

R Markdown and Interactive Dashboards

Adding Interactivity



The R Markdown Workflow

Publishing Outputs

Output options

HTML

PDF

Presentations

Dashboards

Document templates

knitr options

Embedding code in chunks and inline

Other languages

Parameterization

Publishing documents

Your turn: Experiment with different document outputs

Your turn: Restructure from plain R Markdown to slides

Adding Interactivity

What makes dashboards interactive

Dashboard Taxonomy

Parameters

Client-side

Shiny

Client-side and server-side dashboards

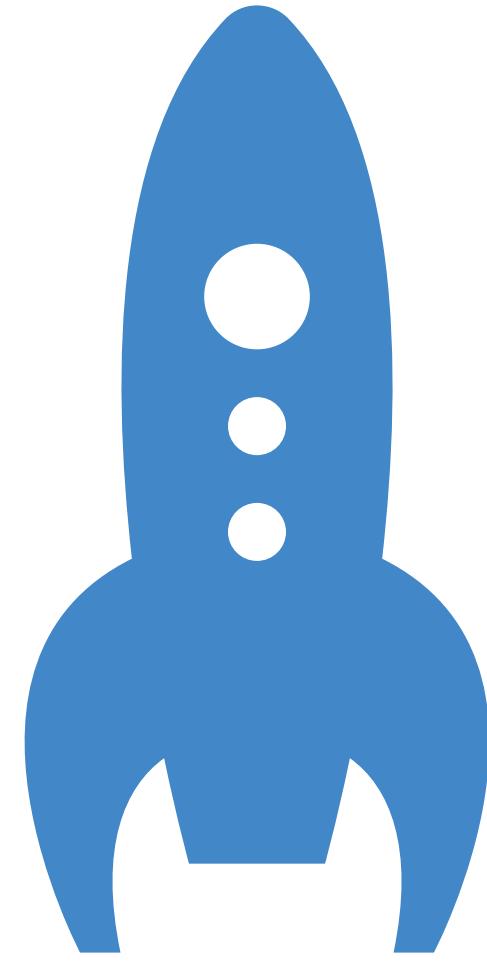
Why Interactivity?

In your groups, discuss:

1. What constitutes interactivity in the context of data exploration?
2. Why is interactivity desirable?
3. How long do you think it should take to craft an interactive dashboard?



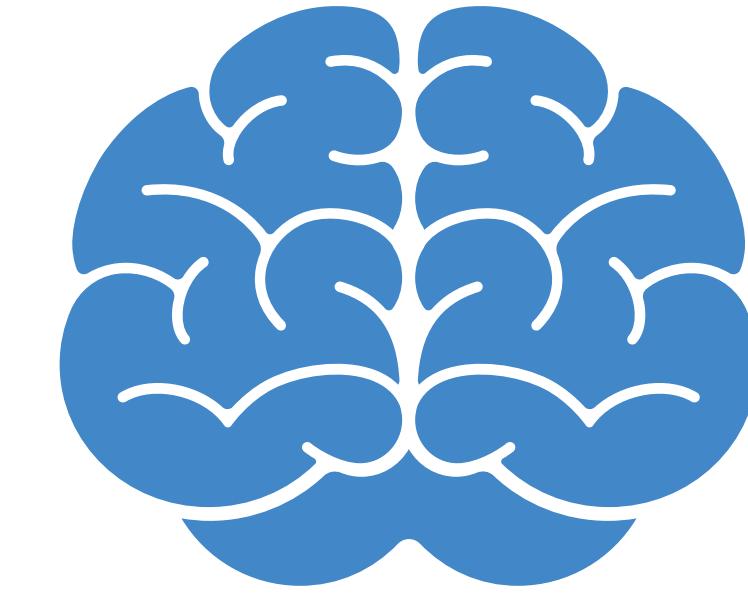
Interactivity...



Encourages exploration



Drives engagement



Improves retention

*Interactivity is the gateway
drug that hooks users on your
content*

Let's run some experiments



The Babynames Dataset

- US babynames from 1880 to 2017 as registered with US Social Security
- About 2 million entries in total
- Categorized by male and female gender

EXERCISE 31

(Don't be concerned that you missed a bunch of exercises.
Each module has its own unique exercise numbers, but
exercise numbers aren't consecutive between modules)

rstudio::conf

Parameterize A Report

1. Open project **03-Adding-Interactivity**
2. Click on **31-Babynames-params.Rmd** in the Files pane to open that file
3. Knit the file and observe the result
4. Now edit the names and/or years in the RStudio IDE and re-knit your file to compare different names. Don't forget to adjust genders appropriately.





Wake me when it's
interactive

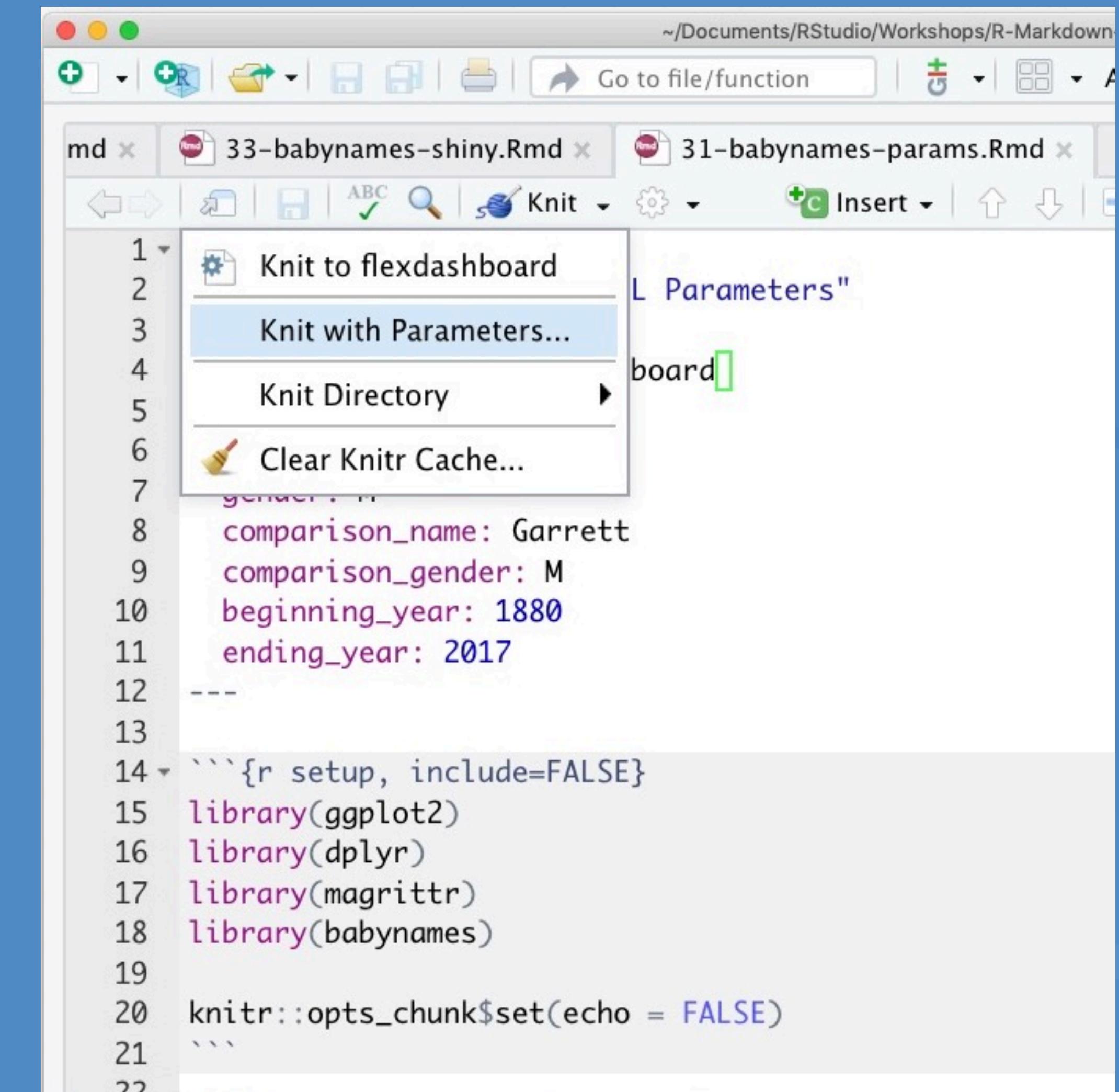
EXERCISE 32

rstudio::conf

Interactive Parameters

1. Use the same **31-Babynames-params.Rmd** we used in the last exercise.
2. Select *Knit with Parameters* from the Knit pull down menu.
3. Change the names and/or years and view the result.
4. Repeat as needed. You'll have to re-knit the document for each variable change.

3m 00s



A screenshot of the RStudio interface showing an R Markdown file named "33-babynames-shiny.Rmd" open. The Knit menu is open, and the option "Knit with Parameters..." is highlighted. A tooltip "Parameters" is visible near the menu item. The code editor shows R code, including parameter definitions for comparison_name, comparison_gender, beginning_year, and ending_year, and library imports for ggplot2, dplyr, magrittr, and babynames. The code also includes knitr::opts_chunk\$set(echo = FALSE) and a comment block.

```
1  Knit to flexdashboard
2  Knit with Parameters...
3  Knit Directory
4
5  Clear Knitr Cache...
6
7  comparison_name: Garrett
8  comparison_gender: M
9  beginning_year: 1880
10 ending_year: 2017
11
12 ---
13
14 ```{r setup, include=FALSE}
15 library(ggplot2)
16 library(dplyr)
17 library(magrittr)
18 library(babynames)
19
20 knitr::opts_chunk$set(echo = FALSE)
21
22
```



Really now.
You woke me for that?

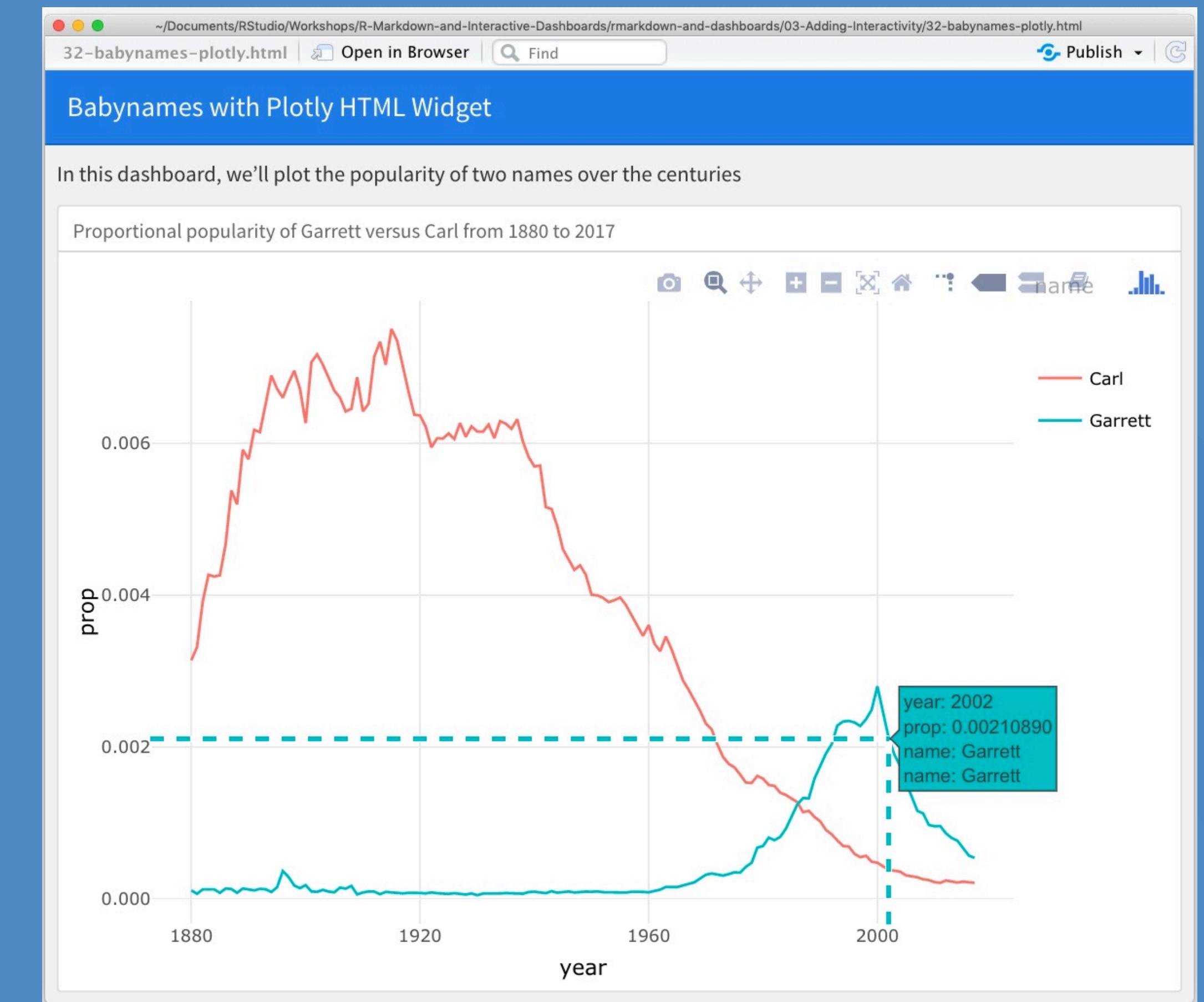
EXERCISE 32

rstudio::conf

Client-side Interactivity With Plotly

1. Open **32-babynames-plotly.Rmd**
2. Knit the file
3. Move your mouse over the graph to view values.
4. Click and drag across the graph to zoom in.

3m 00s





More. I want more.

Client-side Interactivity With Plotly

1. Open **33-babynames-shiny.Rmd**
2. Run the app using the Run Document button where Knit used to be.
3. Play with the parameters and see how the graph changes.



A close-up photograph of a brown tabby cat with green eyes, sitting on a light-colored desk. The cat is looking directly at the camera with a slightly weary expression. In the background, a computer monitor displays a desktop screen with various icons and a web browser window. A keyboard is partially visible in the foreground.

Your efforts are acceptable.
You may now pet me.

Buffy the Catfood Slayer appears by
special arrangement

How did these experiences differ?

Together, let's discuss:

1. Which version did you enjoy most?
2. Look through the code for each version. Which version required the fewest changes?
3. Which version took the longest to start?



*R Markdown supports three
different types of interactivity:
one-time, web-based, and
server-side*

Interactive Components



ଓ আমার
(I love R)

Browser

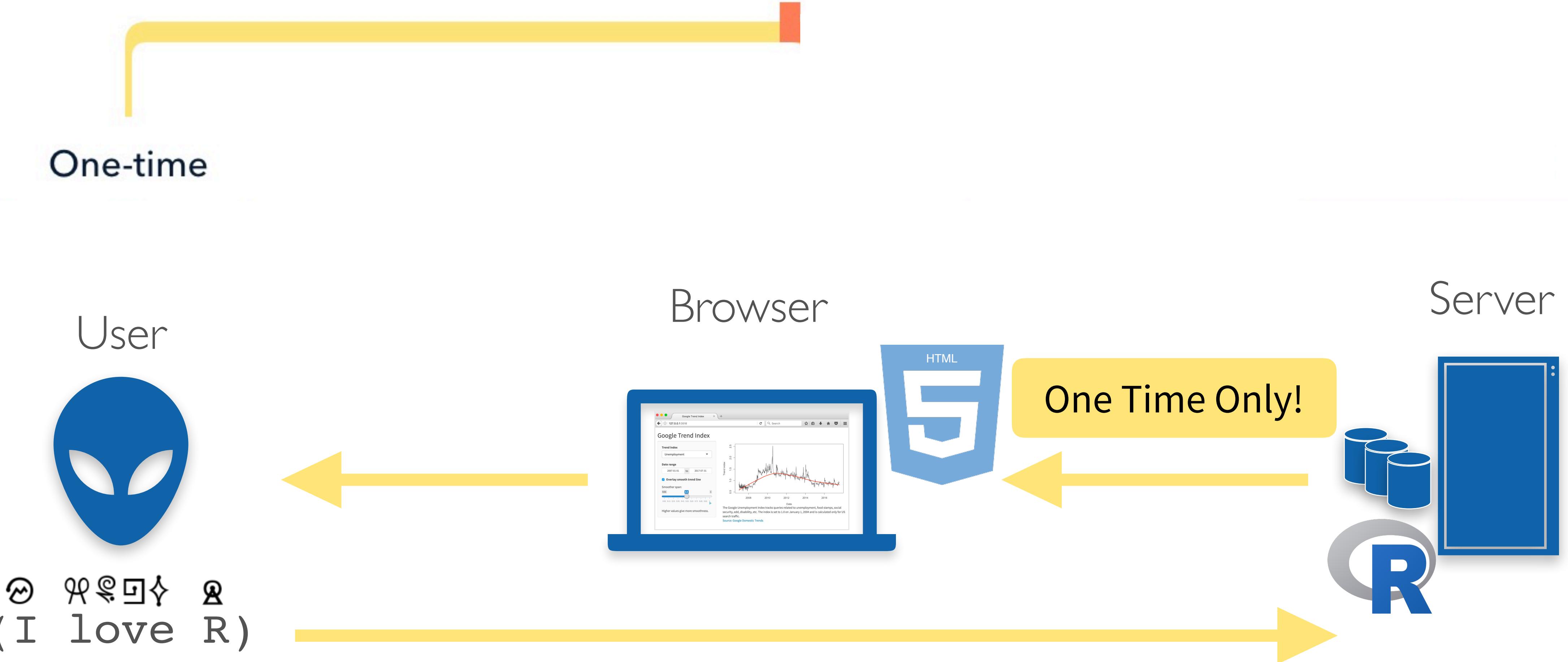


Server



Types of Interactivity

Interactivity



Types of Interactivity

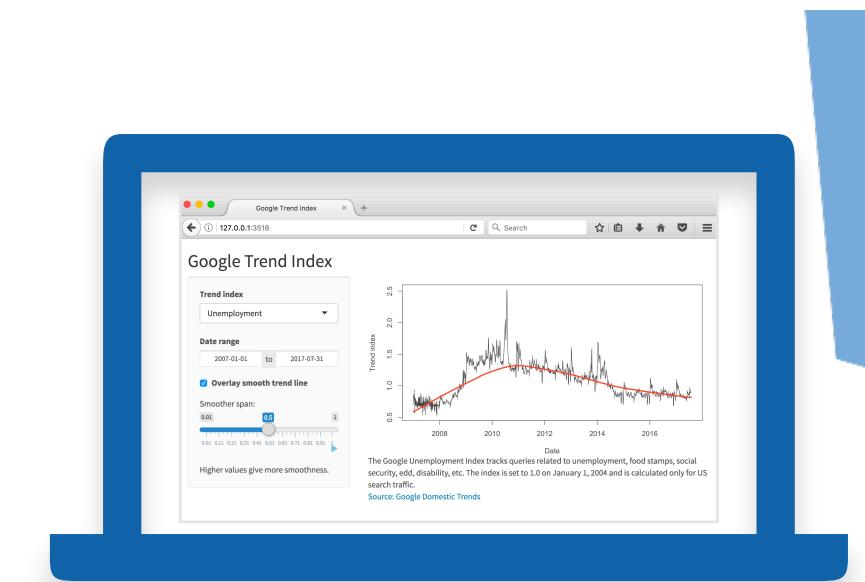
Interactivity



Web-based



Browser



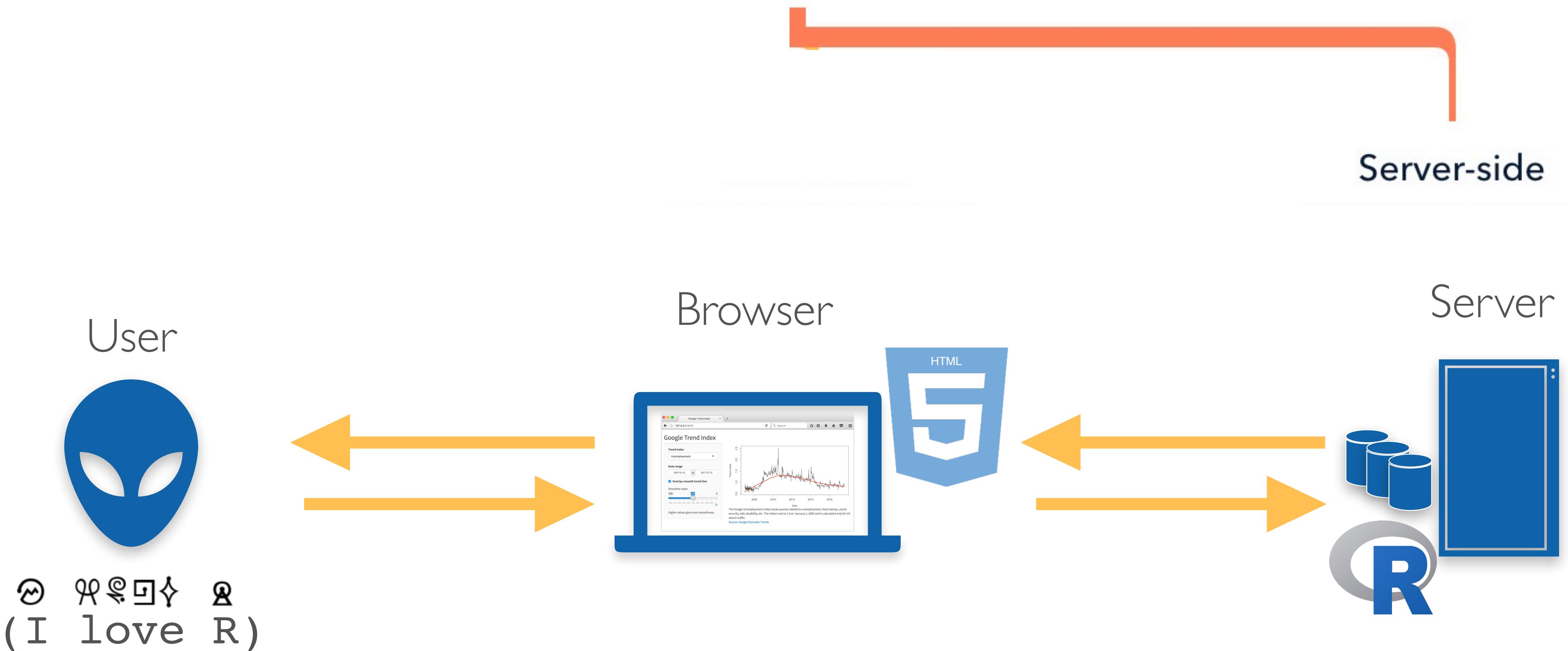
One Time Only!

Server



Types of Interactivity

Interactivity



Types of Interactivity

Interactivity



Types of Interactivity

Interactivity

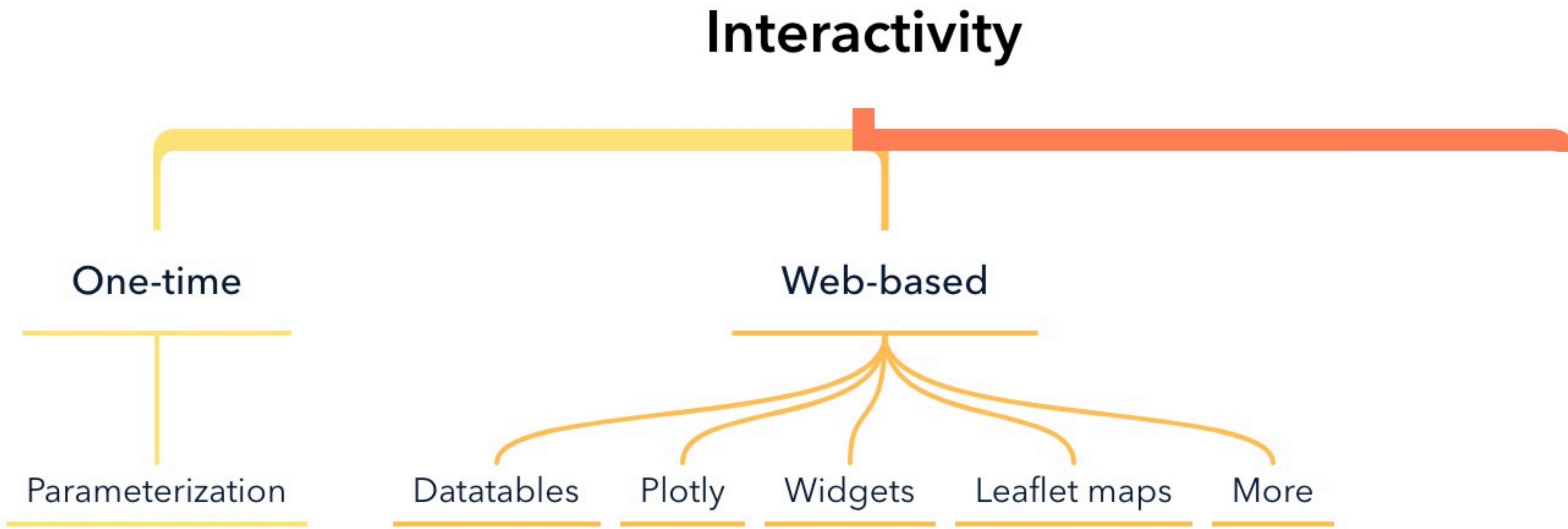


One-time

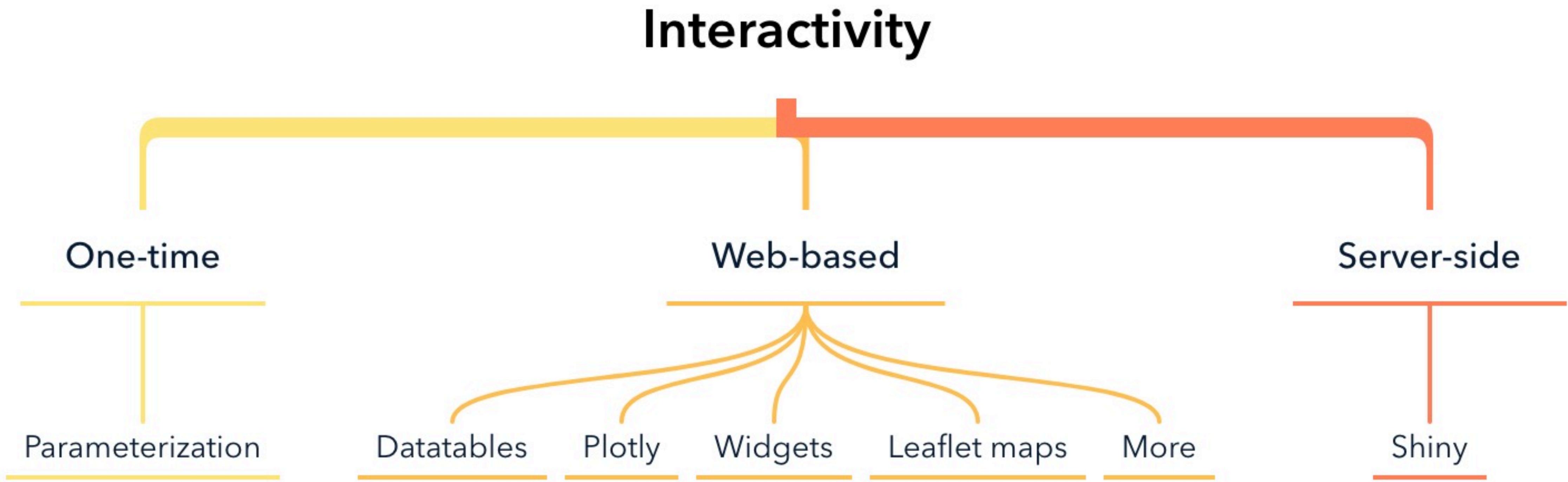


Parameterization

Types of Interactivity



Types of Interactivity



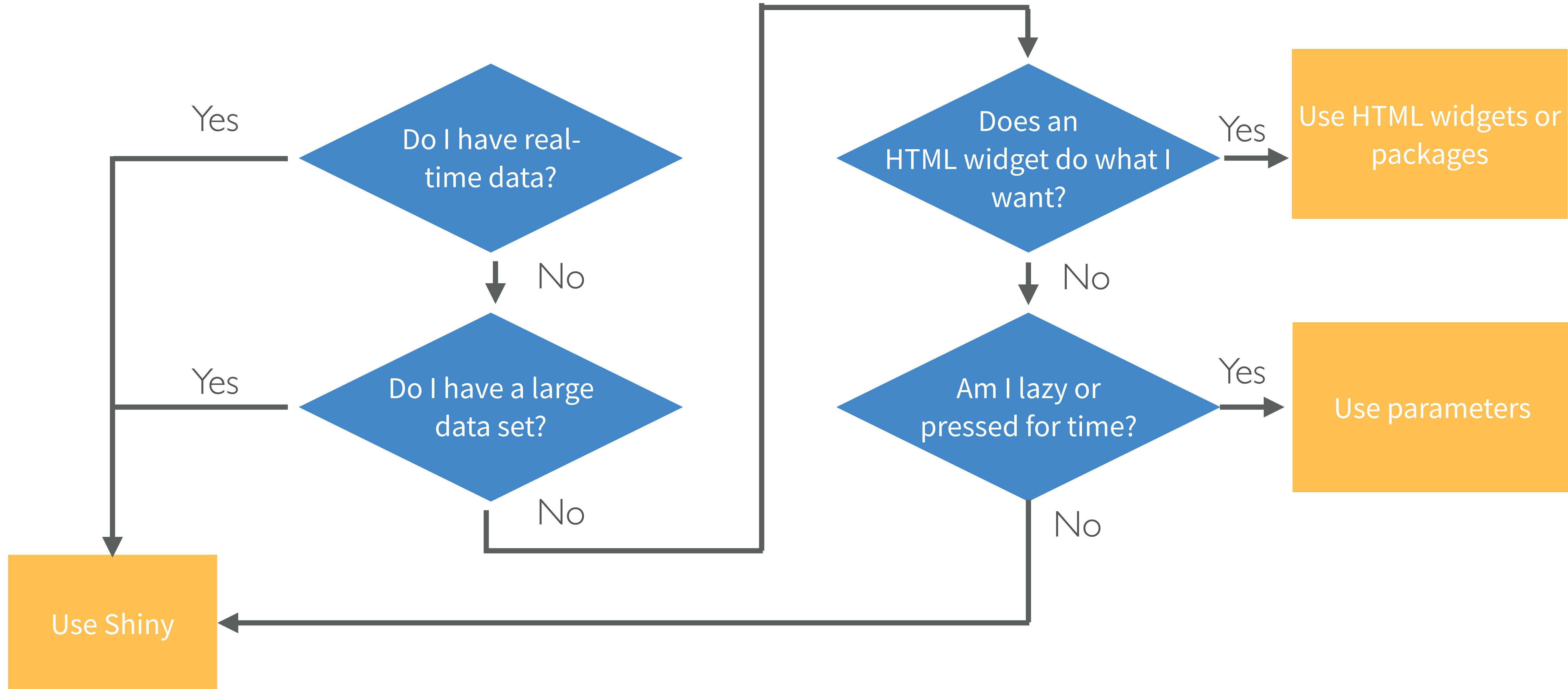
Interaction Comparisons

	One-time Interactivity	Web-based Interactivity	Server-side Interactivity
Complexity	Low	Medium	High
	Low	High	Medium
	Minimal code changes	Small to large changes in code	Requires code restructuring
	None	Data must fit in browser memory	None
	Little	None	Lots
	Bespoke (i.e., Full Custom)	Limited	Bespoke (i.e., Full Custom)
	Web server*	Web server	RStudio Shiny or Connect servers
	Limited data exploration	Data exploration addressed by HTML widgets	Full custom applications

* One-time interactive documents using the interactive *Knit with parameters* feature must publish to an RStudio Connect Server.

*Tailor your interactivity plan
to your data and user goals*

Interaction Type Flowchart



Summary

- Interactivity is the gateway drug that hooks users on your content
- R Markdown supports three different types of interactivity:
 - one-time interactivity using parameterization
 - Web-based interactivity using HTML widgets, and
 - server-side interactivity using Shiny
- Tailor your interactivity plan to your analysis goals