D3.js Introduction

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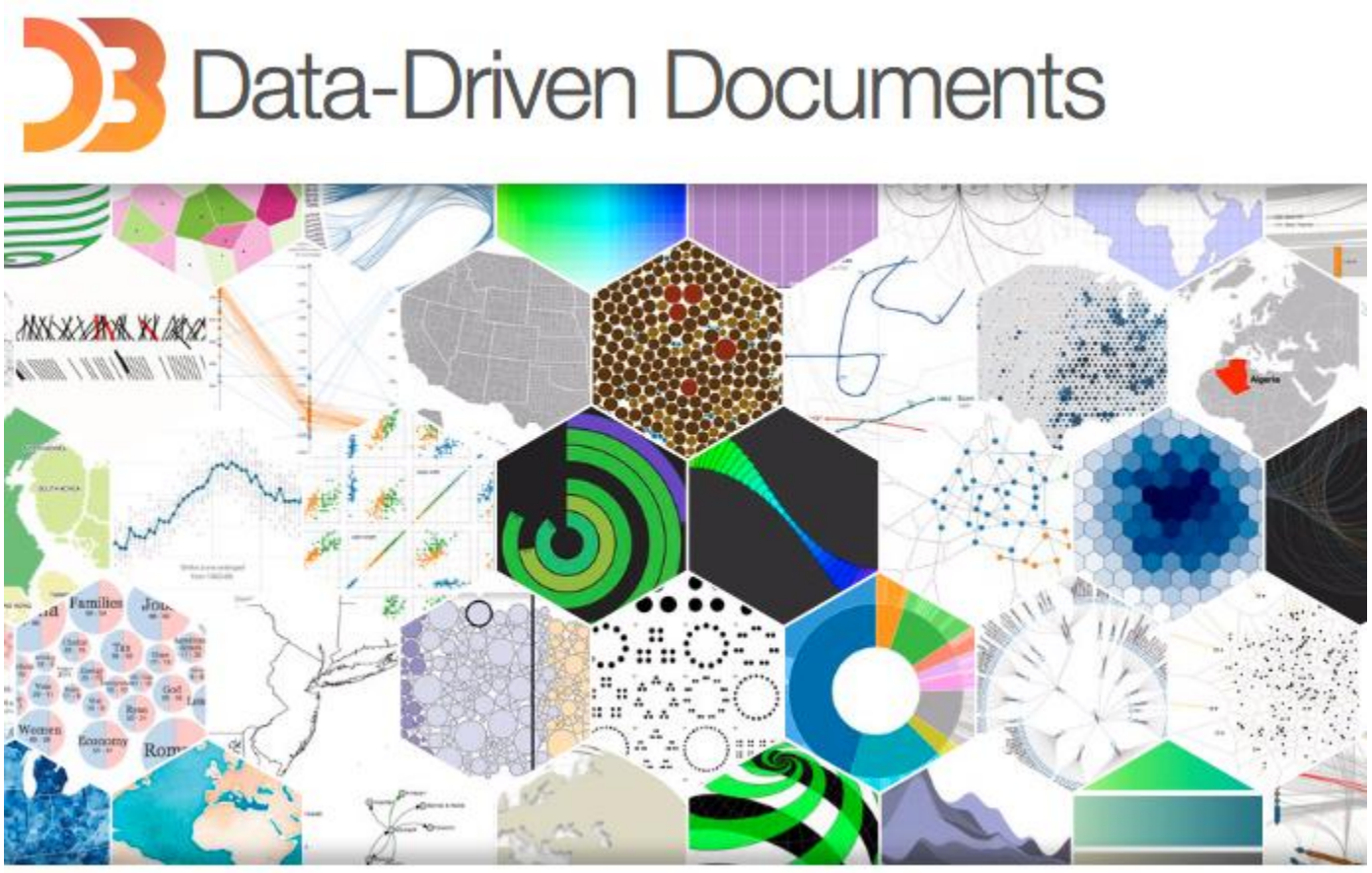

D3: Data Driven Documents

D3 - Introduction

- 1996: first browser with JavaScript
- 2005: J. Heer et al.’s prefuse toolkit
- 2007: J. Heer’s Flare toolkit
- 2009: J. Heer + M. Bostock – Protovis
- 2011: D3

D3 – Data Driven Documents

- Visualization requires visual encoding: mapping data to visual elements.
- The HTML Document Object Model has a rich set of features and standards for visual display
- A tool not to replace the web and modern browser's toolbox but to expose it an easy way to use.
- D3 allows transformation of the HTML DOM from text document to Visualization

D3 – Web Standards

- “Learning D3” is largely learning web standards.

- The **Document** refers to the *W3C Document Object Model*

- Unlike Processing or Protovis, D3’s vocabulary of graphical marks comes directly from web standards: HTML, SVG, and CSS.

D3 - Library

- D3 allows you to bind arbitrary data to a Document Object Model (DOM), and then apply data-driven transformations to the document.

- D3 isn’t a monolithic framework; it’s a suite of small modules (31) for data analysis and visualization.

D3 - Library

```
export {version} from "./dist/package.js";
export * from "d3-array";
export * from "d3-axis";
export * from "d3-brush";
export * from "d3-chord";
export * from "d3-collection";
export * from "d3-color";
export * from "d3-contour";
export * from "d3-dispatch";
export * from "d3-drag";
export * from "d3-dsv";
export * from "d3-ease";
export * from "d3-fetch";
export * from "d3-force";
export * from "d3-format";
export * from "d3-geo";
export * from "d3-hierarchy";
export * from "d3-interpolate";
export * from "d3-path";
export * from "d3-polygon";
export * from "d3-quadtree";
export * from "d3-random";
export * from "d3-scale";
export * from "d3-scale-chromatic";
export * from "d3-selection";
export * from "d3-shape";
export * from "d3-time";
export * from "d3-time-format";
export * from "d3-timer";
export * from "d3-transition";
export * from "d3-voronoi";
export * from "d3-zoom";
```

D3.JS - Data Driven Documents

d3 – templates and gallery

https://github.com/d3/d3/wiki/Gallery

D3 - Introduction

- JavaScript library for creating data visualizations

- Data-Driven Documents
  - User provides the data
  - D3 does the driving
  - I.e., it connects the data to web-based documents

- Mike Bostock

- d3js.org

D3 - Introduction

- Generation and manipulation of web-documents with data

- How ?
  - Load the data into the browser's memory
  - Bind the data to document elements
  - Transform elements (i.e., set visual properties) according to each element's bound datum
  - Transition elements between states in response to user input

d3 - Introduction

- No support for older browsers

- No handling of bitmap map tiles
  - Vector graphics instead

- No hiding of original data
  - Client-side execution
  - Data must be sent to the client
  - Do not use D3 if your data cannot be shared !

d3 – Generating page elements

```
<!DOCTYPE html>
<html lang="en">
    <head>
        <meta charset="utf-8">
        <title>D3 Page Template</title>
        <script type="text/javascript“ src=“http://d3js.org/d3.v7.min.js"></script>
    </head>
    <body>
        <script type="text/javascript">
            <! D3 Code here >
        </script>
    </body>
</html>
```

Content Delivery Network (CDN)
src=“http://d3js.org/d3.v7.min.js”
Locally:
src=“../d3.min.js”

d3- Circle drawing

```
var dataset = [5, 10, 15, 20, 25];

var w = 500;
var h = 50;
var svg = d3.select("body")
            .append("svg")
            .attr("width", w)
            .attr("height", h);

var circles = svg.selectAll("circle")
            .data(dataset)
            .enter()
            .append("circle");

circles.attr("cx", "10")
            .attr("cy", "10")
            .attr("r", "10");
```

d3- Circle drawing

…

```
var circles = svg.selectAll("circle")
                 .data(dataset)
                 .enter()
                .append("circle");

circles.attr("cx", function(d, i) {
                 return (i * 50) + 25;
                 })
                 .attr("cy", h/2)
                 .attr("r", function(d) {
                          return d;
                  });
```

d3 - Resources

- https://bost.ocks.org/mike/d3/workshop/#0
- https://blockbuilder.org/
- https://observablehq.com/
- https://github.com/wbkd/awesome-d3
- https://github.com/d3/d3/wiki/Gallery
- https://d3-discovery.net/
- https://observablehq.com/@d3/