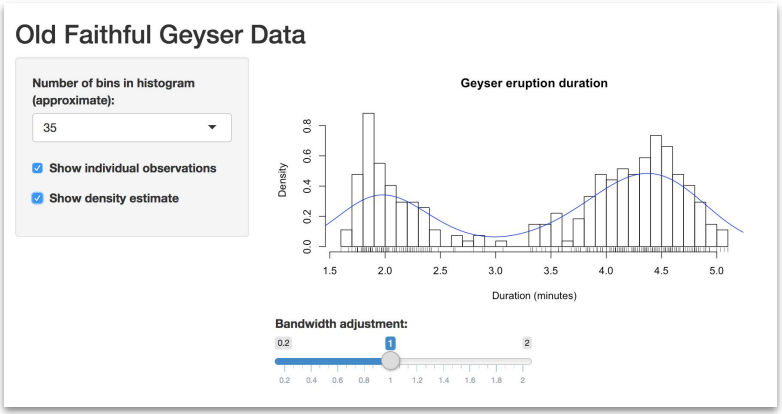
Version 1



Version 2

Adding new features to Shiny in Production

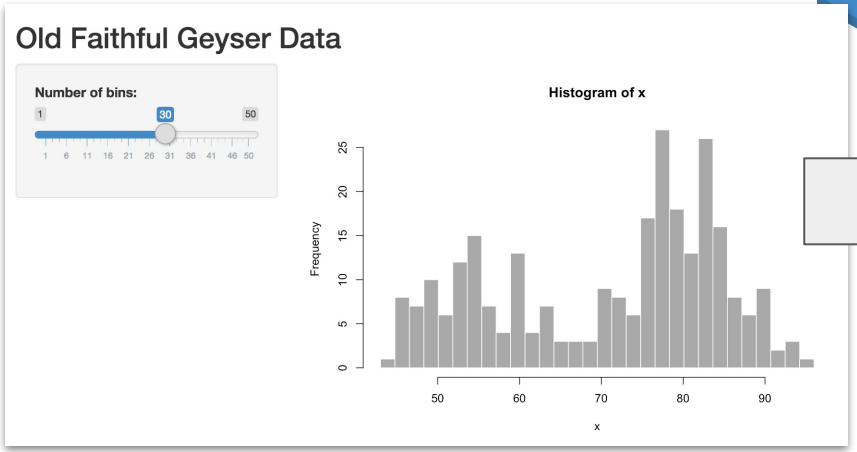




Version 1

Version 2

git



Version 1

Version 2

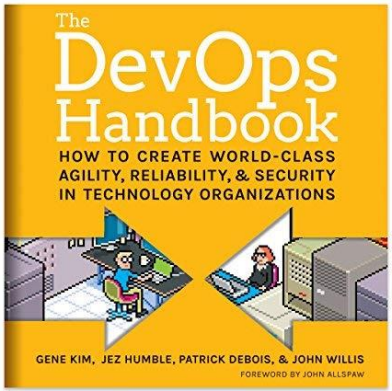
Does pushing a code change feel risky?

DevOps Learning: Decouple **deployment** from **release**

- **Deployment** is any push of code to an environment (test, prod)
- **Release** is when that code (feature) is made available to users or customers

Deployment on demand and thoughtful release strategies allow more control (and more success) over the delivery of features to end users.

- Application-based release patterns (today!)
- Environment-based release patterns (tomorrow)



Application-Based Release Patterns

Feature Toggle

A mechanism to selectively enable and disable features, or control which features are visible to specific user segments.

Enable **dark launch**: deploy a change to production and then perform testing while it's invisible to most users.

- Modify the code to make calls to new functions, log results without displaying
- Have 1% of users make invisible calls to new feature, fix issues, progressively increase users to test production load

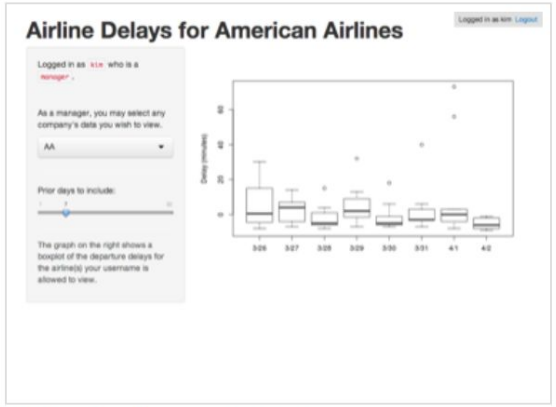
Starting from the Gallery

Shiny from RStudio

Get Started | Gallery | Articles | Reference

Professional Features

These examples demonstrate some of the unique features of RStudio Connect.

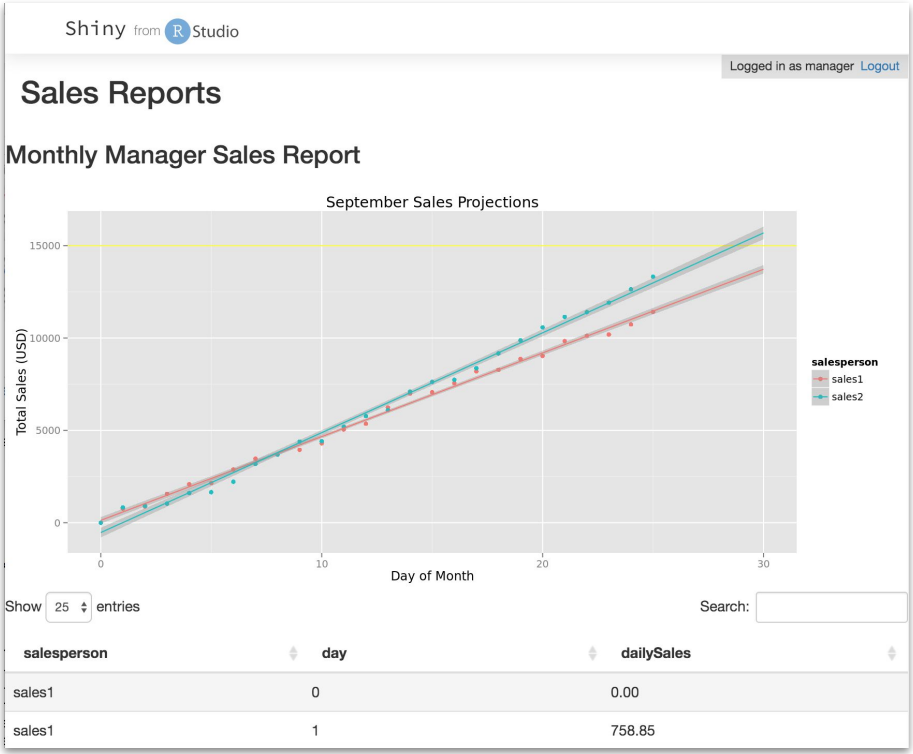


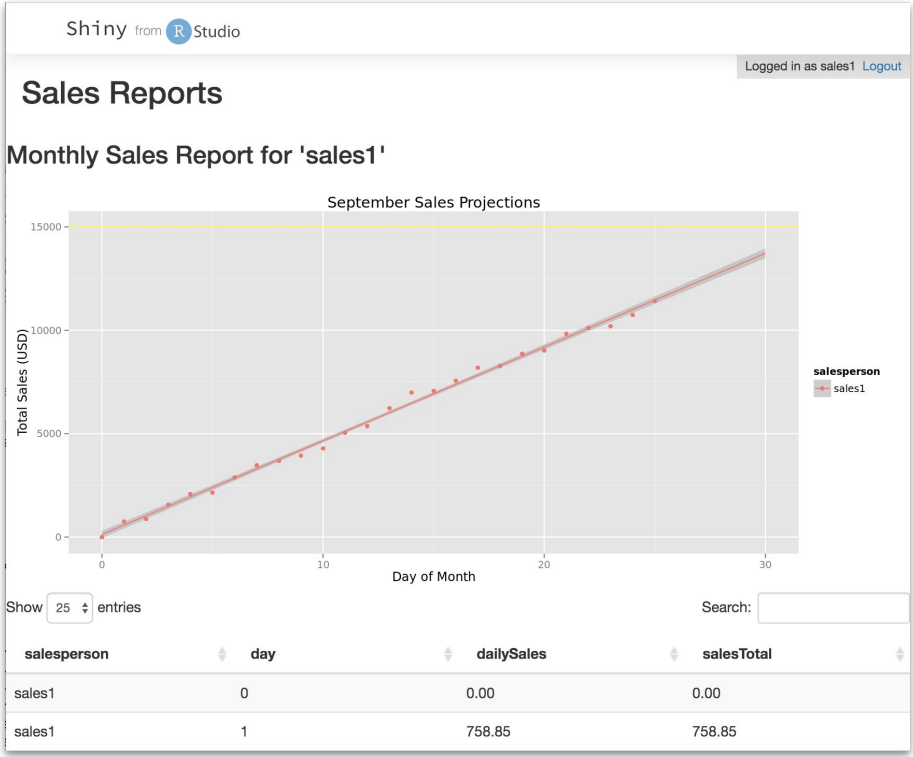
Authentication and database

Personalized UI

Smells like feature toggles!

“Personalized Data Access” `session$user`





Feature Toggles

Shiny applications can access the username and groups of the current user through the session parameter of the shinyServer function.

Your application could use this information to display customized messages or to enable functionality for a specific subset of users.

```
shinyServer(function(input, output, session) {
  output$username <- reactive({
    session$user
  })

  output$groups <- reactive({
    session$groups
  })
})
```

Implementation

```
# Render the subtitle of the page according to what user is logged in.
output$subtitle <- renderText({
  if (is.null(user())){
    return("You must log in to use this application using Shiny Server Pro.")
  }

  if (isManager()){
     return("Monthly Manager Sales Report")
   } else {
     return(paste0("Monthly Sales Report for '", user(), "'"))
   }
})
```

Implementation

UI built through conditional session$user tests within server-side output objects

```
output$salesTbl <- renderDataTable({
  # If no user is logged in, don't show any data.
  if (is.null(user())){
    return()
  }

  # Otherwise return all data that should be visible to this user.
  myData()
})
```

`output$subtitle` `output$salesPlot` `output$salesTbl`

Dynamic UI Feature Toggles

The conditionalPanel function

The `conditionalPanel` function, is used in `ui.R` and wraps a set of UI elements that need to be dynamically shown/hidden.

Creates a panel that shows and hides its contents depending on the value of a JavaScript expression, usually input-based.

This example shows how to define an output variable in the server code that you can use in the UI.

```
session$user session$groups
```

Branch: master ▾ **advanced-shiny** / server-to-ui-variable / **app.R**

daattali add many readmes and a few more examples

1 contributor

18 lines (15 sloc) | 391 Bytes

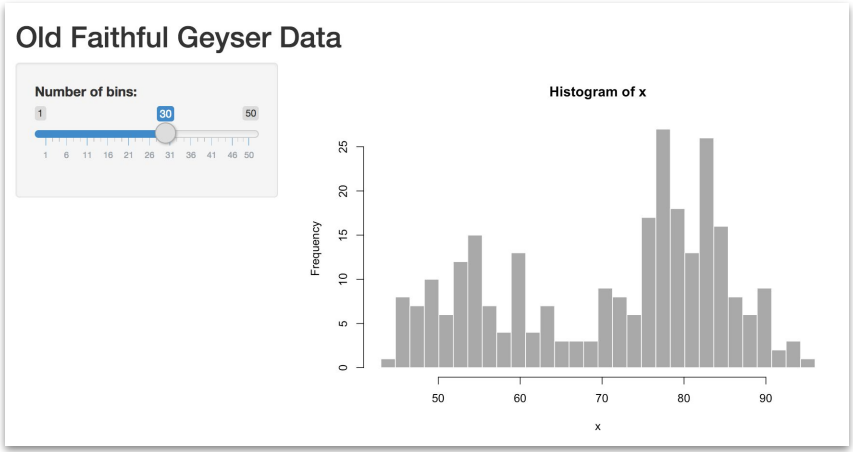
```
1  library(shiny)
2
3  ui <- fluidPage(
4    selectInput("num", "Choose a number", 1:10),
5    conditionalPanel(
6      condition = "output.square",
7      "That's a perfect square!"
8    )
9  )
10
11 server <- function(input, output, session) {
12   output$square <- reactive({
13     sqrt(as.numeric(input$num)) %% 1 == 0
14   })
15   outputOptions(output, 'square', suspendWhenHidden = FALSE)
16 }
17
18 shinyApp(ui = ui, server = server)
```

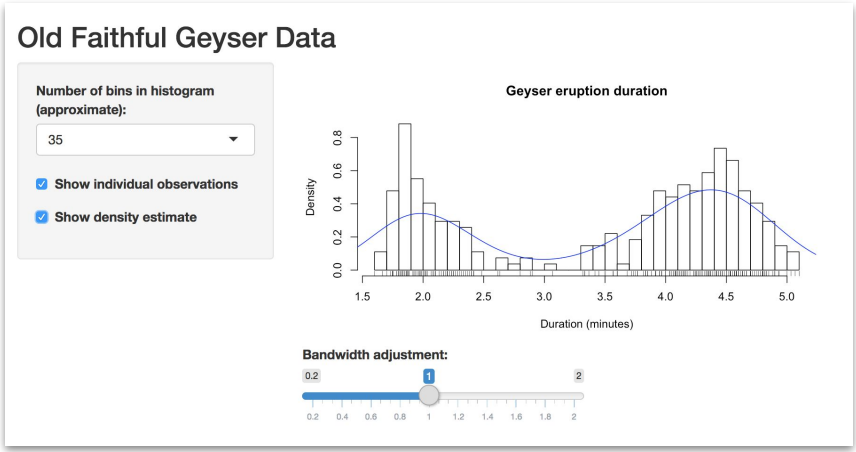
Output condition example: Dean Attali

```
output$isBeta <- reactive({
    [Test for group membership]
})
```

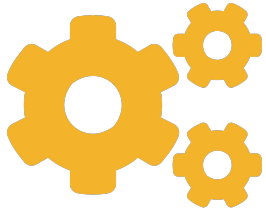
```
conditionalPanel(
condition = "output.isBeta == false", … UI Elements)
```

```
conditionalPanel(
condition = "output.isBeta == true",
… UI Elements)
```





Feature Toggles in Production?

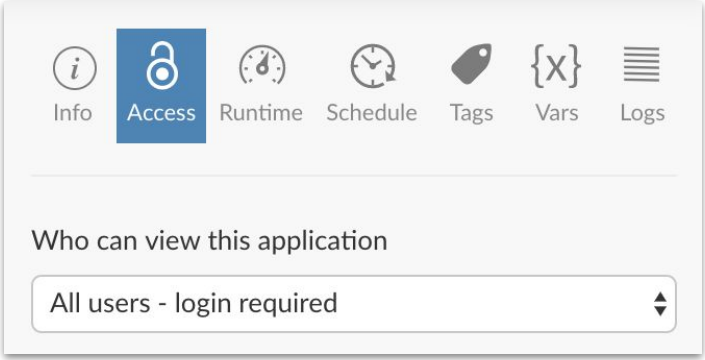


Will I (personally) use feature toggles for Shiny application deployment and releases? **No, not likely.**

- Not easy to manage, automate, test and ultimately “toggle”
  - Alternative: “Environment-Based Release Patterns”
- Still a cool concept, useful for solving other types of problems
  - RStudio Connect Feature Hacks!

Mixing Access Controls & Feature Toggles on RStudio Connect

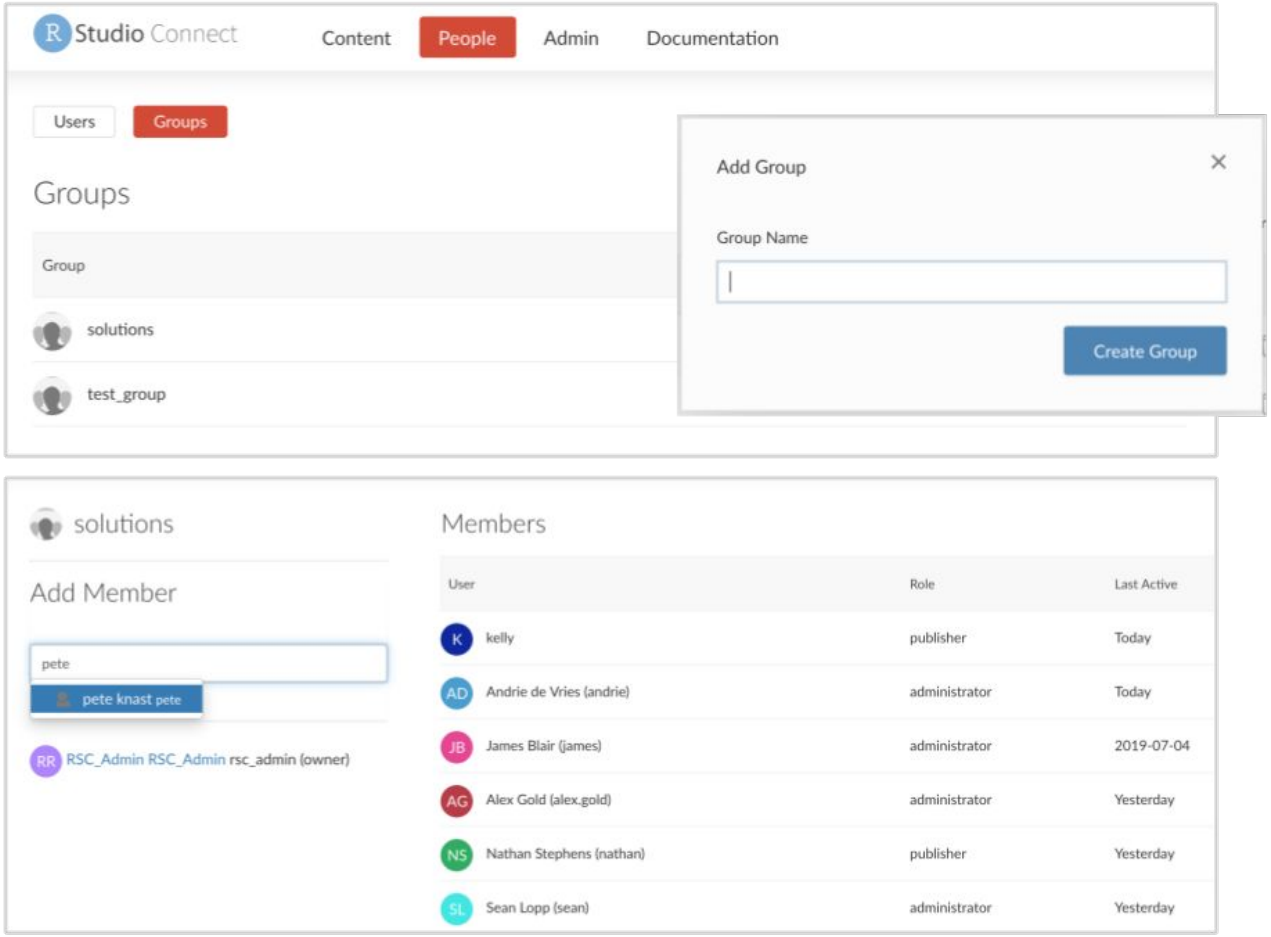
Content **Access** Control Options on RStudio Connect



Access Control Setting	Description
Anyone, no login required	Allows for anonymous viewer access
All users, login required	Everyone with an RStudio Connect account
Specific users or groups	Only users or groups you specify can access
Collaborators & you	Only you and your collaborators can access

People > Group Management UI in RStudio Connect
(Admin Tools)

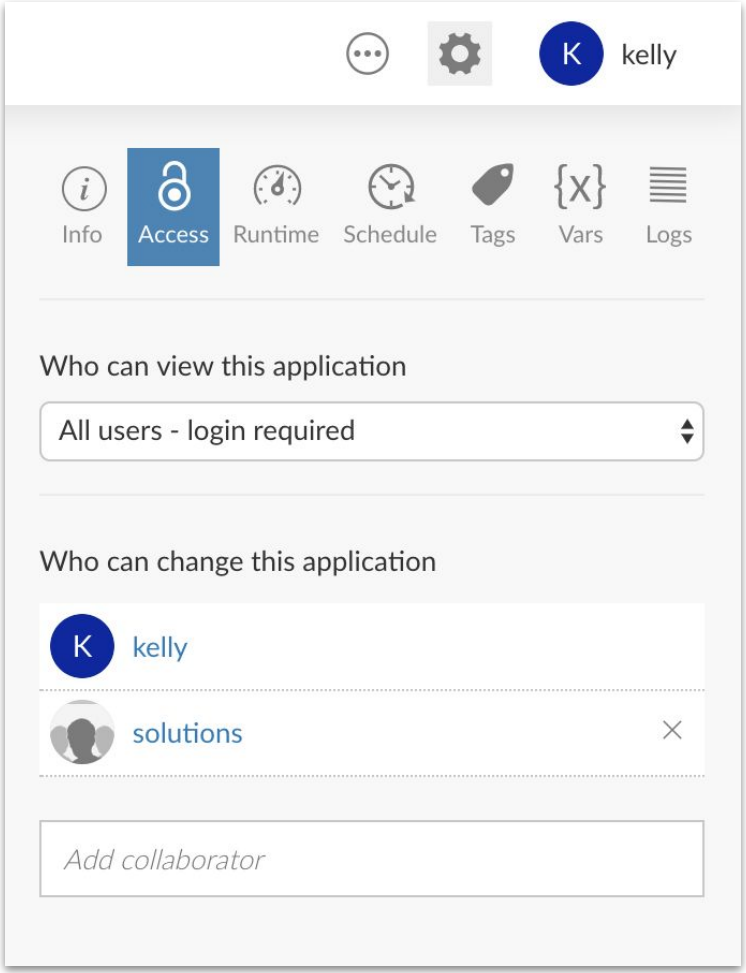
Solutions Engineering group setup



Problem: Can you add me as a collaborator on this?

1. Self service code access
   - `install.packages("gitlink")`
2. Slack Incoming Webhook integration

```
If session$groups != solutions {
   Display an action button that will send me a slack alert when clicked.
}
```



“Slack me if you need access”

Problem: Can you add me as a collaborator on this?

1. Self service code access
   - `install.packages("gitlink")`
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If session$groups != solutions {

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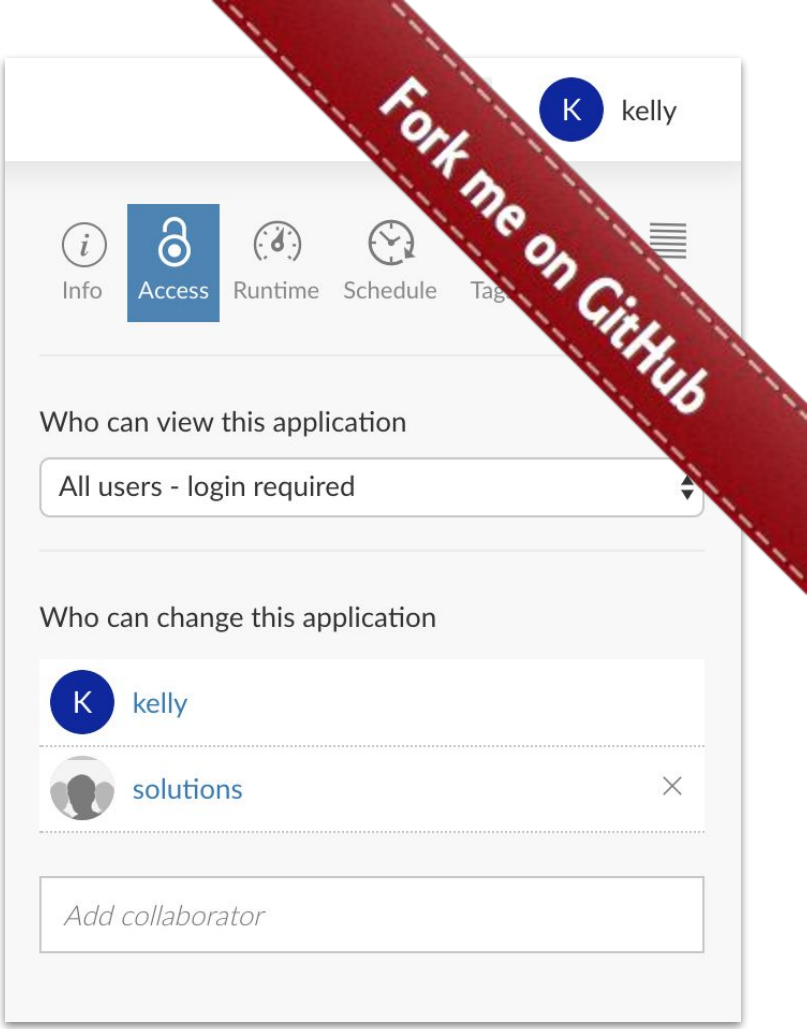
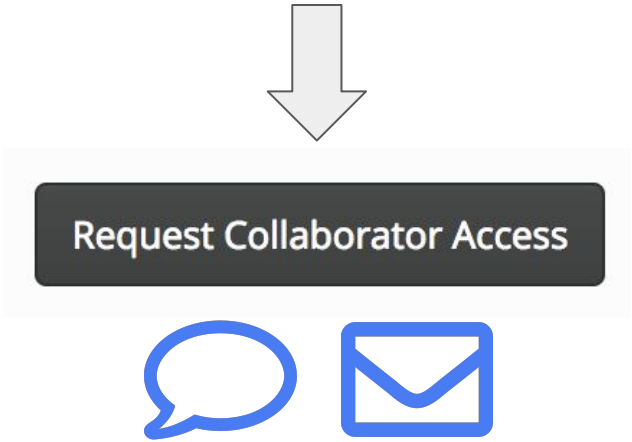
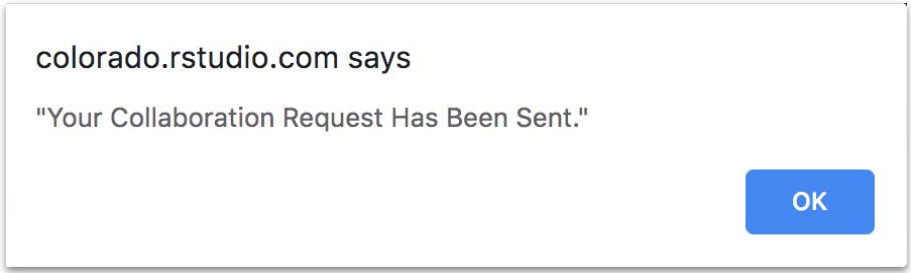


“Slack me if you need (collaborator) access”

```
conditionalPanel(
    condition = "output.isCollab == false",
    actionButton("request", "Request Collaborator Access")
)
```





Action Button - Command Pattern

Pattern 1 - Command

Use `observeEvent()` to trigger a command with an action button.

Example

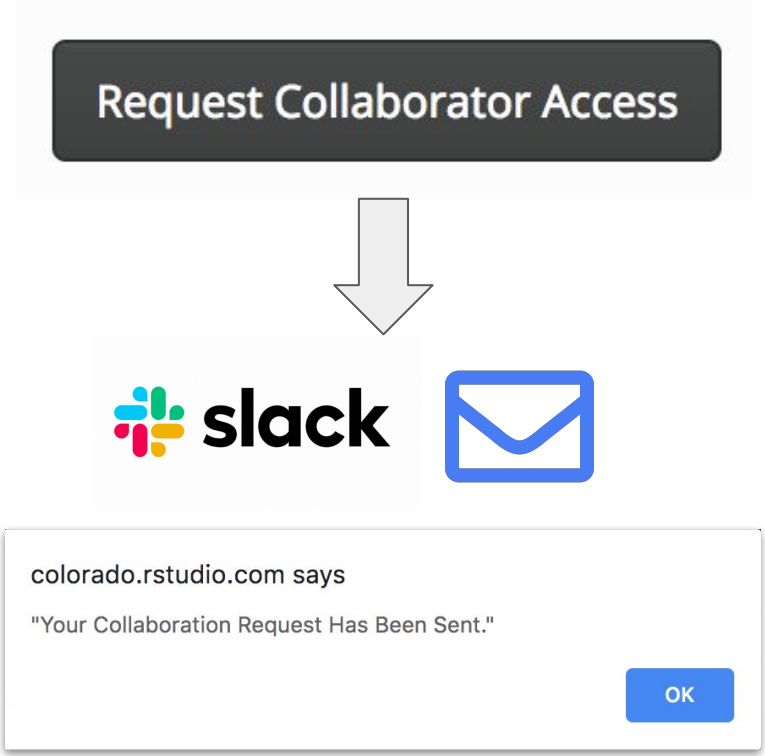
Click Me

Action Button - Pattern 1
by RStudio, Inc.

app.R | www ▾ | ↥ show with app

```
library(shiny)

ui <- fluidPage(
  tags$head(tags$script(src = "message-handler.js")),
  actionButton("do", "Click Me")
)

server <- function(input, output, session) {
  observeEvent(input$do, {
    session$sendCustomMessage(type = 'testmessage',
      message = 'Thank you for clicking')
  })
}

shinyApp(ui, server)
```

Code license: MIT



Recommendation: Create a Slack App

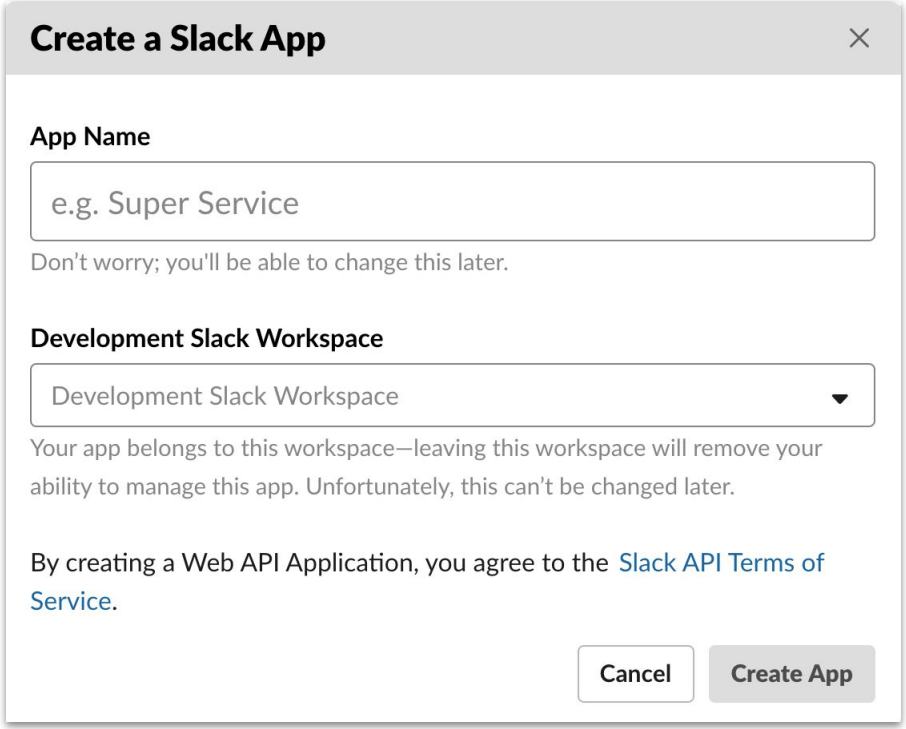
There are a number of R packages and legacy methods you could use to talk to slack from your R code.

I recommend creating a Slack App.

Send data to Slack in real-time

- Incoming Webhook

Creating an Incoming Webhook gives you a unique URL to which you send a JSON payload with the message text and some options.



Add features and functionality

Choose and configure the tools you'll need to create your app (or review all our documentation).

Incoming Webhooks
Post messages from external sources into Slack.

Interactive Components
Add buttons to your app's messages, and create an interactive experience for users.

Slash Commands
Allow users to perform app actions by typing commands in Slack.

Event Subscriptions
Make it easy for your app to respond to activity in Slack.

Bots
Add a bot to allow users to exchange messages with your app.

Permissions
Configure permissions to allow your app to interact with the Slack API.

Install your app to your workspace

Install your app to your Slack workspace to test your app and generate the tokens you need to interact with the Slack API. You will be asked to authorize this app after clicking **Install App to Workspace.**

Reinstall App

App Name

Connect Collaborate Notifier

Display Information

This information will be shown in the Slack App Directory and in the Slack App
For more information, view our App Detail Guidelines.

App name
Connect Collaborate |

Short description
A Webhook for Collaboration Requests on RStudio Cor

App icon & Preview

Connect Collaborate Notifier APP
A Webhook for Collaboration Requests on RStudio Connect Shiny Apps

Background color
#004492

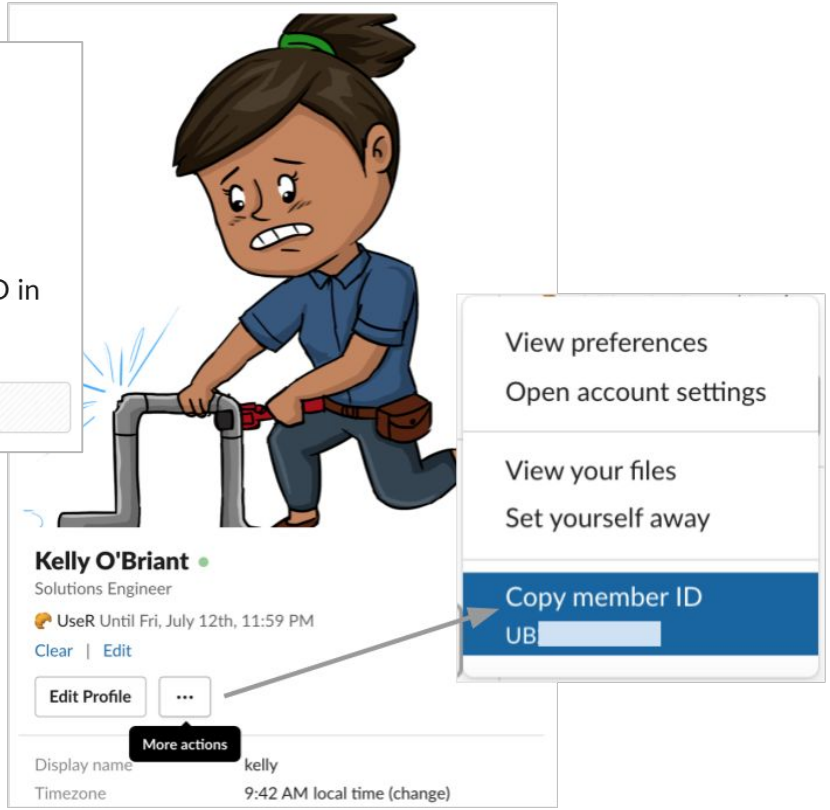
“Slack _**me**_ if you need access”

Mentioning users

A mention is a special type of reference that will provide a link to the mentioned user's profile, and also *notify* them about the reference. The help center page for mentions describes what that notification process looks like.

To mention a user in an app-published message, you need to provide their user ID in the following syntax:

```
Hey <@U024BE7LH>, thanks for submitting your report.
```



- Find your slack member ID
- Construct your message
- Send JSON payload to Webhook URL

Action Button - Command Pattern

```
conditionalPanel(
    condition = "output.isCollab == false",
    actionButton("request", "Request Collaborator Access")
)
```

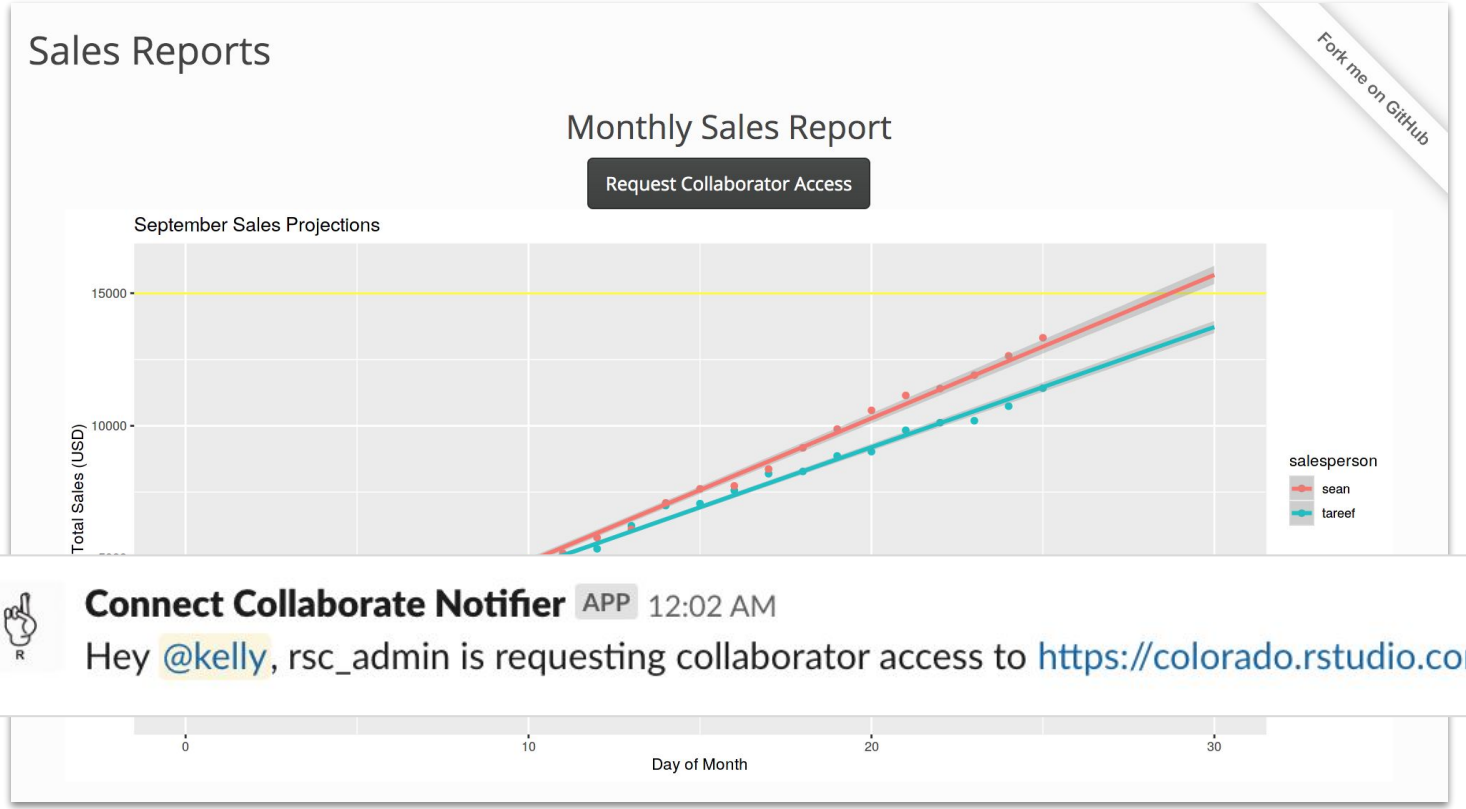
ui.R

```
observeEvent(input$request, {
    collab_alert <- glue('{{"text":"Hey <{slack_owner_id}>, {session$user} is requesting collaborator access to {vanity_url}"}}')

    POST(slack_webhook, body = collab_alert, add_headers('Content-Type' = 'application/json'))

    session$sendCustomMessage(type = 'confirm-request',
                              message = 'Your Collaboration Request Has Been Sent.')
})
```

server.R

```
// This recieves messages of type "confirm-request" from the server.
Shiny.addCustomMessageHandler("confirm-request",
  function(message) {
    alert(JSON.stringify(message));
  }
);
```

message-handler.js

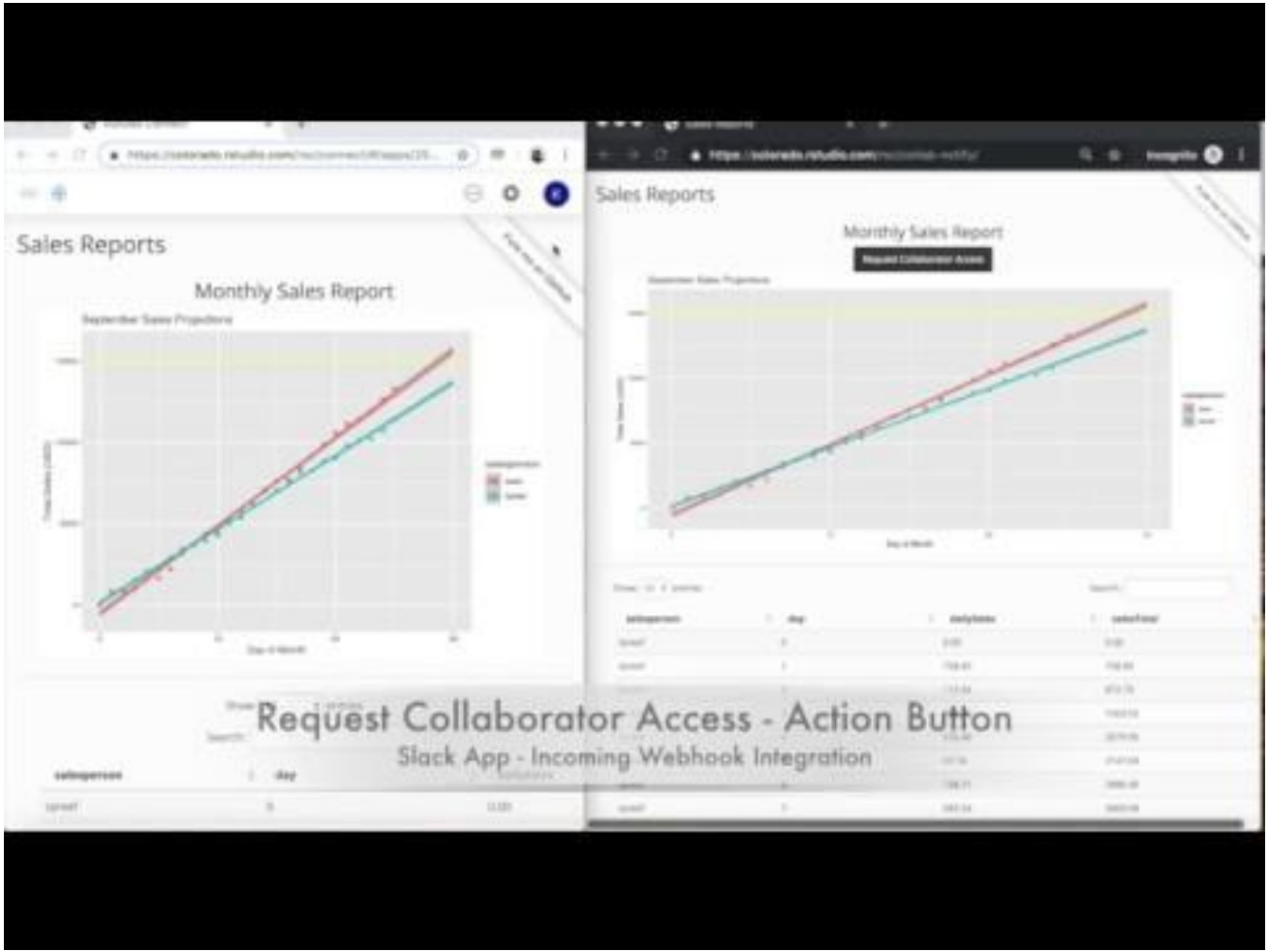


Access Control Setting	Group or User Conditional	Solution
All users, login required	Group isSolutions() FALSE	Element for requesting collaborator access

Left:
Publisher view with access controls on RStudio Connect

Signed in as Kelly, who is a member of solutions

No button displayed

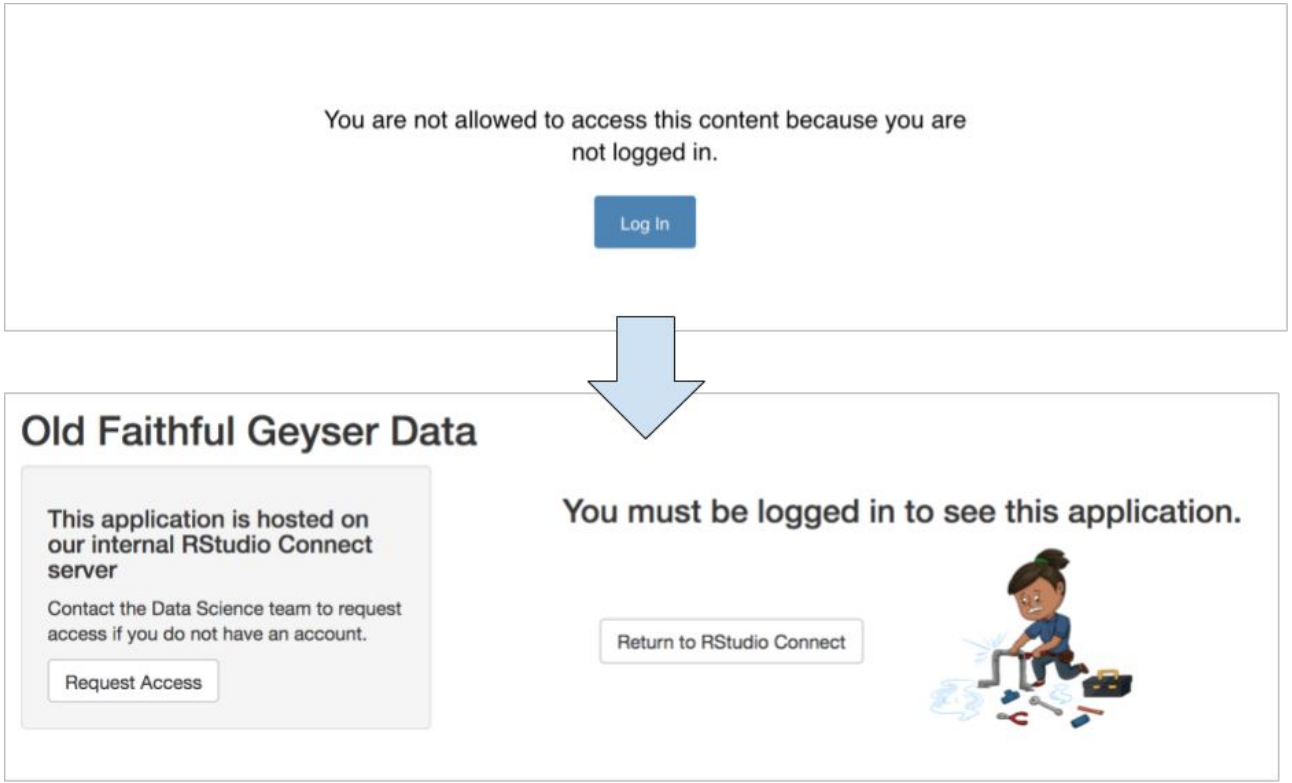


[Watch on YouTube]

Right:
Vanity URL app access by a different user

User is not a member of the solutions group

Request Access button displayed

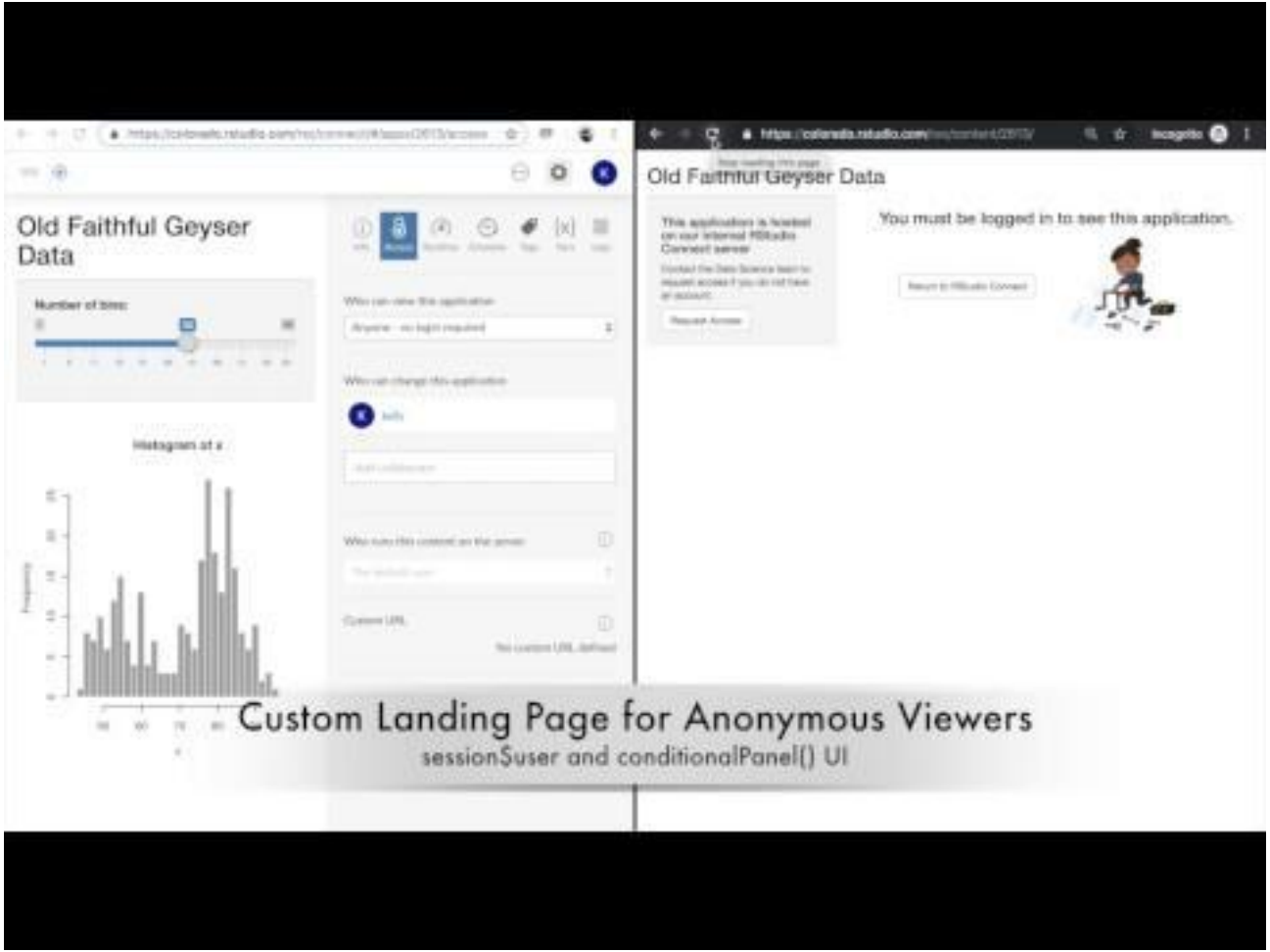


More Hacks for session$user

Create a custom landing page for anonymous visitors and logged out users

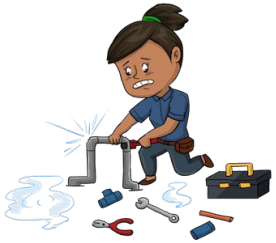
Access Control Setting	Group or User Conditional	Solution
Anyone, no login required	is.null(user()) TRUE	Custom UI for anonymous viewers

Left:
Publisher view with access controls on RStudio Connect



[Watch on YouTube]

Right:
Custom UI for anonymous and logged-out visitors to the app



Code:
github.com/kellobri/shiny-feature-toggle

Slides: **bit.ly/shiny-feature-toggle**

- solutions.rstudio.com
- community.rstudio.com
- kelly@rstudio.com