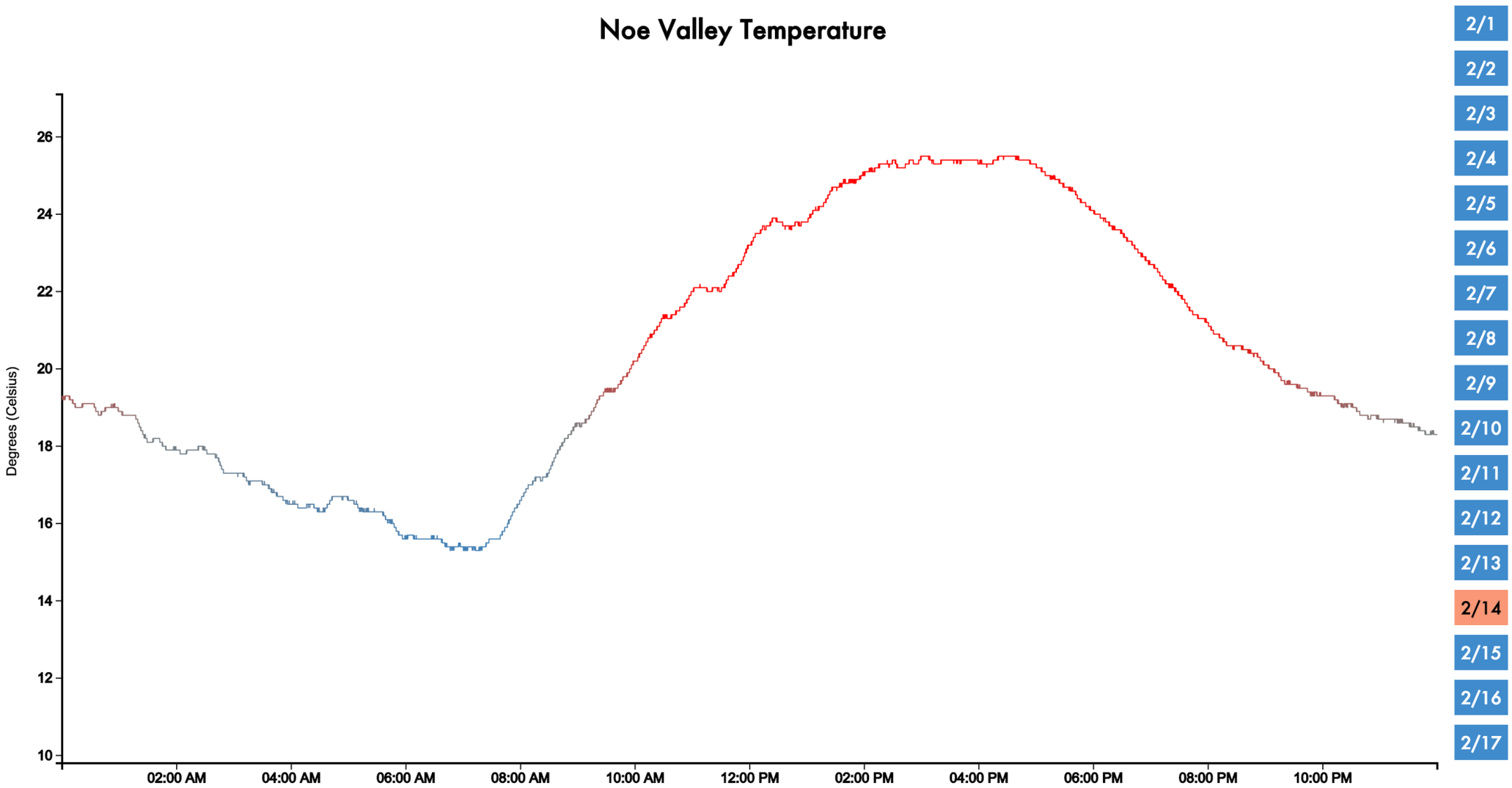


Building Interactive Data Visualizations (with D3)

February 18th, 2015

Formerly

Questions? tweet @clearspandex

Formerly

Questions? tweet @clearspandex

Currently

Zipfian Academy

+

galvanize

Questions? tweet @clearspandex

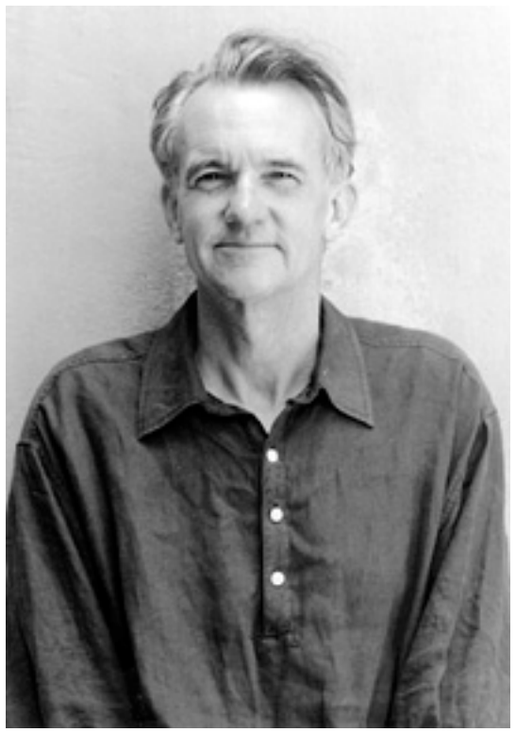
Jonathan Dinu
Director of Education, Galvanize
jonathan@galvanize.it
@clearspandex

Outline

- The Power of Data Visualization
- Basics of Visual Theory
- [Live Code]: Charts with Dimple.js
- The Data Visualization Process
- Why D3?
- [Live Code]: Basics of D3
- BREAK
- Author vs. Reader Driven Visualizations
- [Live Code]: Animation and Interaction with D3
- Narrative Structures
- Q&A + Next Steps

Questions? tweet @clearspandex

The Power of Data Visualization



Questions? tweet @clearspandex

Graphical Excellence

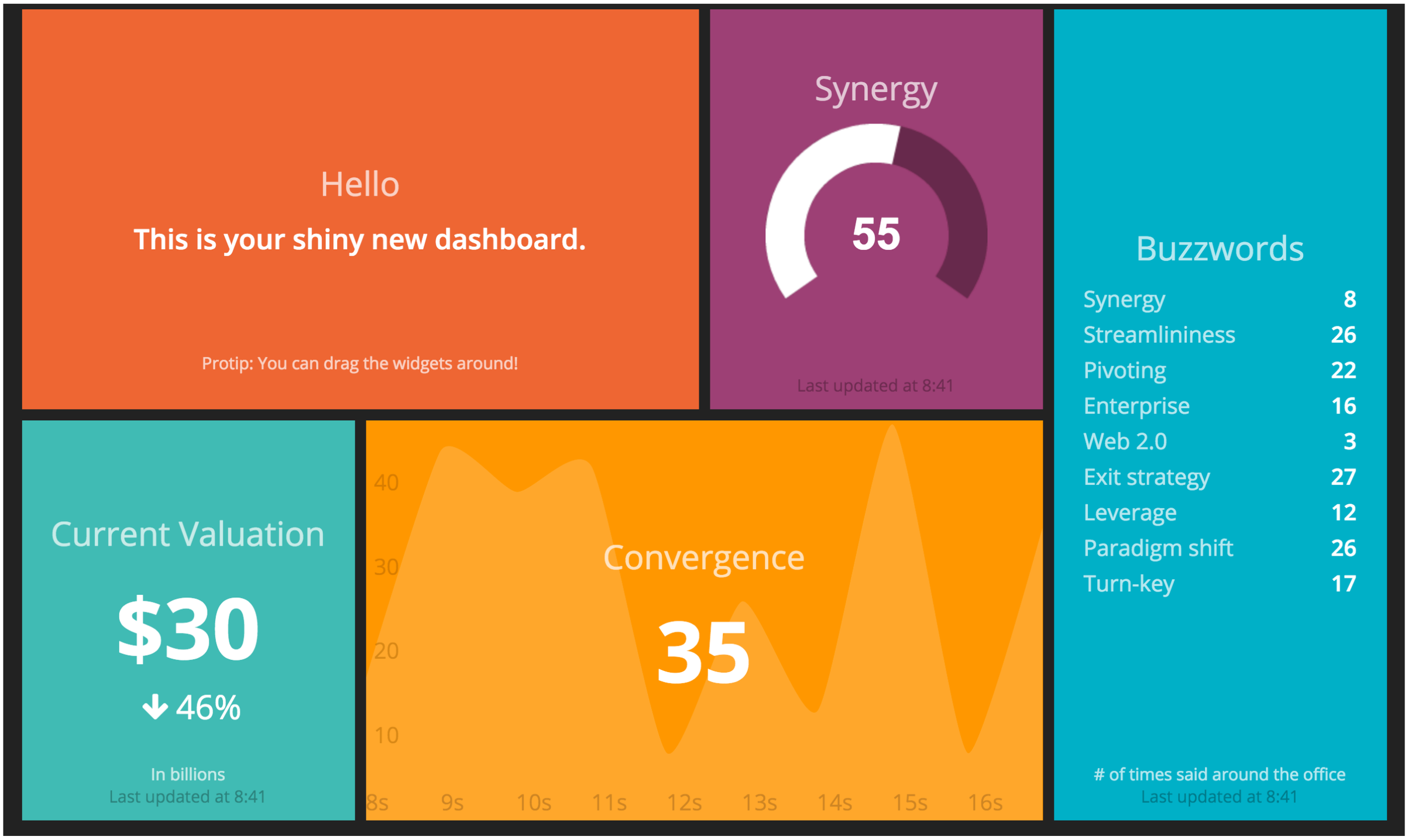
"Excellence in statistical graphics consist of complex ideas communicated with clarity, precision, and efficiency."

-- Edward R. Tufte

Communication

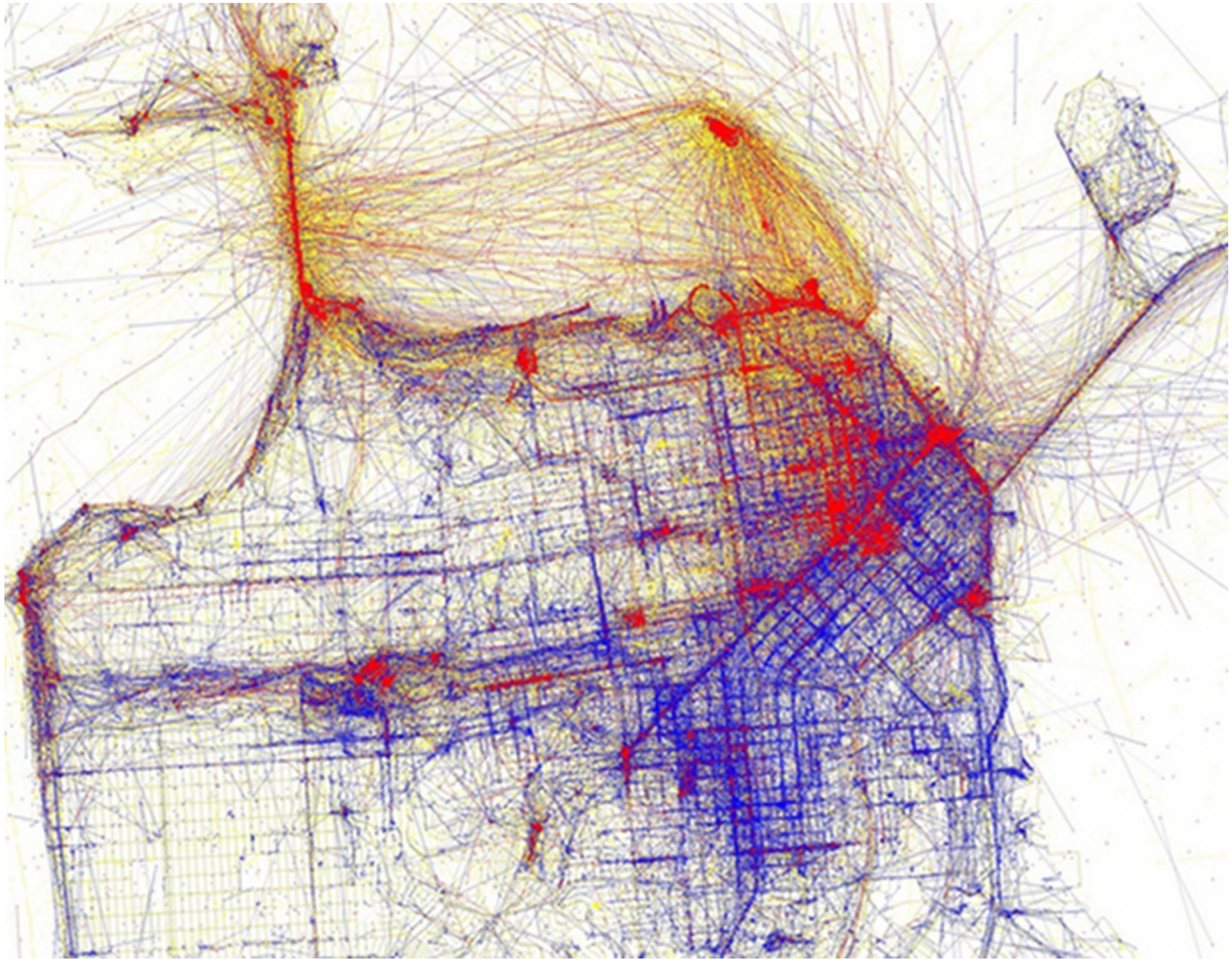
"Your best insight is only as good as your ability to communicate it to others."

-- Jonathan Dinu



http://dashingdemo.herokuapp.com/sample

http://www.facebookstories.com/stories/2200/data-visualization-photo-sharing-explosions



Tourists

Locals

https://www.flickr.com/photos/walkingsf/sets/72157624209158632/

Eric Fischer, @enf

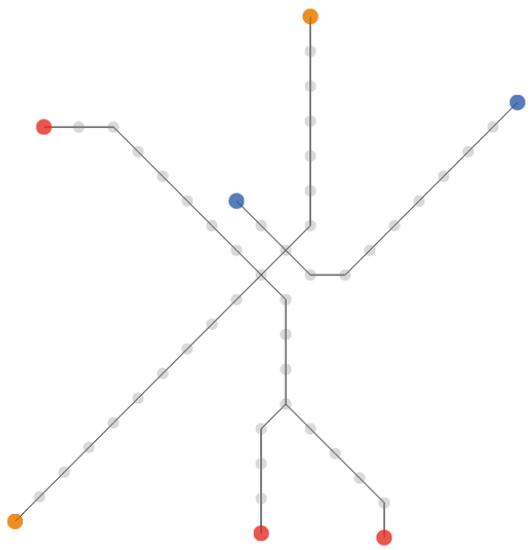
The Trains

In a typical weekday, trains make approximately 1150 trips on the red, orange, and blue lines starting at 5AM and continuing through 1AM the next morning. On Saturdays trains make 870 trips and on Sundays they make 760.

To better understand how the trains operate on a typical day, below are all trips that trains took on the red, orange, and blue lines on Monday February 3 2014. Each vertical line represents a station, and time extends from top to bottom. Steeper lines indicate slower trains. This visualization was first used by Étienne-Jules Marey to visualize train schedules and is typically called a "Marey Diagram."

Average Number of Trips per Day

	Weekdays	Saturdays	Sundays
Red	450	350	300
Orange	320	260	220
Blue	380	260	240
Total	**1150**	**870**	**760**

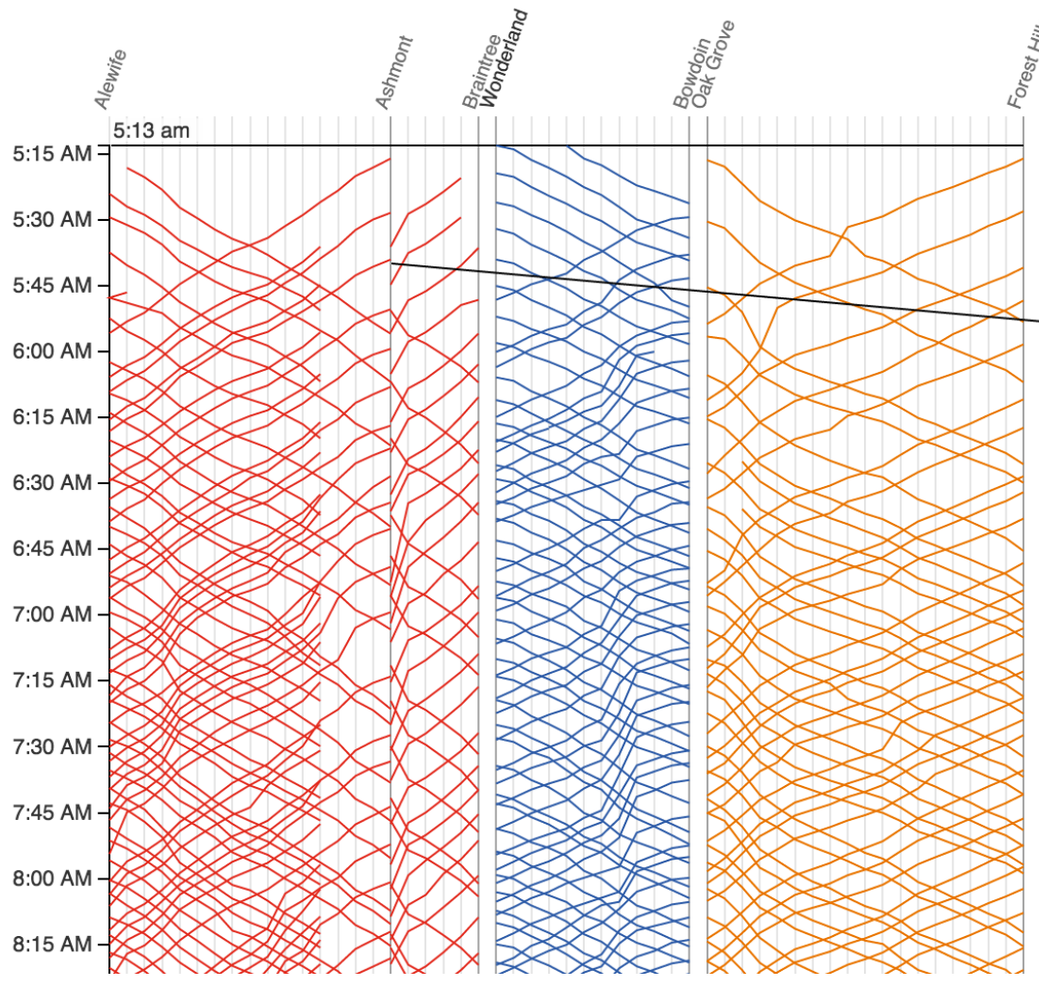


Locations of each train on the red, blue, and orange lines at 5:13 am. Hover over the diagram to the right to display trains at a different time.

Trains are on the right side of the track relative to the direction they are moving.

See the morning rush-hour, midday lull, afternoon rush-hour, and the evening lull.

Subway Trips on Monday February 3, 2014



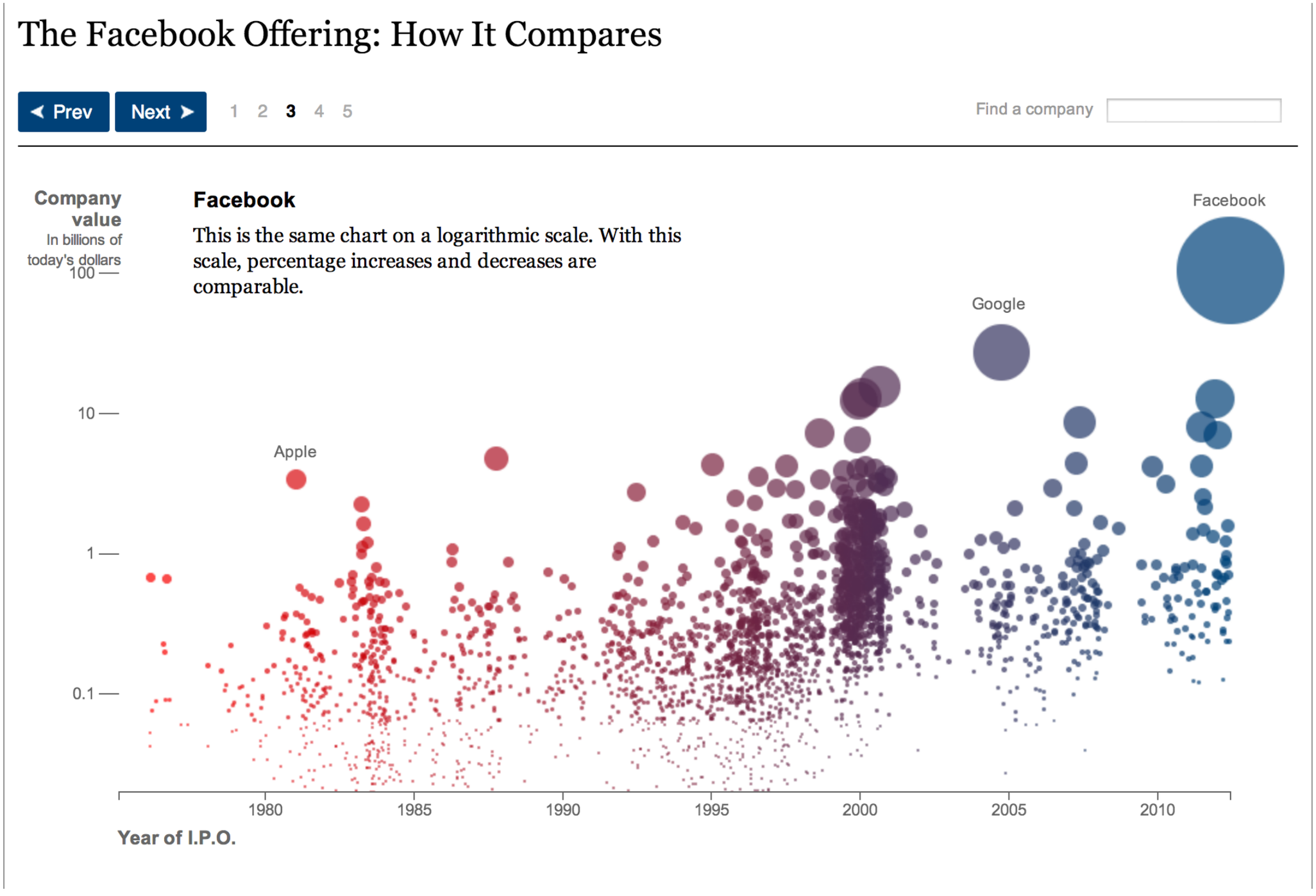
Service starts at 5AM on Monday morning. Each line represents the path of one train. Time continues downward, so steeper lines indicate slower trains.

Since the red line splits, we show the Ashmont branch first then the Braintree branch. Trains on the Braintree branch "jump over" the Ashmont branch.

Train frequency increases around 6:30AM as morning rush hour begins.

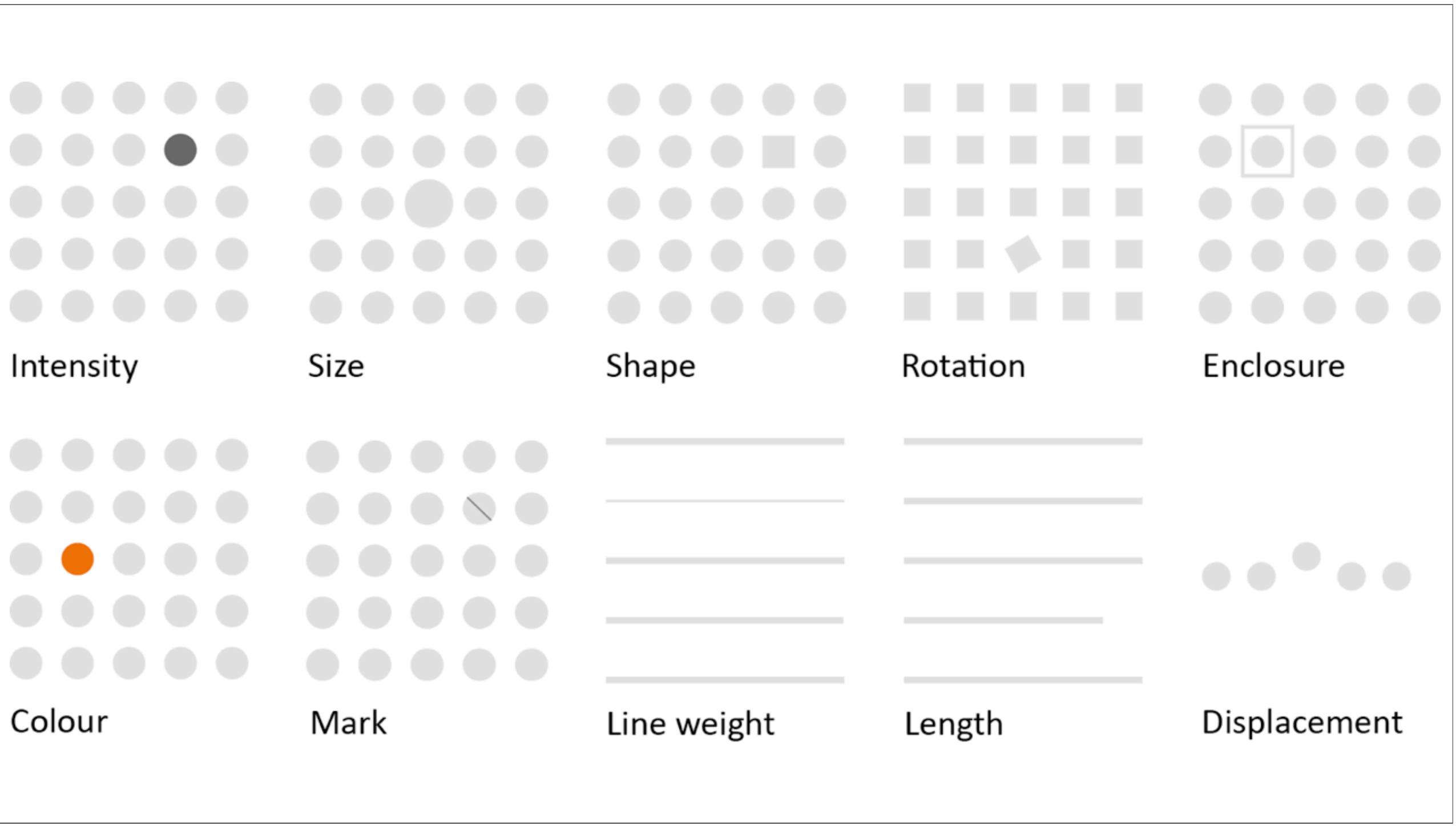
http://mbtaviz.github.io/

Deconstructing a Data Visualization



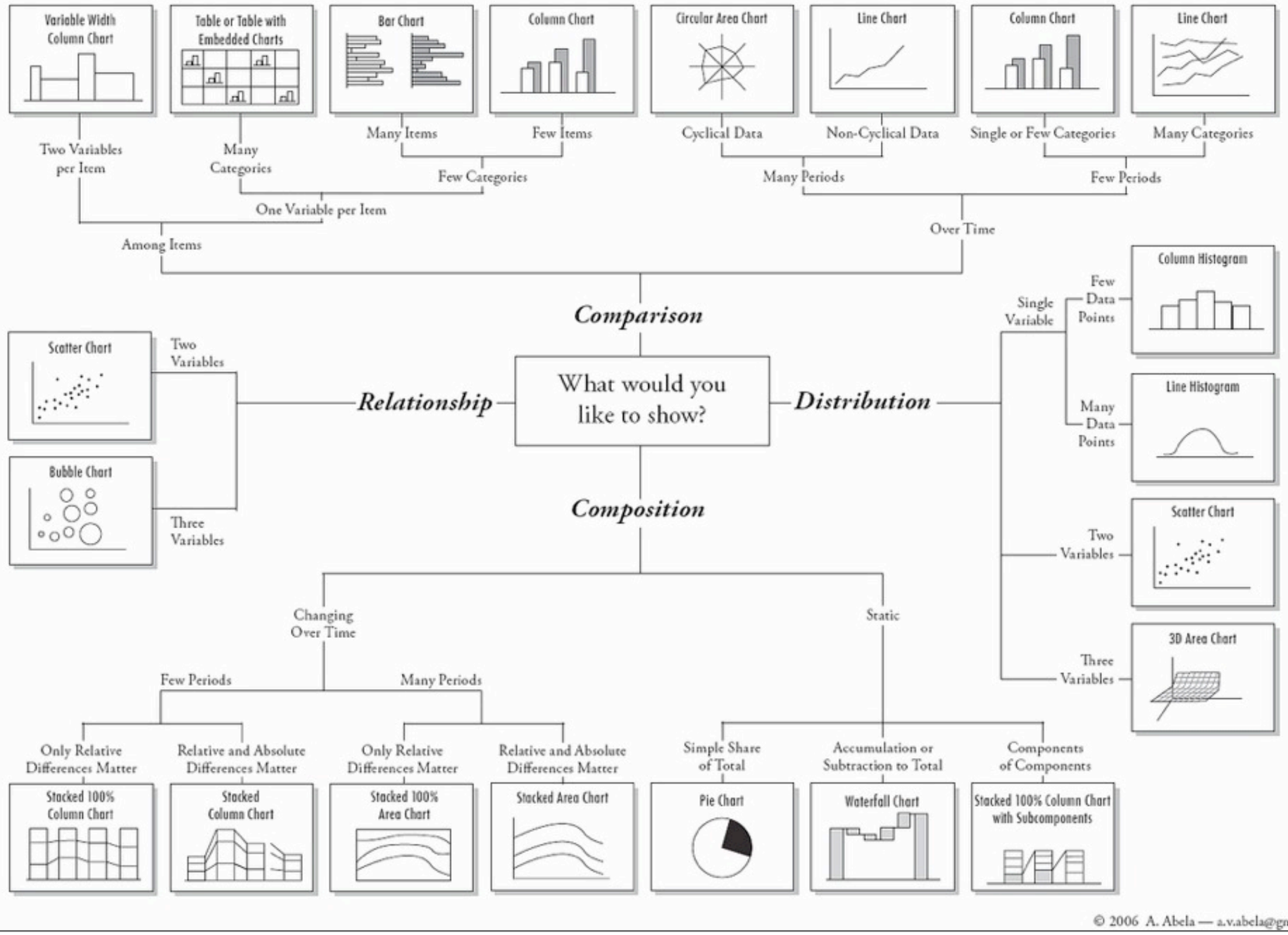
http://www.nytimes.com/interactive/2012/05/17/business/dealbook/how-the-facebook-offering-compares.html

Visual Encodings



Questions? tweet @clearspandex

Chart Suggestions—A Thought-Starter



Questions? tweet @clearspandex

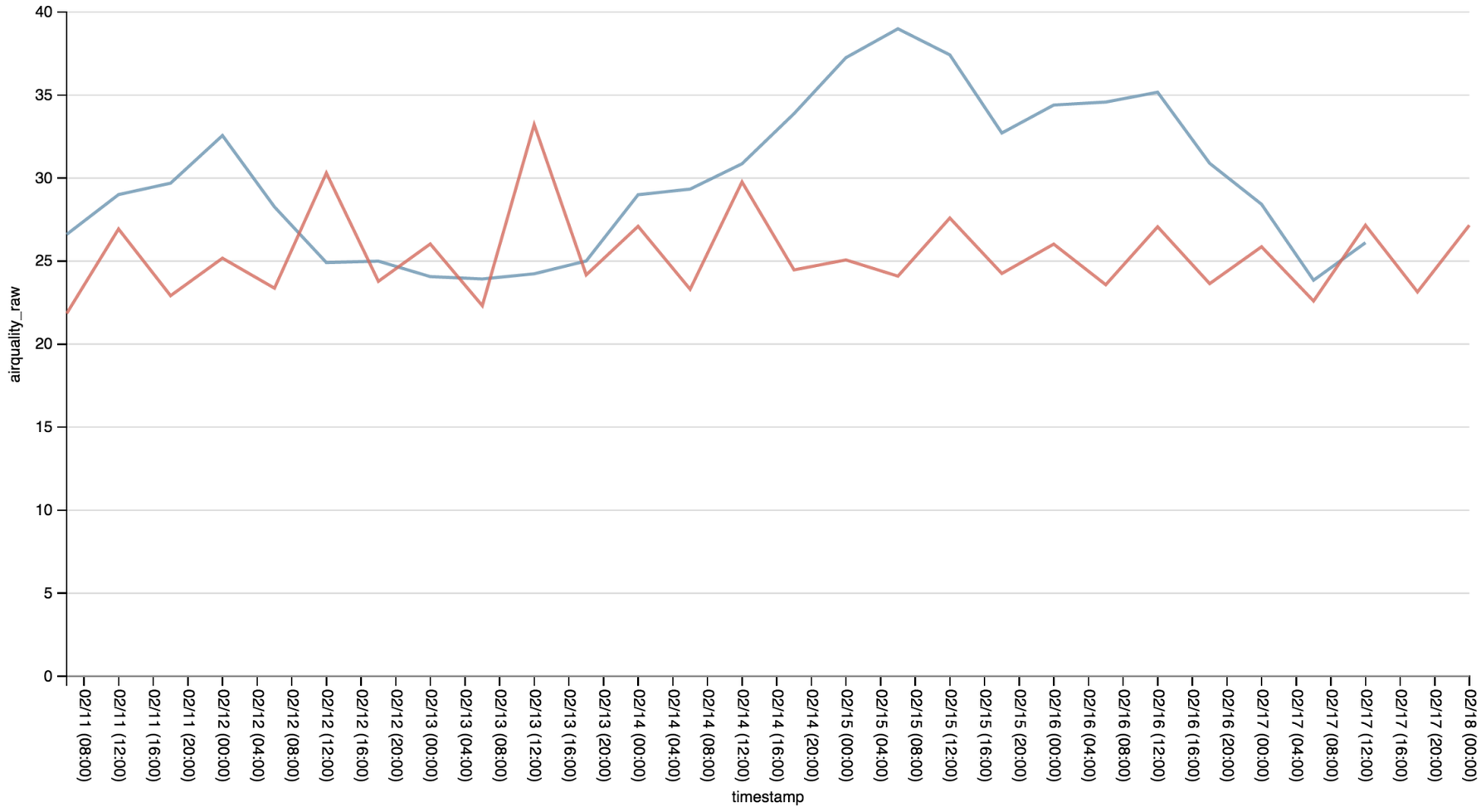
http://extremepresentation.typepad.com/blog/2006/09/choosing_a_good.html

"Data graphics visually display measured quantities by means of the combined use of points, lines, a coordinate system, numbers, symbols, words, shading, and color."

-- Edward R. Tufte

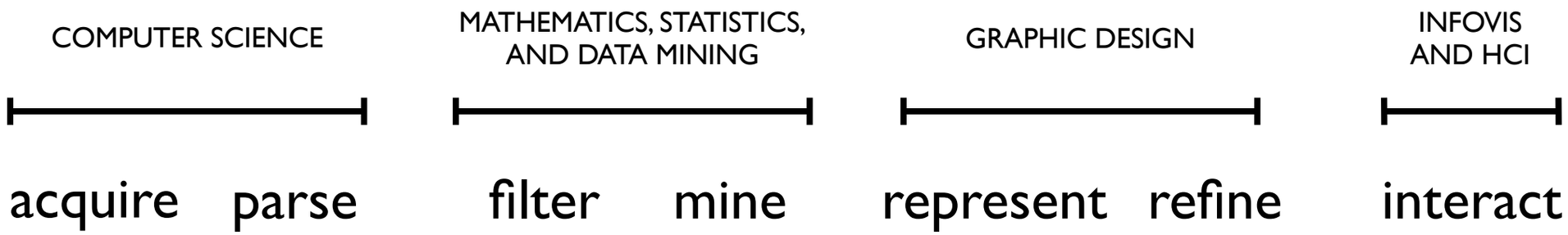
LIVE CODE

- Add another city to chart (juxtaposition)
- Change column visualized
- Add scatter on top of line



Questions? tweet @clearspandex

Process



Questions? tweet @clearspandex

Source: Ben Fry -- "Computational Information Design"

Process

Exploratory

COMPUTER SCIENCE

MATHEMATICS, STATISTICS, AND DATA MINING

acquire parse filter mine

Explanatory

GRAPHIC DESIGN

INFOVIS AND HCI

represent refine interact

Questions? tweet @clearspandex

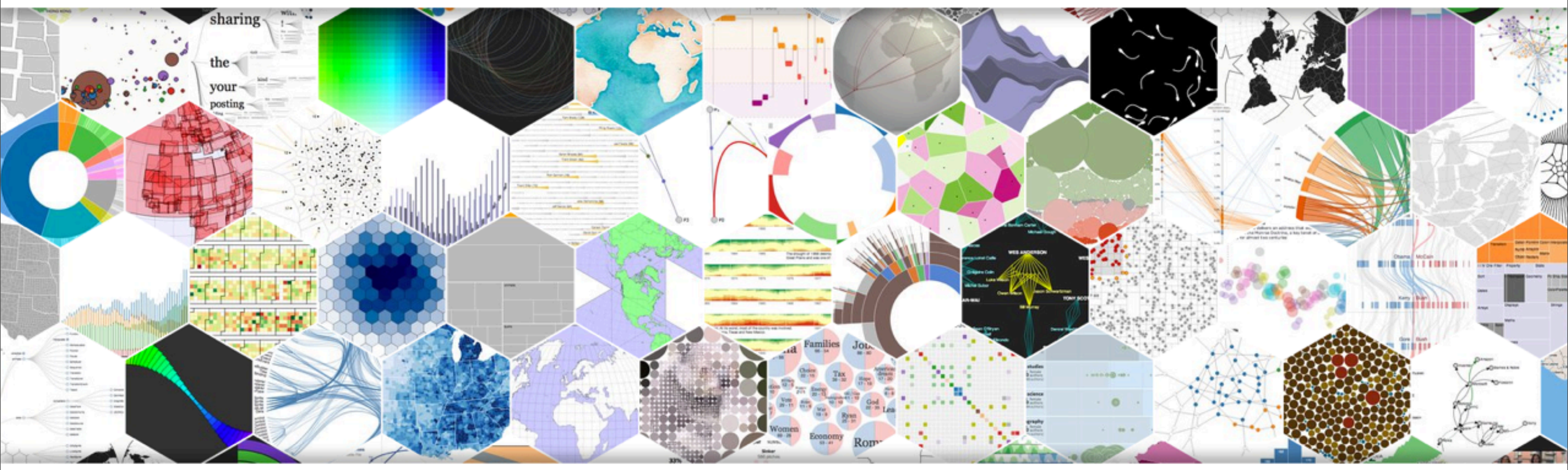
Source: Ben Fry -- "Computational Information Design"

D3

Overview Examples Documentation Source

Fork me on GitHub

Data-Driven Documents



D3.js is a JavaScript library for manipulating documents based on data. **D3** helps you bring data to life using HTML, SVG and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

See more examples.

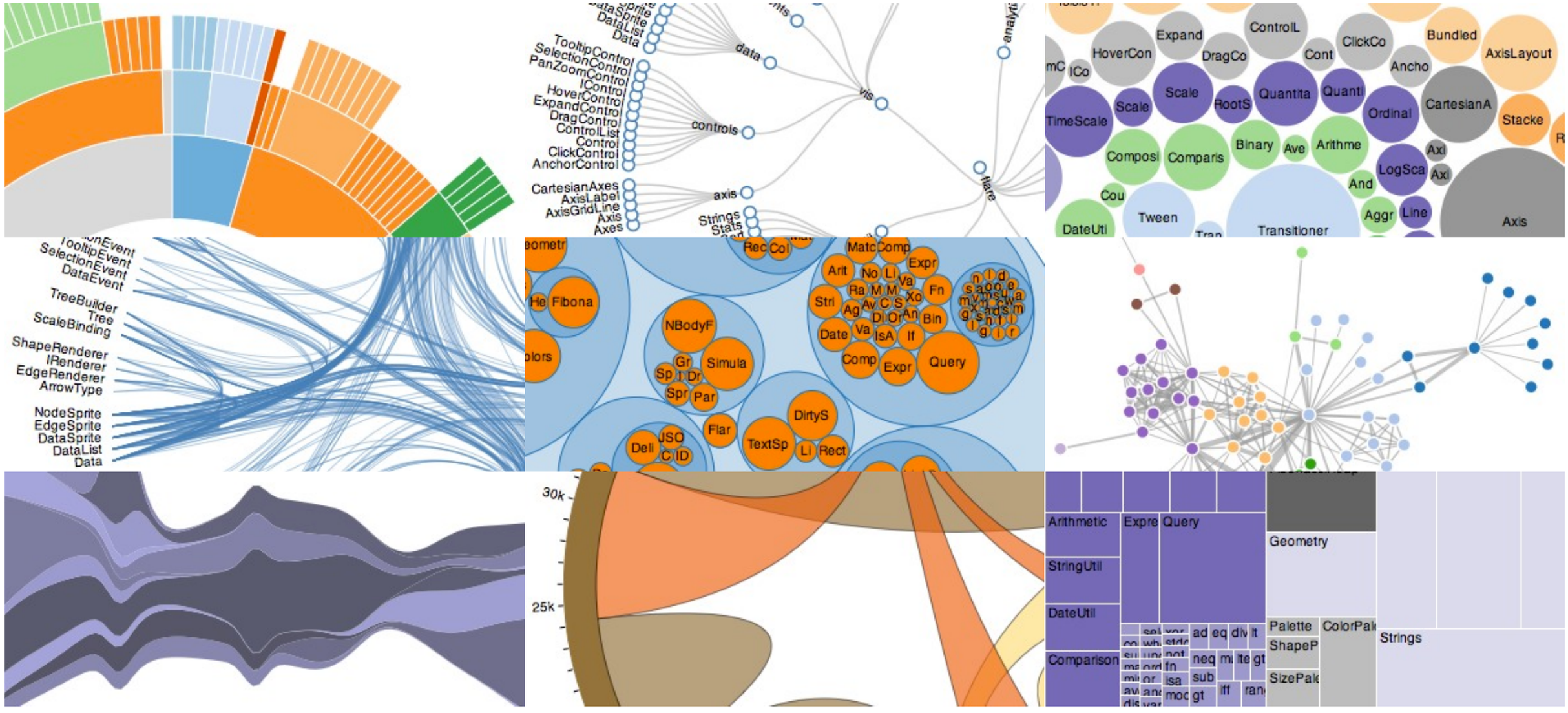
Download the latest version (3.4.1) here:

- d3.v3.zip

Or, to link directly to the latest release, copy this snippet:

Questions? tweet @clearspandex

D3



Questions? tweet @clearspandex

Abstractions

Chartio, Excel

Rickshaw, Vega

D3.js, Processing, Python

HTML5 Canvas, SVG

Questions? tweet @clearspandex

Questions?

Thank You!

Jonathan Dinu
Director of Education, Galvanize
http://hopelessoptimism.com
@clearspandex

Extra Slides

Data Binding

Selection

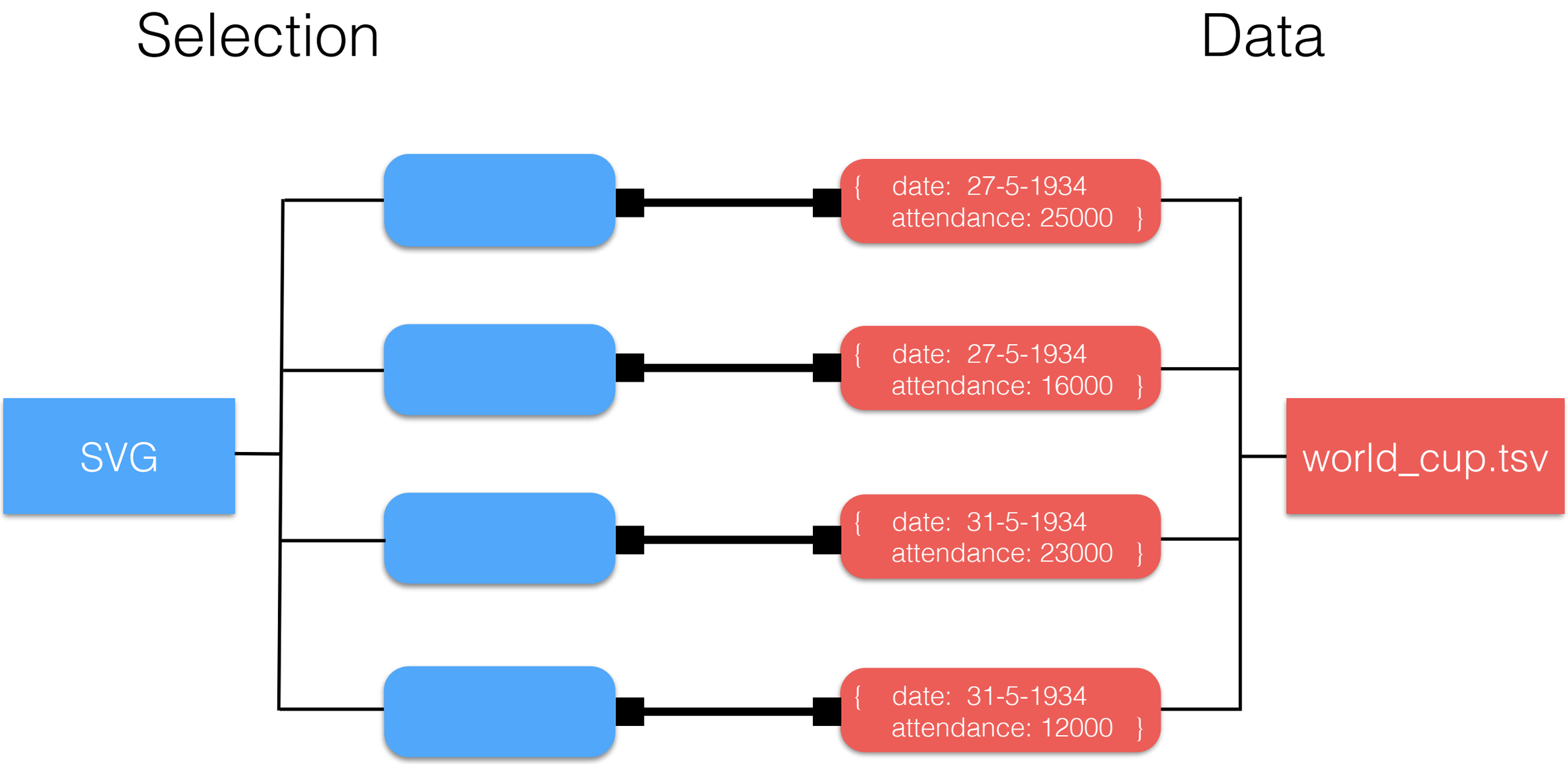
Data

SVG

.....

world_cup.tsv

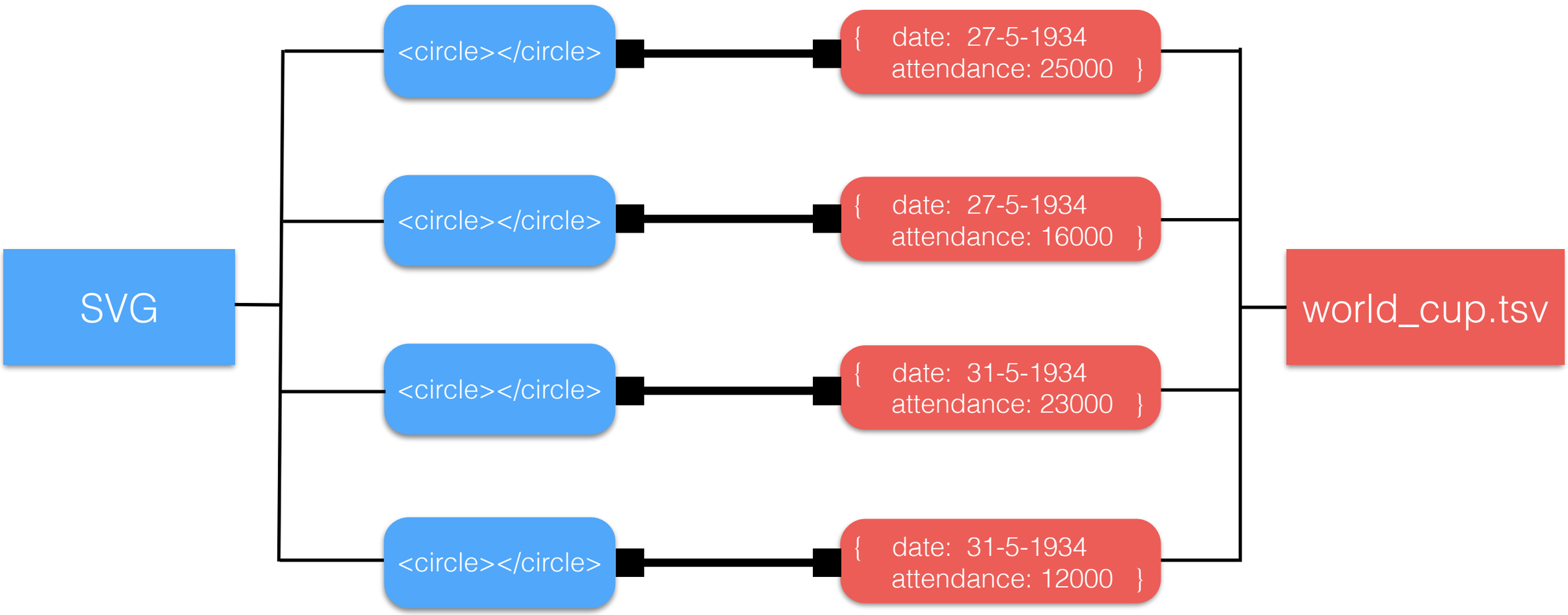
Data Binding



Data Binding

Selection

Data



Data Binding

Selection

Data