PBO Workshop

Getting Excited About Data-Driven Documents With d3

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Outline

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The Philosophy of d3

- d3 isn't just another charting library
  - Although it does happen to come with a lot of prepackaged layouts and examples
- d3 is a very small and sharp tool that plays nicely with others
- d3 doesn't pollute the global namespace
- d3 honors and exposes the user to web standards instead of reinventing them
  - Authors can take their new depth of knowledge of modern web standards with them
- d3 does "one" thing and does it well, reminiscent of the UNIX spirit

d3 Solves the Cruxes of Visualization

Well, to be accurate it does more than one thing, it:

- Binds data and styled presentation elements
  - Provides control over the ability to update, append and remove these bonds
- Provides scales to define the mapping back and forth between between data and pixel space
  - These scales include linear, log, power, discrete/continuous, banded, ordinal, etc.
- Applies data-driven dynamic transformations to the document
  - Locate data anywhere by url (formats include text, json, xml, html, csv)
- Transitions between different style representations
- Targets the browser, making it ideal for quickly reaching a wide audience
  - And is there a story for getting to paper from there

Background

- d3.js is loosely associated with the Stanford Visualization Group
- Supersedes the ProtoVis project, so resources found there can be relevant
- Mike Bostock is the primary author
- Open sourced on the highly active GitHub.com
- Only a year or two old

Background, cont.

It largely targets the SVG element, which is being increasingly supported across all major browsers:

- Internet Explorer, 9+
- Chrome
- Firefox
- Safari
- iOS
- Android, 3.0+
- Opera, 9.5+

It should be noted that JavaScript has had huge investments in increaing its performance recently

The Author's Tour

A Tour

- The author uses "layouts"
- Association / adjacency representations are addressed with chord layout
  - Chord - produce a chord diagram from a matrix of relationships.
- A whole collection of hierarchical layouts
  - Bundle - apply Holten's hierarchical bundling algorithm to edges.
  - Cluster - cluster entities into a dendrogram.
  - Hierarchy - derive a custom hierarchical layout implementation.
  - Histogram - compute the distribution of data using quantized bins.
  - Pack - produce a hierarchical layout using recursive circle-packing.
  - Partition - recursively partition a node tree into a sunburst

The Author's Tour Continued

- Calendar
- Time-series (note Mike's other project: "Cube")
- Pan and zoom
- Scale elements (with tick, label, title and location options)
- Smooth transitions
- Interaction
- Animation
- Chloropleth / projections
- Force (helpful in solving the non-collision problem)

Repository Examples

- Bar / column
- Box plot - quintile distribution of a single variable
- Bullet - considered a best-practices replacement for gauge charts
- Histogram - compute the distribution of data using quantized bins.
- Hyperbolic tree
- Pie - compute the start and end angles for arcs in a pie or donut chart.
- QQ plots - compare two probability distributions by graphing their quantiles against each other
- Radial -
- Stack -
- Streamgraph - a generalization of stacked area graphs

My Tour

- A side project that I consulted on for the Startup Weekend
- ** My navpane task