Shiny

R for Data Science workshop

2019-05-01 (updated: 2019-07-11)

Shiny

Outline

- Overview
- Shiny app structure
- Reactivity
- File structure
- Deployment

Data science workflow

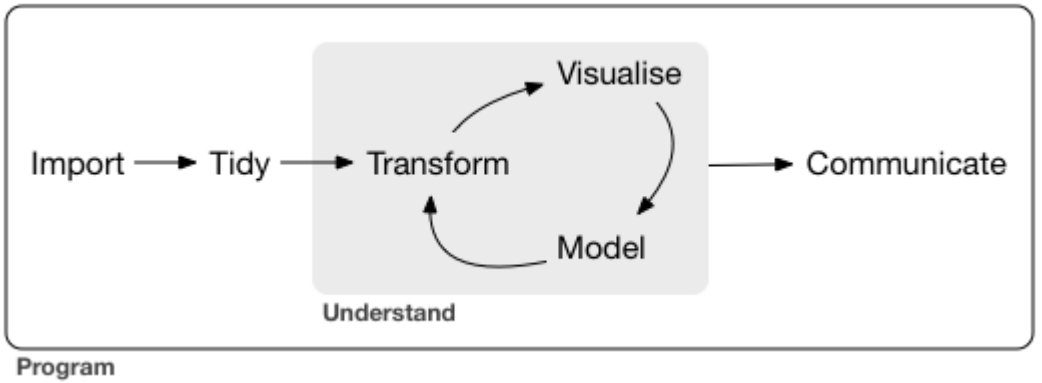


Image source: R for Data Science by Hadley Wickham & Garrett Grolemund.

Data science workflow

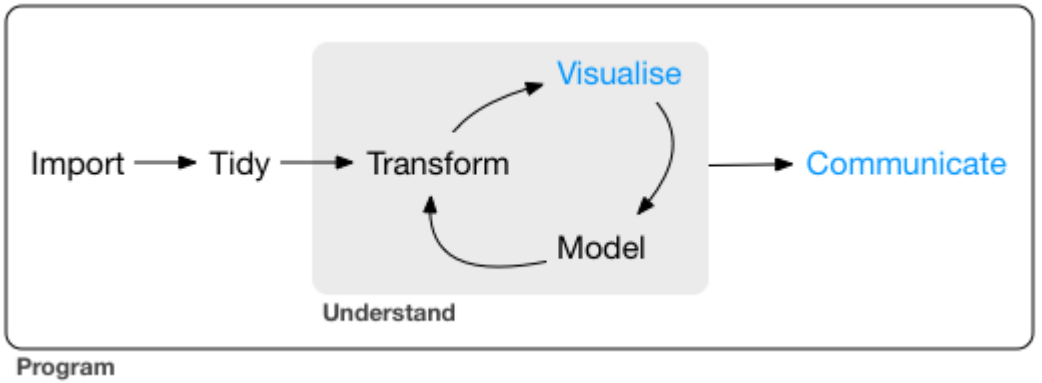
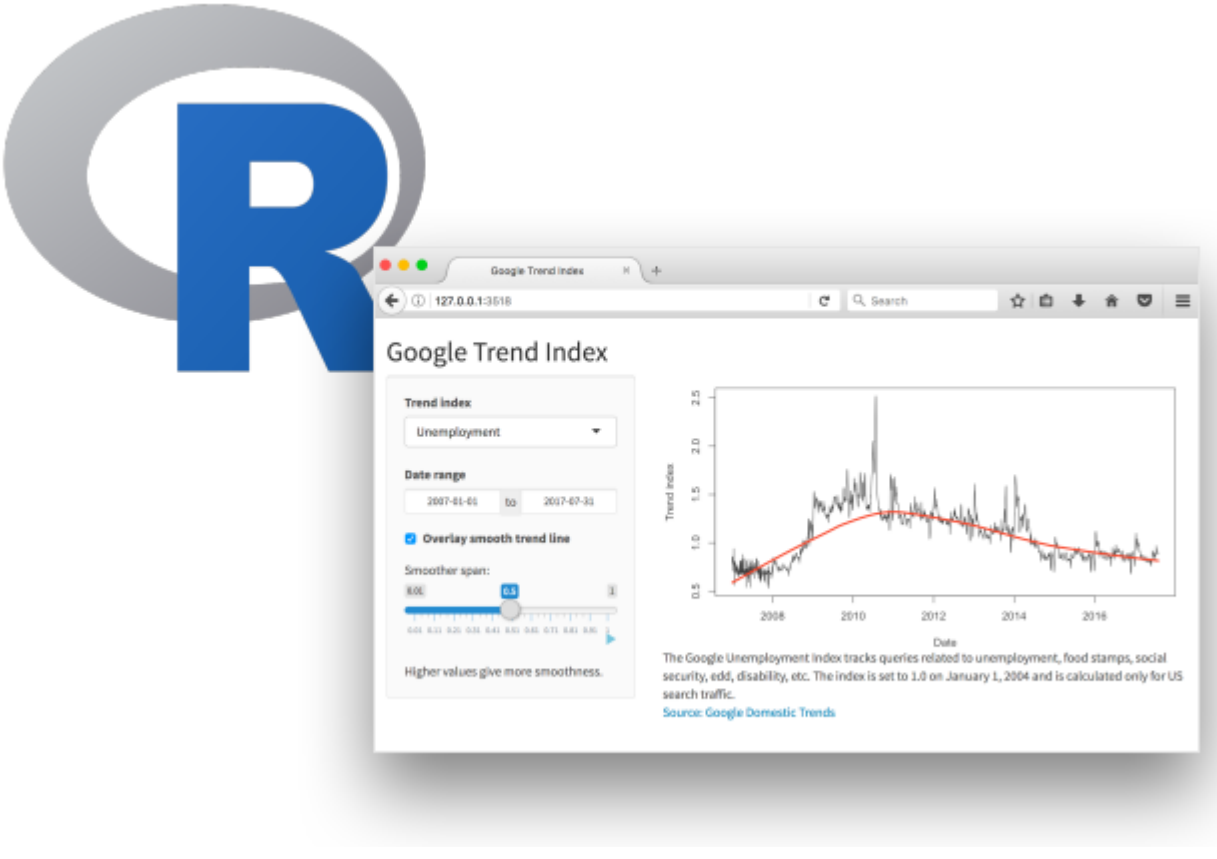


Image source: R for Data Science by Hadley Wickham & Garrett Grolemund.

Shiny

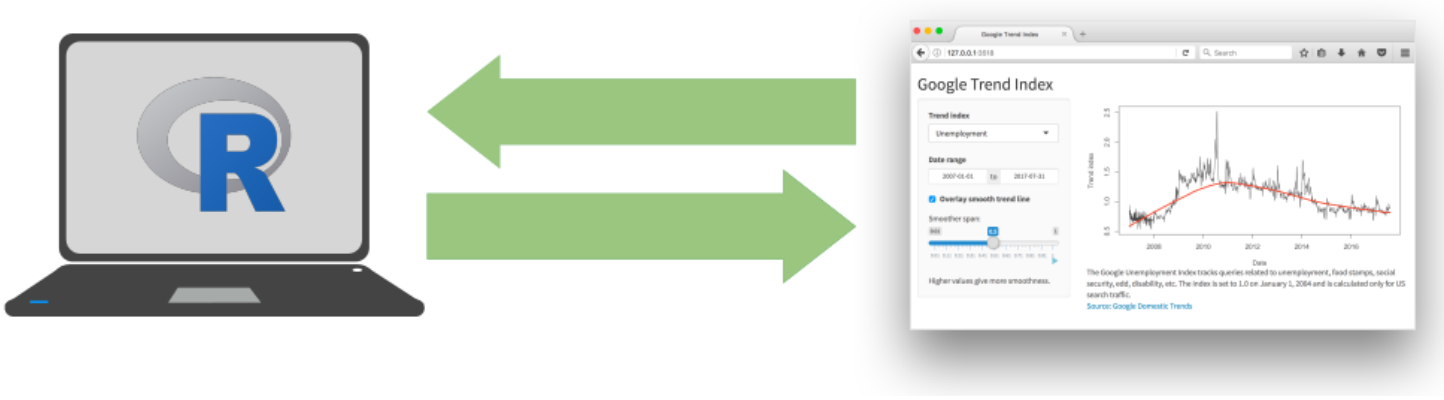
Overview

- Web apps written completely in R
- Shiny generates a web UI consisting of HTML, CSS, & JavaScript
- The web server executes R code
- The UI interacts with the R server using websockets
- You only have to write R code



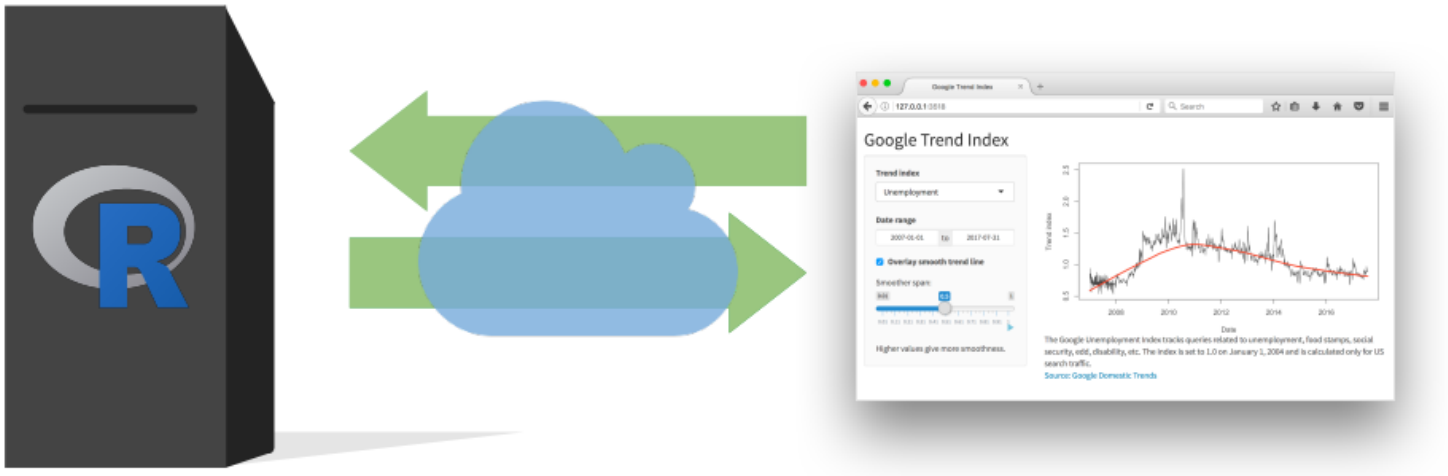
A Shiny app consists of a web page served by an R program.

Image credit: Mine Çetinkaya-Rundel / RStudio



During development and when running locally, the R program is running on your computer.

Image credit: Mine Çetinkaya-Rundel / RStudio



When the Shiny app is deployed in production, a web server runs the R program that serves the app.

The R program processes data and generates the UI (HTML, CSS, JavaScript).

The UI (HTML, CSS, JavaScript) runs in the user's web browser.

Image credit: Mine Çetinkaya-Rundel / RStudio

Shiny

Shiny app structure

```
library(shiny)

ui <- fluidPage()

server <- function(input, output) {}

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

Demo

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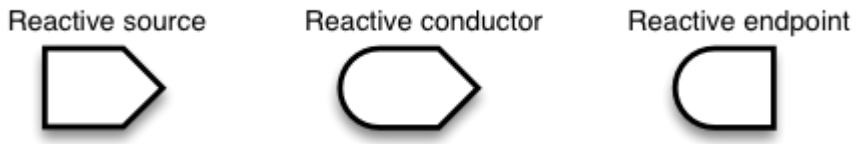
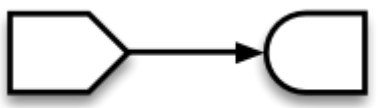
Reactivity

Shiny has three kinds of objects for reactive programming.



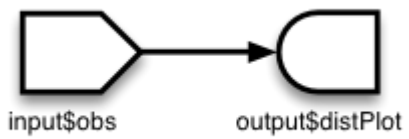
The simplest structure of a reactive program involves just a source and an endpoint:



Shiny

Reactivity example

```
server <- function(input, output) {
  output$distPlot <- renderPlot({
    hist(rnorm(input$obs))
  })
}
```



See it in action: https://gallery.shinyapps.io/01_hello/

Shiny

Household Income example

Our "eat cake first" demo turned into a Shiny app!

Demo

Shiny

Deploying your app

- Shinyapps.io - hosting service from RStudio ($, includes a free tier)
- Shiny server - open source, deploy to your own server or Docker container
- RStudio Connect - RStudio publishing platform for Shiny apps, RMarkdown reports, Plumber API's, dashboards, and more ($$$)

Your turn

Shiny

Create a shiny web app!