

INTERACTIVE VISUALIZATION WITH

HTMLWIDGETS & SHINY

USER! 2015 AALBORG

JOE CHENG <JOE@RSTUDIO.COM>

AGENDA

- Overview & demos of htmlwidgets
- htmlwidgets vs. Shiny
- Interactive graphics with Shiny

HTMLWIDGETS

WHY BROWSER?

- Integrated vector (SVG), raster (Canvas), and 3D (WebGL) engines, generally GPU accelerated
- Fast and powerful layout primitives (HTML) and theming (CSS)
- d3, Bootstrap, React, MathJax, three.js, jQuery UI, Font Awesome, ...
- Leaflet, Data Tables, NVD3, Google Charts, ...
- JavaScript is the world's most well-known programming language ^[citation needed]
- Not because we *have* to—but because we *want* to

INTRODUCING HTMLWIDGETS

- Foundation for building interactive widgets for R using browser-based technology
- Removes complexity, tedium, and common bugs for package authors
- htmlwidgets-based visualizations can be used from the console, R Markdown docs, and Shiny apps
- Brought to you by Ramnath Vaidyanathan, RStudio, and Kenton Russell; first release in December 2014
- <http://htmlwidgets.org> (or just google "htmlwidgets")

DEMOS

VISUALIZING R DATA IN JS

1. Define R function interface: `d3heatmap(mtcars, scale="cols")`
2. Serialize data and options to JSON
3. Create HTML file
4. Locate and gather CSS/JavaScript library dependencies, and embed into HTML file
5. Embed an empty HTML element
6. Write custom JavaScript to take data and options and render into HTML element
7. Implement `print` method
8. Hooks to integrate into RStudio Viewer, R Markdown documents, and Shiny

VISUALIZING R DATA IN JS

1. Define R function interface: `d3heatmap(mtcars, scale="cols")`
2. Serialize data and options to JSON
3. Create HTML file
4. Locate and gather CSS/JavaScript library dependencies, and embed into HTML file
5. Embed an empty HTML element
6. Write custom JavaScript to take data and options and render into HTML element
7. Implement `print` method
8. Hooks to integrate into RStudio Viewer, R Markdown documents, and Shiny

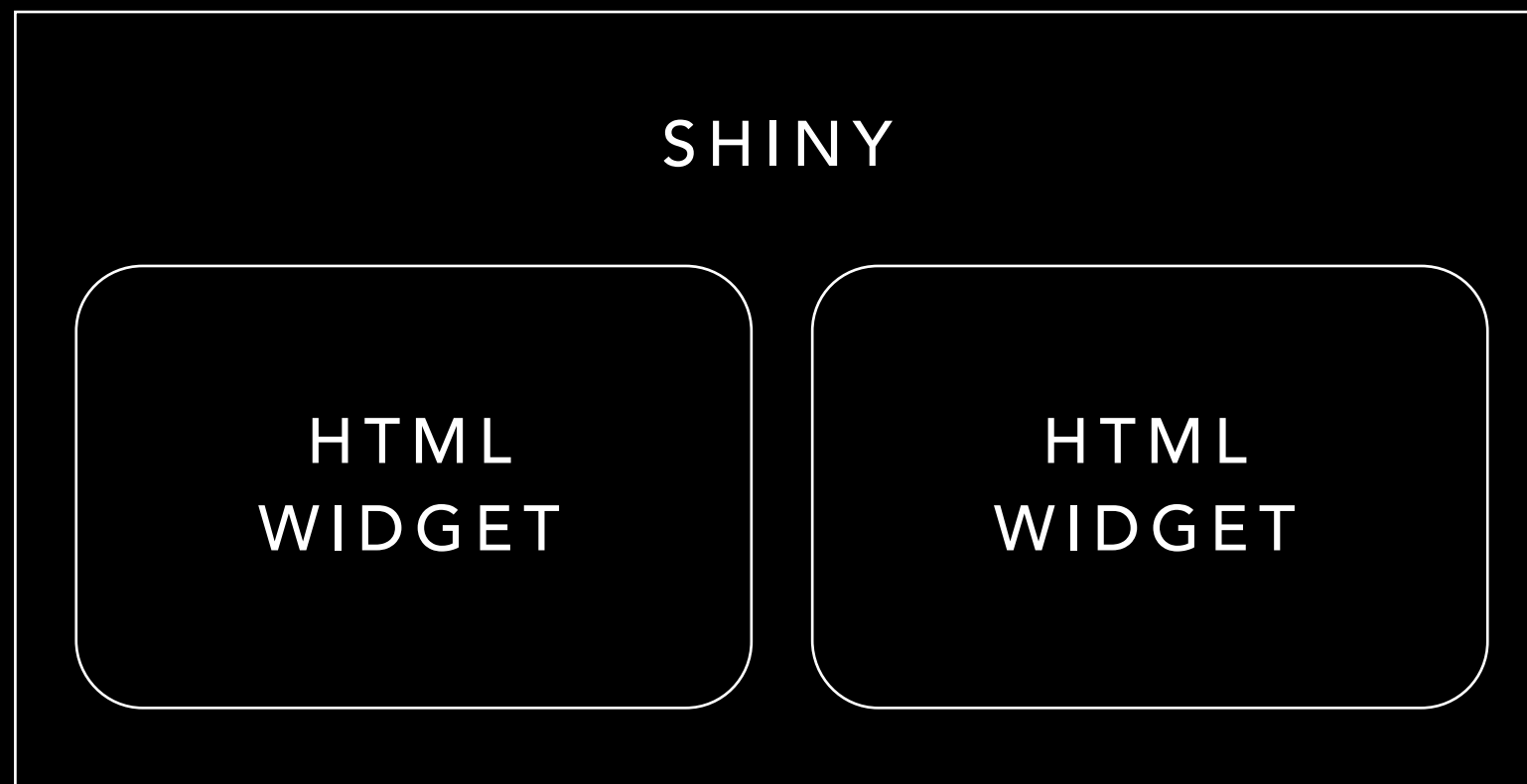
WHERE TO FIND WIDGETS

- Showcase at htmlwidgets.org
- Reverse imports: cran.r-project.org/package=htmlwidgets
- Search GitHub for [repos with "htmlwidgets"](#)
- "Building Widgets" blog by Kenton Russell
buildingwidgets.com/blog/

HTMLWIDGETS VS. SHINY

HTMLWIDGETS VS. SHINY

Not mutually exclusive: htmlwidgets and shiny can be used separately or together



HTMLWIDGETS VS. SHINY

htmlwidgets

Interactivity "in the small"

shiny

Interactivity "in the large"

HTMLWIDGETS VS. SHINY

htmlwidgets

For making individual widgets with JavaScript

shiny

For composing widgets and R logic as web apps

HTMLWIDGETS VS. SHINY

htmlwidgets

Once rendered, no more R calculations (without Shiny)

Deploy on any web host, GitHub.io, or RPubS

shiny

Continuous access to R as app is used

Deploy on Shiny Server or ShinyApps.io

The screenshot shows the RStudio website with a navigation bar containing 'Products', 'Resources', 'Pricing', 'About Us', and 'Blog'. The main content is divided into two sections: 'Shiny Apps for the Enterprise' and 'Industry Specific Shiny Apps'. Each section features a grid of app thumbnails with titles and brief descriptions.

Shiny Apps for the Enterprise

- Marketing Effects**: See the effects of your marketing campaigns. (Thumbnail: Line chart showing trends over time)
- Location tracker**: Track locations over time with streaming data. (Thumbnail: Map with moving location markers)
- Download monitor**: Streaming download rates visualized as a bubble chart. (Thumbnail: Bubble chart with data points)
- Persistent data storage**: Collect and store data to use later. (Thumbnail: Table with columns and rows)

Industry Specific Shiny Apps

- Economic Dashboard**: Economic forecasting with macroeconomic indicators. (Thumbnail: Dashboard with multiple charts)
- ER Optimization**: An app that models patient flow. (Thumbnail: Diagram of patient flow)
- CDC Disease Monitor**: Alert thresholds and automatic weekly updates. (Thumbnail: Dashboard with multiple line charts)
- Supply and Demand**: Forecast demand to plan resource allocation. (Thumbnail: Dashboard with multiple charts)

DEMO: DASHBOARDS

INTERACTIVE GRAPHICS WITH SHINY

INTERACTIVE GRAPHICS WITH SHINY

- Shiny now has basic interactivity primitives for base graphics and ggplot2

DEMO: GGBRUSH

THANK YOU / Q&A

htmlwidgets.org

shiny.rstudio.com

Slides and code samples at github.com/jcheng5/user2015

htmlwidgets talk by Bryan Lewis at New York R Conference
youtube.com/watch?v=OXYX1FVlbdI

Visit the RStudio booth in the Exhibition Hall with questions