Oct 2024

R Shiny Masterclass Series - Introduction

R Shiny UI, navigation and responsive layouts

EPI-interactive

Agenda

- **Session 1** | 30 September | Getting started with Posit Cloud and your first R Shiny app
- **Session 2** | 01 October | R Shiny core concepts and mobile ready layout
- **Session 3** | 03 October | R Shiny user interface components, reactivity and debugging
- **Session 4** | 07 October | Data sources and data processing in R Shiny
- **Session 5** | 08 October | Interactive charts with Plotly: chart types, customising hover boxes and chart styling
- **Session 6** | 10 October | Maps and spatial visualisation with Leaflet: adding map layers, annotations, pins, filters and legend
- **Session 7** | 14 October | Publishing R Shiny apps, design considerations and case study
- **Session 8** | 15 October | Case study, top 10 tips for data visualisation with R Shiny and wrap-up

Today

Recap: Session 1

Have pen and paper ready!

Goals:

- Practice with Shiny layout functions
- Know how to add static content to app
- Create custom layouts with the Shiny Bootstrap grid system

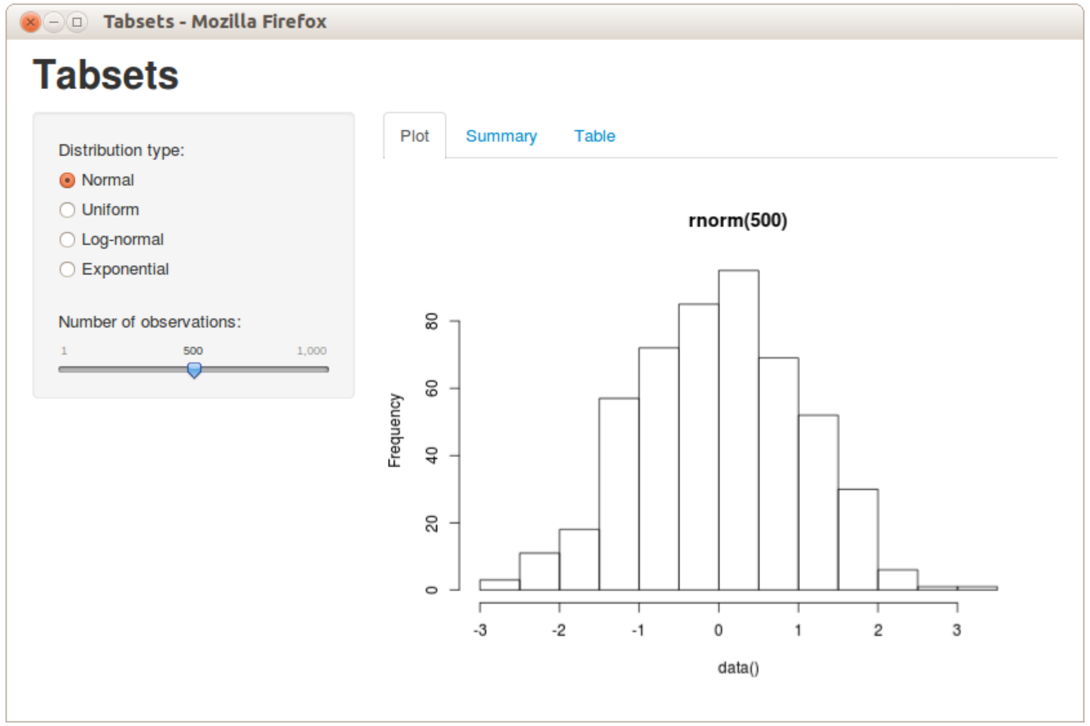
Shiny UI functions

Shiny UI functions

- Shiny gives us access to pre-made UI functions to simplify interface design
- Layout functions
  - **sidebarLayout**
  - splitLayout (horizontal) / verticalLayout (vertical)
  - flowLayout
- Navigation functions
  - **tabsetPanel**
  - **navlistPanel**
  - **navbarPage**
- We can freely combine these together!

Navigation: tabsetPanel

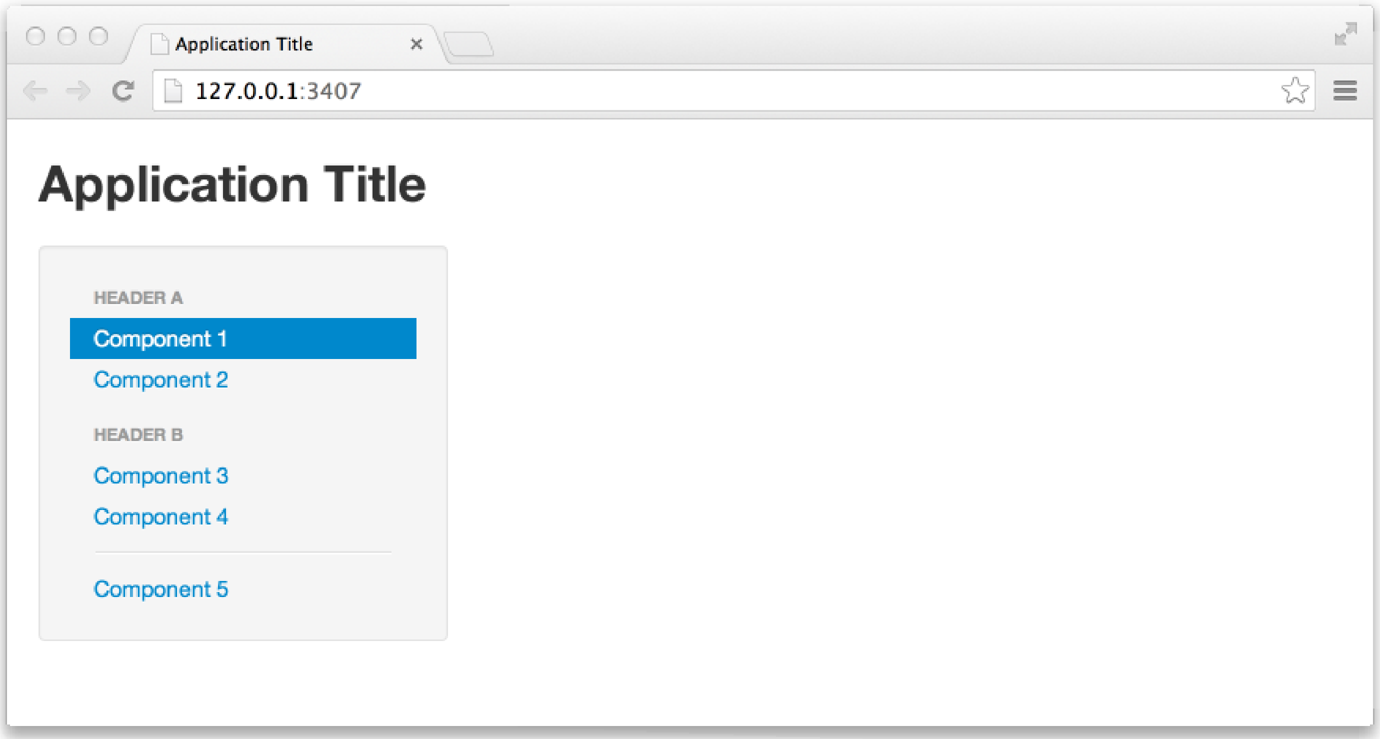
tabsetPanel(..., id = NULL, selected = NULL, type = c("tabs","pills"), header = NULL, footer = NULL)



https://shiny.rstudio.com/articles/layout-guide.html

Navigation: navlistPanel

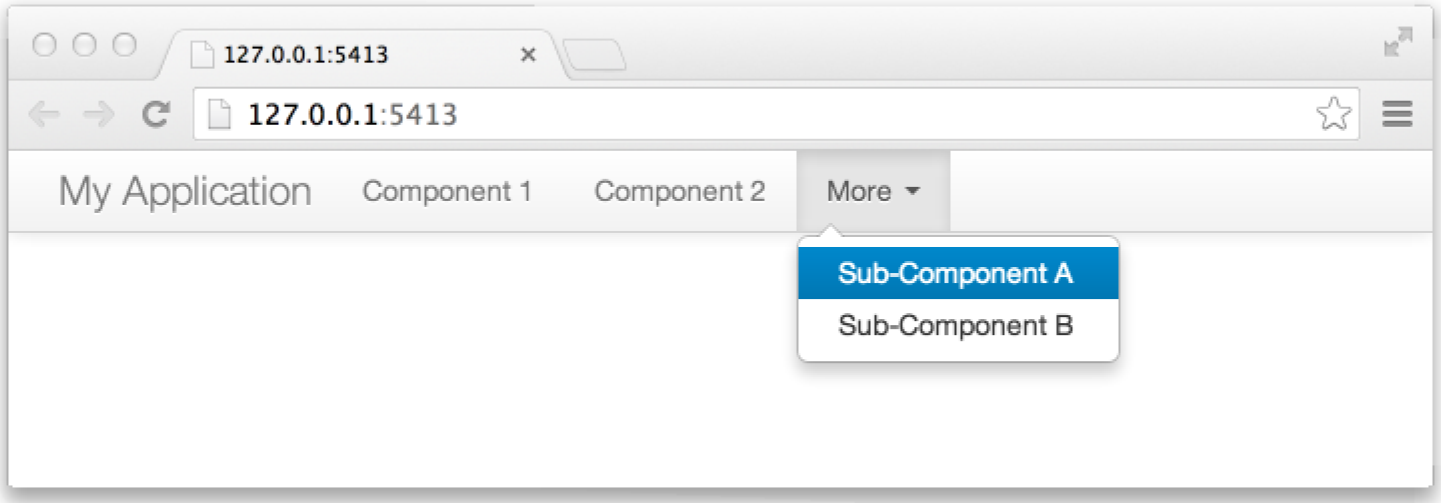
navlistPanel(..., id = NULL, selected = NULL, well = TRUE,
 fluid = TRUE, widths = c(4, 8))



https://shiny.rstudio.com/articles/layout-guide.html

Navigation: navbarPage

- navbarPage(title, ..., id)
- navbarMenu(title, ..., menuName = title)



https://shiny.rstudio.com/articles/layout-guide.html

Navigation: individual tabs

- tabPanel(title, ..., icon = NULL)
- This is where the actual content of the tab itself will go
- Used across all the navigation elements

Navigation: Exercise

- In Posit Cloud, open Session-2, then /stage1

- Add a tabSetPanel to the current app, within the existing mainPanel
- In one tab, add the “distplot” output
- In the other, add the “distPlot2” output

- We have provided “distPlot2”, in server.R, which is the same as “distPlot”, with different coloured bars

Shiny Layout

- Shiny abstracts away a lot of HTML
- E.g. a sidebarPanel(…) is actually
  <div class="col-sm-4"> <form class = “well”> … </form> </div>
- This is helpful for quick development, but it can limit options in future
- Use HTML(…) to wrap pure HTML code
- Use containers like div(), wellPanel(), tagList() to contain multiple elements together

- Note that you are using functions to generate HTML

Shiny HTML

- HTML tags can be generated using identically named functions

Check tags on:
https://shiny.rstudio.com/articles/html-tags.html

- E.g. p("paragraph") becomes <p>Paragraph</p>
- Many tags require the “tags$” format, e.g. tags$table()
- Some commonly use ones can go without, e.g. p()
  (see documentation above)

Adding new components: exercise

Add some new components (HTML tags) to the mainPanel in ui.R

Try out adding different tags in the UI file:

- tags$strong(), tags$i()
- tags$a(href=…)
- HTML() (can be used for direct HTML input as a character string)

Try out tags with children (tags within tags):

- tags$ul(tags$li())

Try adding an image

- tags$img(src=…)

Mobile ready layout & Bootstrap

Bootstrap

What is Bootstrap

- Originally created by a designer / developer at Twitter
- Maintained by an open-source team of contributors under the MIT licence
- Contains most widely used grid system on the web (and more)
- Premade styles and components
- “Mobile first” / responsive layout

How does it work

- The Bootstrap grid is based on **containers**, **rows** and **columns**
- A **container** holds a series of **rows**, and each **row** is divided into 12 units
- Columns can be sized between 1-12 units within a row

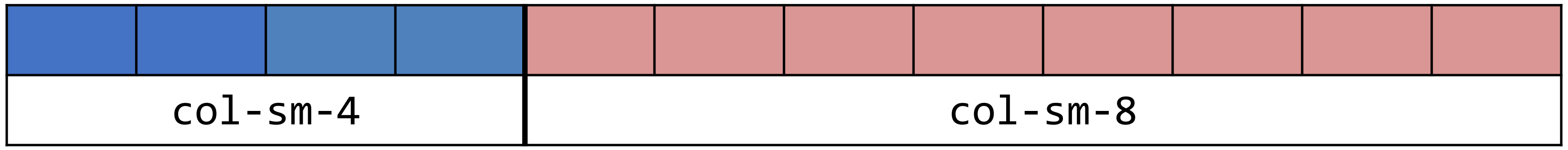
Bootstrap HTML – Breakpoints

Bootstrap target devices:

• Extra small devices, portrait phones (<576px)	“xs”
• Small devices, landscape phones (≥768px)	“sm”
• Medium devices, tablets (≥768px)	“md”
• Large devices, desktops (≥992px)	“lg”
• Extra large devices, desktops (≥1200px)	“xl”

Bootstrap Grid

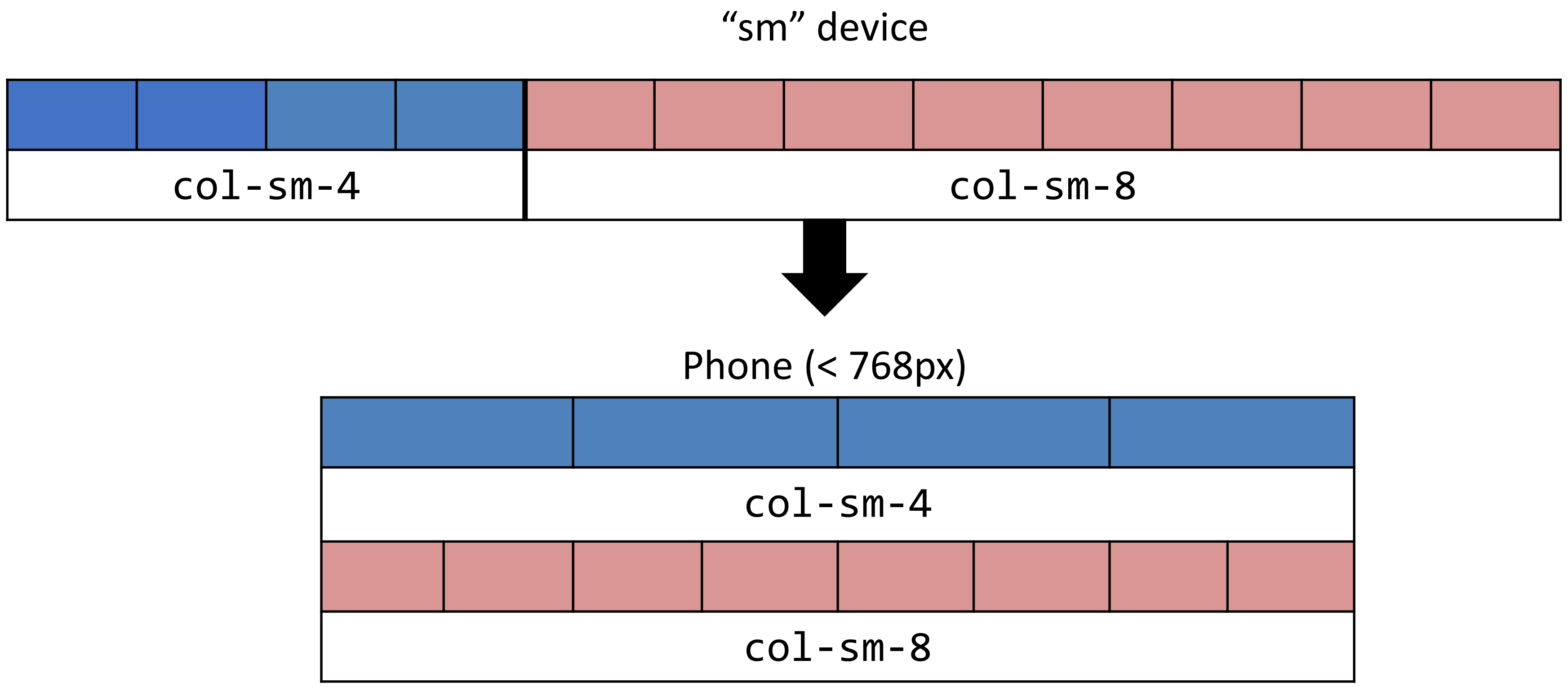
Fixed default sidebarLayout: 4 – 8 column layout



Check HTML layout with Chrome developer tools

Bootstrap Grid

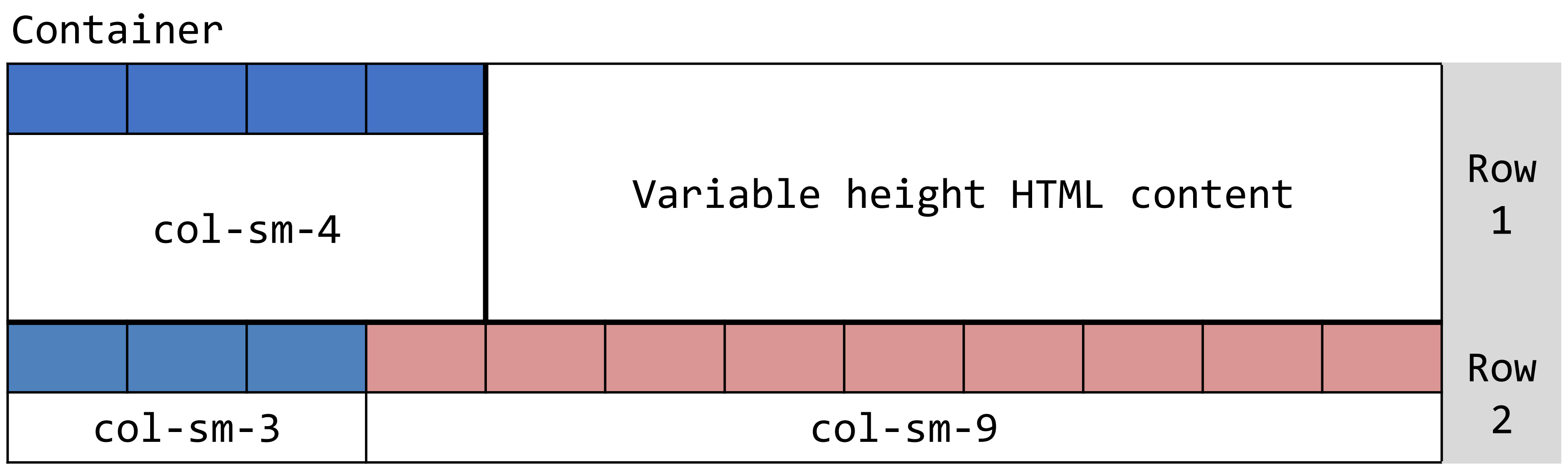
Fixed default sidebarLayout: 4 – 8 column layout



Try it out in your app....

Bootstrap Grid

- Columns have variable height
- Columns don’t need to be specified in full
  E.g. we don’t know how much content we'll have in the top right, but we want the next columns to appear below



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Bootstrap Grid

- We can guarantee vertical ordering with **rows**

- Wrapper (parent element) can be **container-fluid** or **container:**
    - Both horizontally centre the content
    - Container-fluid always stretches to the edge (Shiny default)

      fluidPage(…)
    - Container applies a fixed width according to breakpoints:

      1200px, 992px, 768px…

      fixedPage(…)

Bootstrap HTML – “Div soup”

Now let’s guess the layout… Draw the grid for a large device

```
<div class="container-fluid">
          <div class="row">
                    <div class="col-sm-6">
                              Content
                    </div>
          </div>
          <div class="row">
                    <div class="col-sm-4">
                              Content2
                    </div>
                    <div class="col-sm-8">
                              Content3
                    </div>
          </div>
</div>
```

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Bootstrap HTML – “Div soup”

```
<div class="container-fluid">
     <div class="row">
          <div class="col-sm-6 col-md-3">
               Content
          </div>
          <div class="col-sm-6 col-md-9">
               Content2
          </div>
     </div>
</div>
```

Bootstrap HTML – “Div soup”

```
<div class="container-fluid">
     <div class="row">
          <div class="col-sm-3"> Content1 </div>
          <div class="col-sm-3"> Content2 </div>
          <div class="col-sm-2"> Content3 </div>
          <div class="col-sm-2"> Content4 </div>
          <div class="col-sm-2"> Content5 </div>
     </div>
</div>
```

Bootstrap HTML – “Div soup”

```
<div class="container-fluid">
      <div class="row">
            <div class="col-sm-5">
                  Content
            </div>
            <div class="col-sm-6">
                  Content2
            </div>
            <div class="col-sm-4">
                  Content3
            </div>
      </div>
</div>
```

Bootstrap - Exercise

Now let’s convert the Geyser app in /stage2:

```
fluidRow(
    column(6, [add sidePanel elements here]
    ),
    column(6, [add mainPanel elements here]
    )
  )
```

sidebarLayout -> fluidRow
sidebarPanel -> column

mainPanel -> column

Check how the page behaves at different sizes.

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Next time

- Shiny UI components
- Reactivity
- Debugging

Challenge (Using your stage 2 project):

Modify your application to have the following structure:

- At the top of the page: a fluidRow containing a title element and an image as a logo
- Beneath this, a fluidRow containing either a tabsetPanel, navlistPanel or navbarPage
  - Use your existing tabPanels inside of this navigation element
- Beneath this, a new row for the footer, with 3 evenly sized columns
  - In the first column, add your name. In the second, add a link to an email address. In the third, add a web link that opens in a new tab.

Share the link to your project on the **Session 2 forum**.