D3.js and Custom Visualizations

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MicroStrategy World 2016
Presenter

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Visualizations and Mapping
5 years with MicroStrategy
Mathematics at Virginia Tech
Why We Visualize
Why We Visualize

![Banana Visualization](image)

**Banana Table**

<table>
<thead>
<tr>
<th>Batch</th>
<th>Bananas</th>
<th>Damaged</th>
<th>Edible</th>
<th>Ripe</th>
<th>Size Weight (lbs)</th>
<th>Price ($.39/ lbs)</th>
<th>Price/Edible Banana</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>77.50%</td>
<td>2.11</td>
<td>$1.33</td>
<td>$0.26</td>
</tr>
</tbody>
</table>

![MicroStrategy Logo](image)
Data visualization experts (Few, Tufte, Cleveland) routinely eschew elaborate visualizations for a core set of minimalist graph types.
Out-of-the-Box Visualizations

HTML5
Why Branch Out?

TAMPA BAY RAYS VS. WASHINGTON NATIONALS | JUNE 21, 2012, NATIONALS PARK

RUNNERS T1

RAYS 0
NATIONALS 0

Craig Robinson | flipflopflyin.com
Why Branch Out?

• You need more stylized graphs for presentation:
  • Venn diagrams, gauges, thermometers, cartograms, and whatever this is...

informationisbeautiful.net
Why Branch Out?

• You need visualizations specific to a use case or business problem:
  • Organizational charts, Sankey diagrams, social network diagrams, etc.
Why Branch Out?

• You want to explore the boundaries of what you can do with data representation and build something that’s never been done before:

Radial Boxplot | bl.ocks.org/davidwclin/ad5d13db260caeffe9b3
Self-organizing hexagonal heat map | visualcinnamon.com
Extend MicroStrategy

**Build**
developers.microstrategy.com

- Expanding API to help custom visualizations feel OOTB
- API to parse & link data to your visualization
- Visualization Builder tool makes creating & testing your plugin trivial

**Share & Discover**
visualizations.microstrategy.com

- Consumer-friendly Community platform
- Developer-oriented GitHub
- Download visualizations as a single, easily transferrable plugin folder
- [github.com/mstr-dev/Visualization-Plugins](https://github.com/mstr-dev/Visualization-Plugins)

**Deploy**
On Web & Desktop

- Via GUI on Desktop (10.2)
- Simple copy-&-paste deployment to Web, Desktop, and Mobile (iOS)
What is D3.js?

Data-Driven Documents

• D3.js is a JavaScript library for creating purpose-built visualizations for representing data.
  • An API that aides you in processing data and binding it to the document object model.
  • Uses common Web standards, such as HTML, CSS, SVG, which makes D3.js content extremely flexible and widely consumable.
• Created by Mike Bostock.
• D3js.org: “D3 solves the crux of the problem: efficient manipulation of documents based on data.”
D3.js Popularity

- Good documentation
- Numerous examples
- Open source, BSD license
- Prominently used on major websites
- Active community
A Mixed Recovery

Industries in the health care and energy sectors grew substantially over the last five years, while jobs in real estate and construction continued to shrink. Industries that paid in the middle of the wage spectrum generally lost jobs. And while the economy overall is back to its pre-recession level, it hasn’t added the roughly 10 million jobs needed to keep up with growth in the working-age population.
D3.js Reality Check

- No prepackaged charts
  - Steep learning curve compared to Google Charts, Highcharts, Chart.js
  - Label management can take work
- Does not support older browsers
  - “D3 is not a compatibility layer, so if your browser doesn't support standards, you're out of luck.”
What Are Your Charting Options?

<table>
<thead>
<tr>
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<th>NVD3</th>
</tr>
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<tbody>
<tr>
<td>Highcharts</td>
<td>Crossfilter</td>
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<tr>
<td>Flot</td>
<td>dc.js</td>
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<tr>
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<td>amCharts</td>
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<td>Ember Charts</td>
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<tr>
<td>Raphael JS</td>
<td>Bokeh</td>
</tr>
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<td>FusionCharts…</td>
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### What Are Your Charting Options?

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<th>NVD3</th>
<th>Framework Comparisons:</th>
</tr>
</thead>
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<td>Crossfilter</td>
<td>JavaScript Graph Comparison</td>
</tr>
<tr>
<td>Flot</td>
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<td>Wikipedia Comparison of JavaScript charting frameworks</td>
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</table>

…”

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[Image of MicroStrategy logo]
Inherit Functionality

- MicroStrategy provides the container and data, you provide the visualization
- Container menu options just work
  - Title and container formatting options
  - Show Data
- Basic drop zones
- Works as target of filters
Wiring Your Visualization Up to MicroStrategy

1. Create a plug-in folder and subfolders
   • Add a visualizations.xml file that defines where the visualization should be available (document/dashboard)
   • Add a styleCatalog.xml configuration file that defines the style to render the HTML code for the visualization

2. Add your code to render the visualization (using D3.js or other framework)

3. Connect the data MicroStrategy serves up to the code that will render the visualization with the Data Interface API
   • Data is served up in grid or JSON formats
Visualization Builder
Visualization Builder

- Test with real data as you build
- Automatically manages the small things with a GUI for:
  - Icons
  - Error messages
  - Minimum object requirements
  - Availability in doc/dash

- Download Builder on GitHub

github.com/mstr-dev/Visualization-Plugins
Demo
Build and Deploy a D3.js Visualization
## API Support

<table>
<thead>
<tr>
<th>Version</th>
<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>10.1</td>
<td>Data Interface</td>
</tr>
<tr>
<td>10.2</td>
<td>JSON Data Format</td>
</tr>
<tr>
<td></td>
<td>Use as Filter</td>
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<tr>
<td></td>
<td>Custom Drop Zones</td>
</tr>
<tr>
<td>10.x</td>
<td>Properties</td>
</tr>
<tr>
<td></td>
<td>Color By Attribute and Palette Colors</td>
</tr>
<tr>
<td></td>
<td>Incremental Data Fetch</td>
</tr>
<tr>
<td></td>
<td>Thresholds and Legends</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
</tbody>
</table>
Selector API
Deploy
Desktop

Download

Import

Visualize
Deploy

Web

Download

Copy & Restart

Visualize
Resources

Documentation: developers.microstrategy.com
  • Visualization SDK > Creating an HTML5 Visualization
    • > Using the Visualization Builder > Using an existing D3 Visualization

Developer community: github.com/mstr-dev/Visualization-Plugins
Discover: visualizations.microstrategy.com

D3.js: d3js.org
Framework Comparisons:
  • JavaScript Graph Comparison
  • Wikipedia Comparison of JavaScript charting frameworks