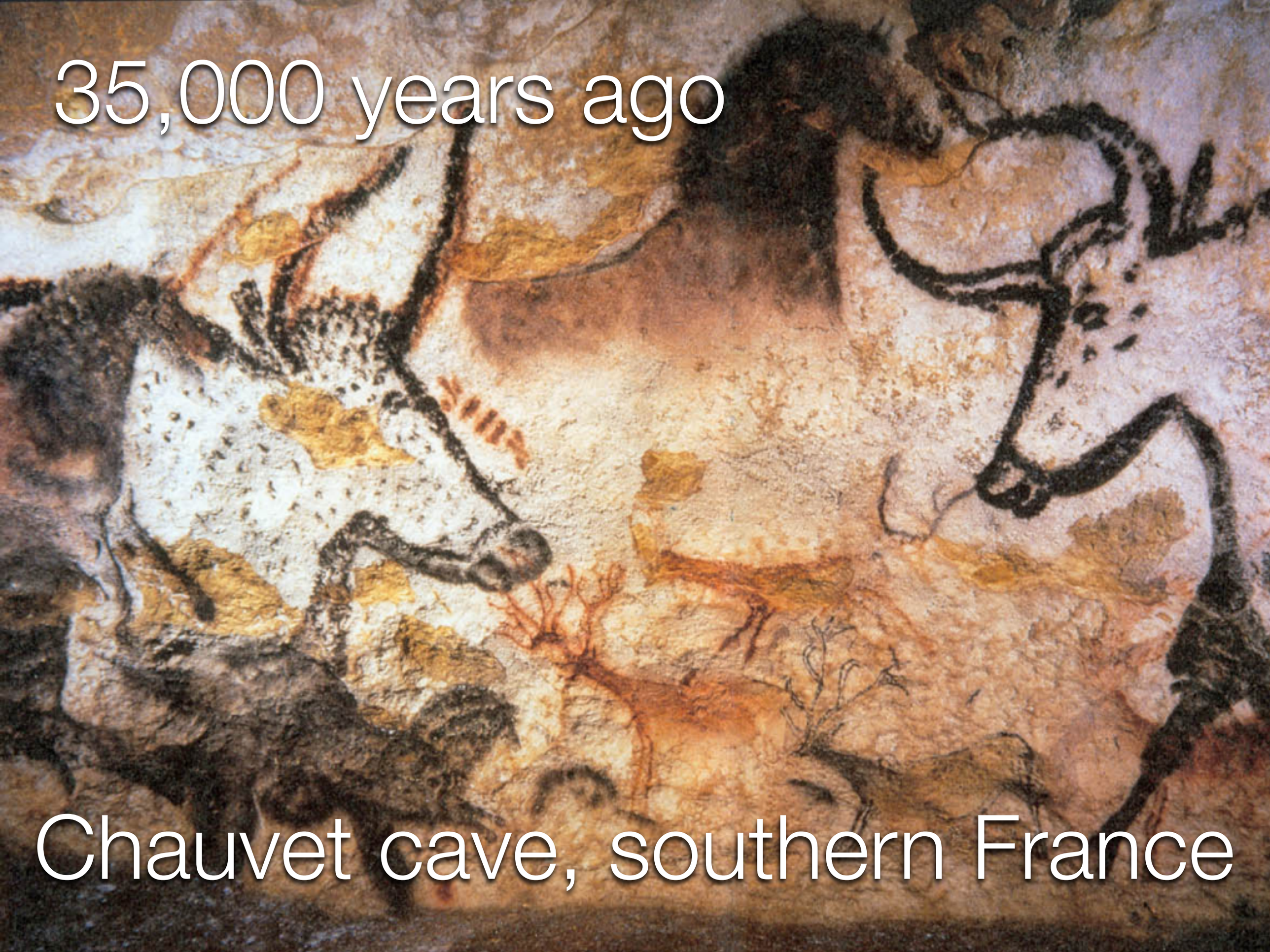
Visualizing Information with HTML5

@synodinos


35,000 years ago
Chauvet cave, southern France


By far the oldest
paintings ever
discovered


Hundreds of paintings
At least 13 different species

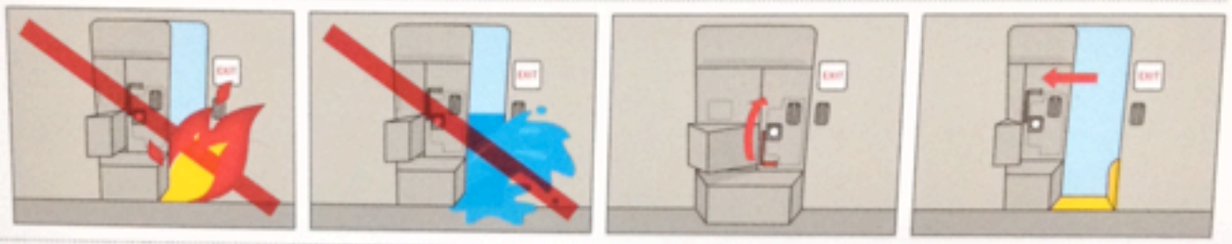
source @ImageThink

Safety instructions
Airbus A321

In case of an evacuation

Avoid smoke

Check and open door



Jump and slide

Lifejackets and slides

Popular Forked Repositories

Spoon-Knife octocat 8,208 forks
This repo is for demonstration purposes only. Comments and issues may or may not be responded to.
all commits / commits by owner

bootstrap twitter 6,219 forks
HTML, CSS, and JS toolkit from Twitter
all commits / commits by owner

homebrew mxcl 4,079 forks
The missing package manager for OS X.
all commits / commits by owner

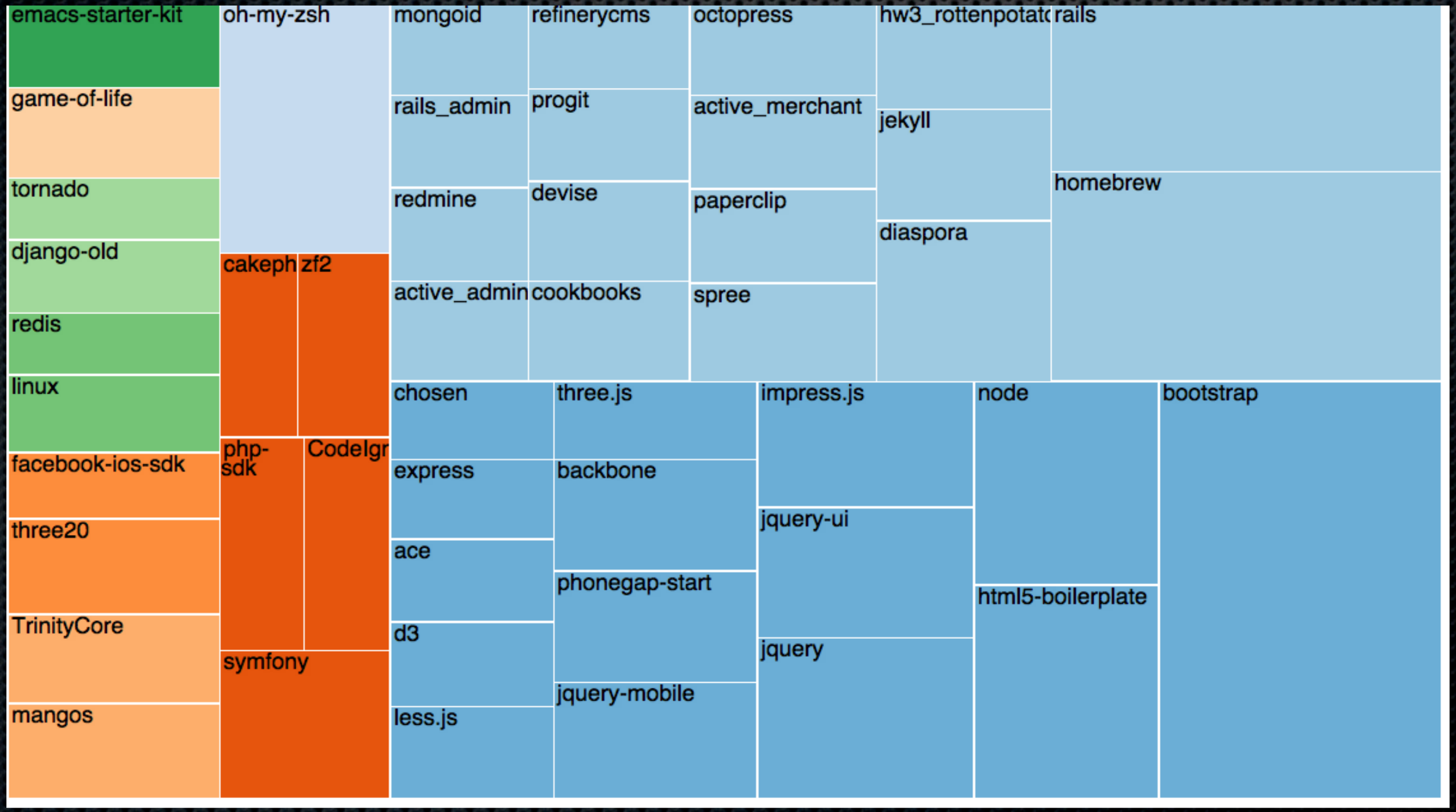
rails rails 3,372 forks
Ruby on Rails
all commits / commits by owner

oh-my-zsh robbyrussell 2,148 forks
A community-driven framework for managing your zsh configuration. Includes 40+ optional plugins (rails, git, OSX, hub, capistrano, brew, ant, macports, etc), over 80 terminal themes to spice up your morning, and an auto-update tool so that makes it easy to keep up with the latest updates from the community.
all commits / commits by owner

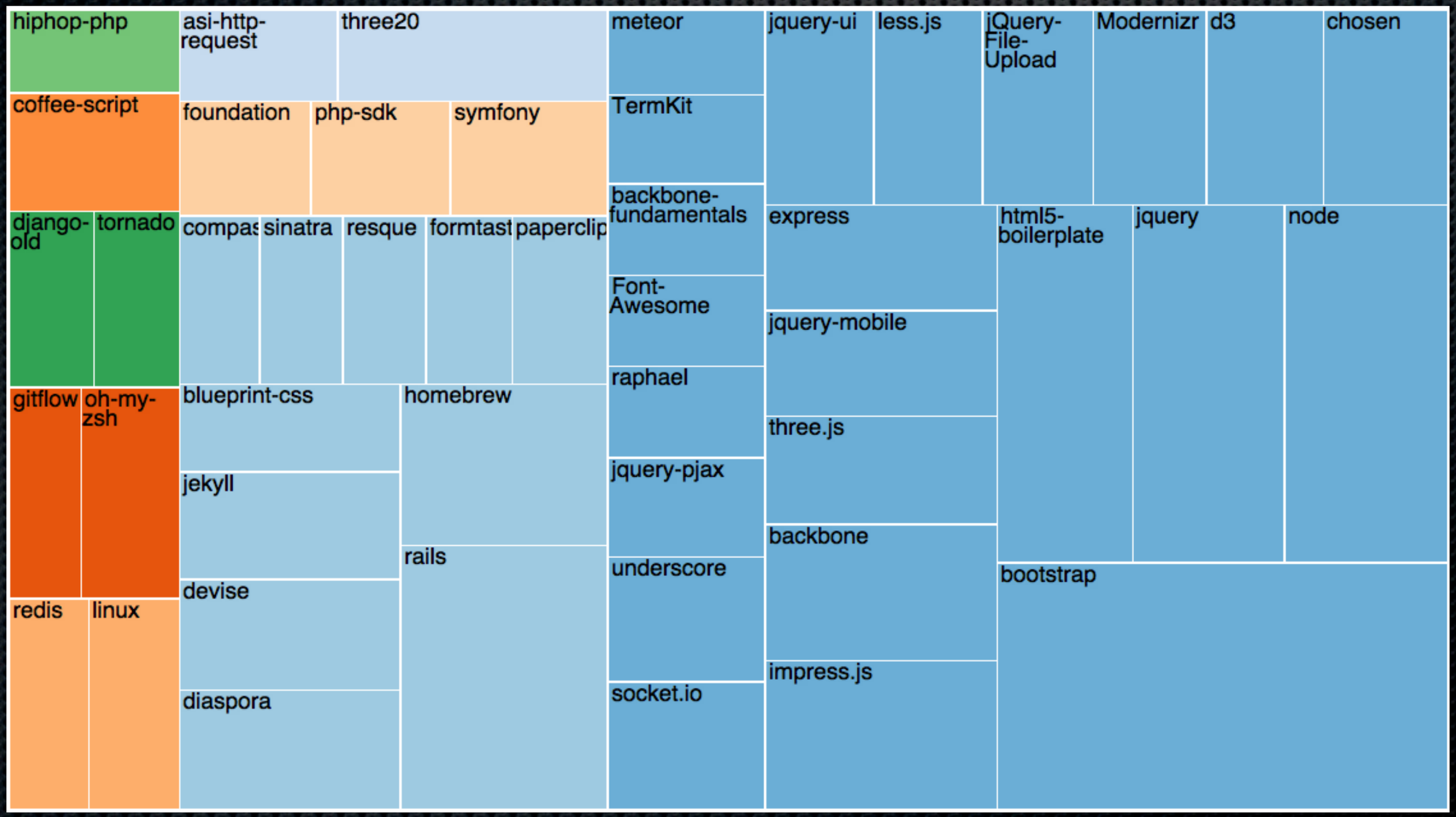
html5-boilerplate h5bp 2,046 forks
A professional front-end template that helps you build fast, robust, adaptable, and future-proof websites.
all commits / commits by owner

node joyent 1,930 forks
evented I/O for v8 javascript
all commits / commits by owner

Github's Most Forked



Github's Most Watched



Why Visualize Data?

- Understand relations
- Realize patterns
- Make sense of quantitative data
- Discover correlations between data sets
- Make “boring” data more appealing/engaging
- Maximum value, during short attention span

Transitions

Backrounds
& Borders

CSS3

Animations

Transforms

CSS3 Animations

```
#moves {
  transition: all 2s ease-out;
}
```

```
$('#moves').click(function() {
  $('#moves').css({
    marginLeft:300
  });
});
```

Plain JS Animations

```
$('#moves').click(function() {
  $('#moves').animate({
    marginLeft: 300,
  }, {
    duration: 2000,
    easing: "easeout"
  }, function() {
    console.log('Finished.')
  });
});
```

GPU Accelarated (potentially)

- CSS3 transitions
- CSS3 3D transforms
- Canvas Drawing
- WebGL 3D Drawing

chrome://gpu/

CSS3 Remote Demo

- http://graphicpeel.com/cssiosicons

SVG

XML format for 2D vector graphics

Major browsers offer (varying) support

Static, interactive or animated

Google indexes SVG files

Transformations

Filter effects

Alpha masks

Template objects

Clipping paths

Interactivity (events)

SVG Demo

- [local demo]

Canvas

Rendering of 2D shapes & images

Low level, procedural model

JS drawing funcs similar to other 2D APIs

Animation by redrawing

Basic lines & strokes

Paths

Pixel-based manipulation

Scaling, rotation, transformations

PNG representation as data URI

Embedded Images

Shadows, Gradients & Alpha transparancy

Canvas

- Bitmap
- Procedural
- Only <canvas> accesible via DOM
- Script
- Developer friendly
- Better performance
- You redraw every pixel based on timers and events

SVG

- Vector
- Declarative
- Elements are identifiable via DOM
- Inline
- Designer friendly
- Complexity -> slow rendering
- “True” support for animations

Canvas

```
ctx.beginPath();
ctx.arc(centerX
  , centerY
  , radius
  , 0
  , 2 * Math.PI
  , false);
ctx.fillStyle = "red";
ctx.fill();
ctx.lineWidth = 2;
ctx.strokeStyle = "black";
ctx.stroke();
```

SVG

```
<circle
   cx="100"
   cy="50"
   r="40"
   stroke="black"
   stroke-width="2"
   fill="red"/>
```

Canvas Local Demo

- [local demo]

Canvas Remote Demo

- http://browserquest.mozilla.org/

JS API for
3D graphics

WebGL ctx
instead of canvas
2D ctx

Based on
OpenGL ES

WebGL

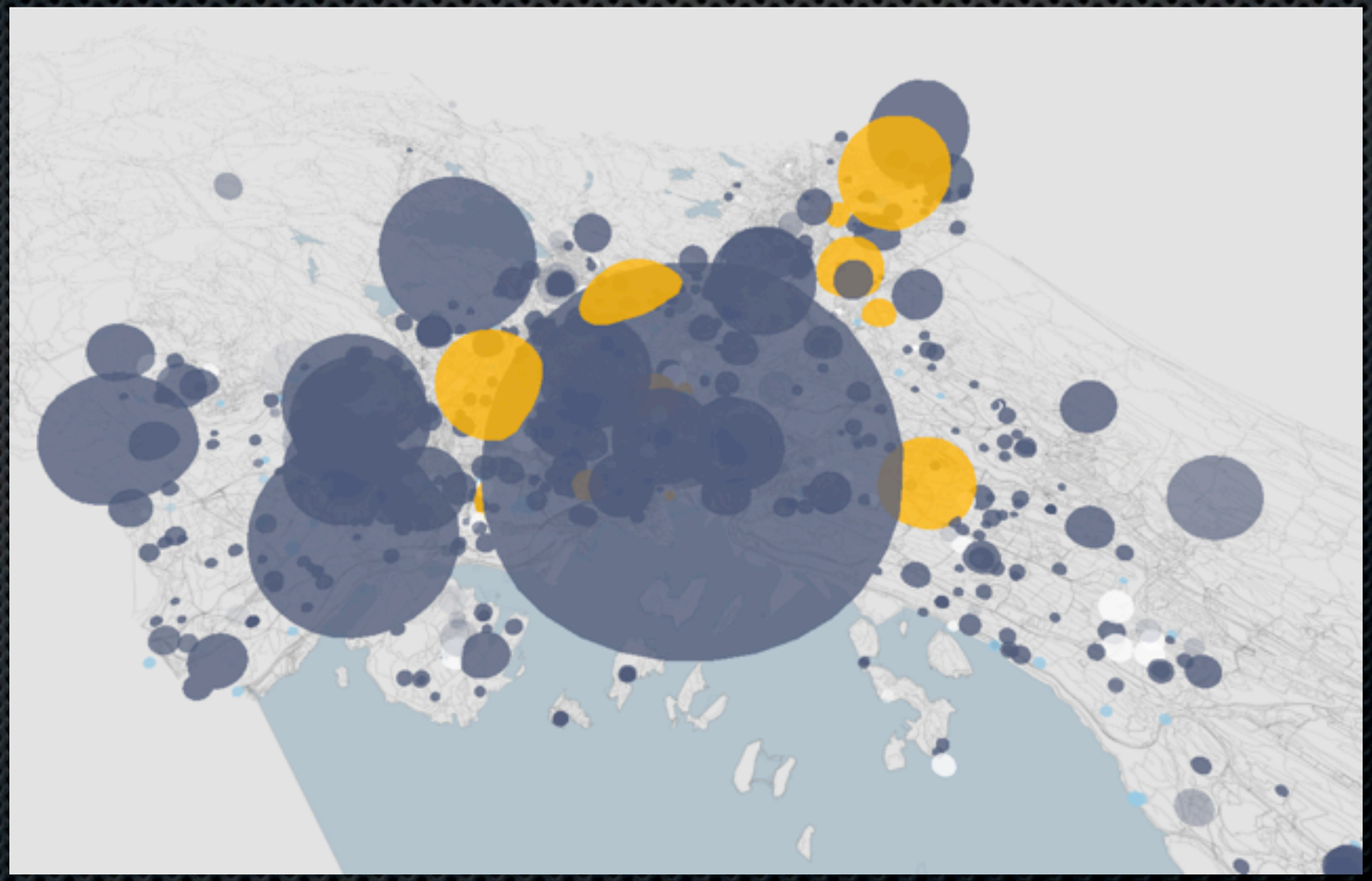
Access to 3D
hardware

JS control code +
shader code (GPU)

Lots of 3rd-
party libs

WebGL Remote Demo

- http://seeplan.bengler.no/planimator



JS vector

Shapes & paths

fallback

Events

Pure SVG

```
<svg style="height="200" width="320">
  <circle cx="50" cy="40"
    r="10" fill="#ff0000"
    stroke="#ffffff">
  </circle>
</svg>
```

Raphaël

```
var paper = Raphael(10, 50, 320, 200);
var circle = paper.circle(50, 40, 10);
circle.attr("fill", "#f00");
circle.attr("stroke", "#fff");
```

Processing.js

Port of the Processing visual programming lang

Builds on Java but uses simplified syntax

Has a light-weight IDE (Java)

Can combine Processing & JS

Access DOM from Processing

Processing.js modes

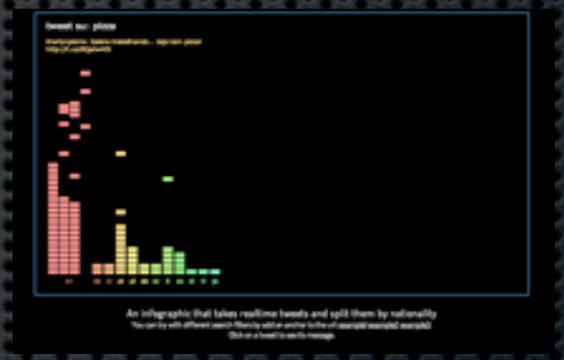
Programming	Run	Rendering
Basic: static images	Write pure JS	2D
Continuous: loops, custom funcs, keyboard & mouse events	Import Processing code	3D
Java: everything subclass of PApplet (not recommended)	Compile Processing to JS	PDF*

Processing.js Dev Workflow

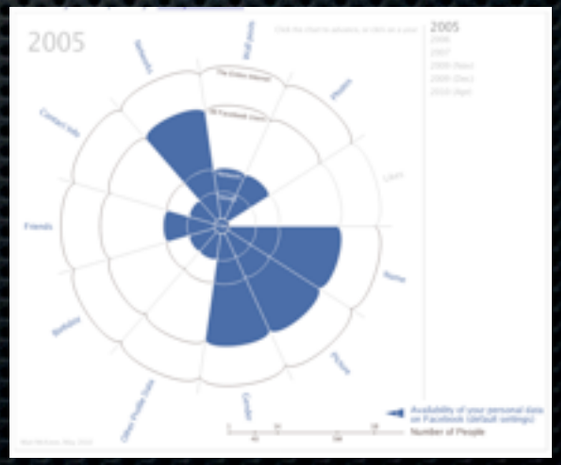
- [local demo]

Processing.js Remote Demos

- http://sandropaganotti.com/wp-content/goodies/demos/twitter-stream/?q=2#pizza



- http://mattmckeon.com/facebook-privacy/



D3.js

Binds data to DOM & then applies data-driven transforations

W3C Selectors API (Sizzle fallback)

Dynamic Properties

Doesn't directly bother with graphical representation*

Native Transitions

Plugins

Beautiful, ready to use layouts

You can still use CSS3, SVG, etc.

D3.js Structure

- [basic local demo]

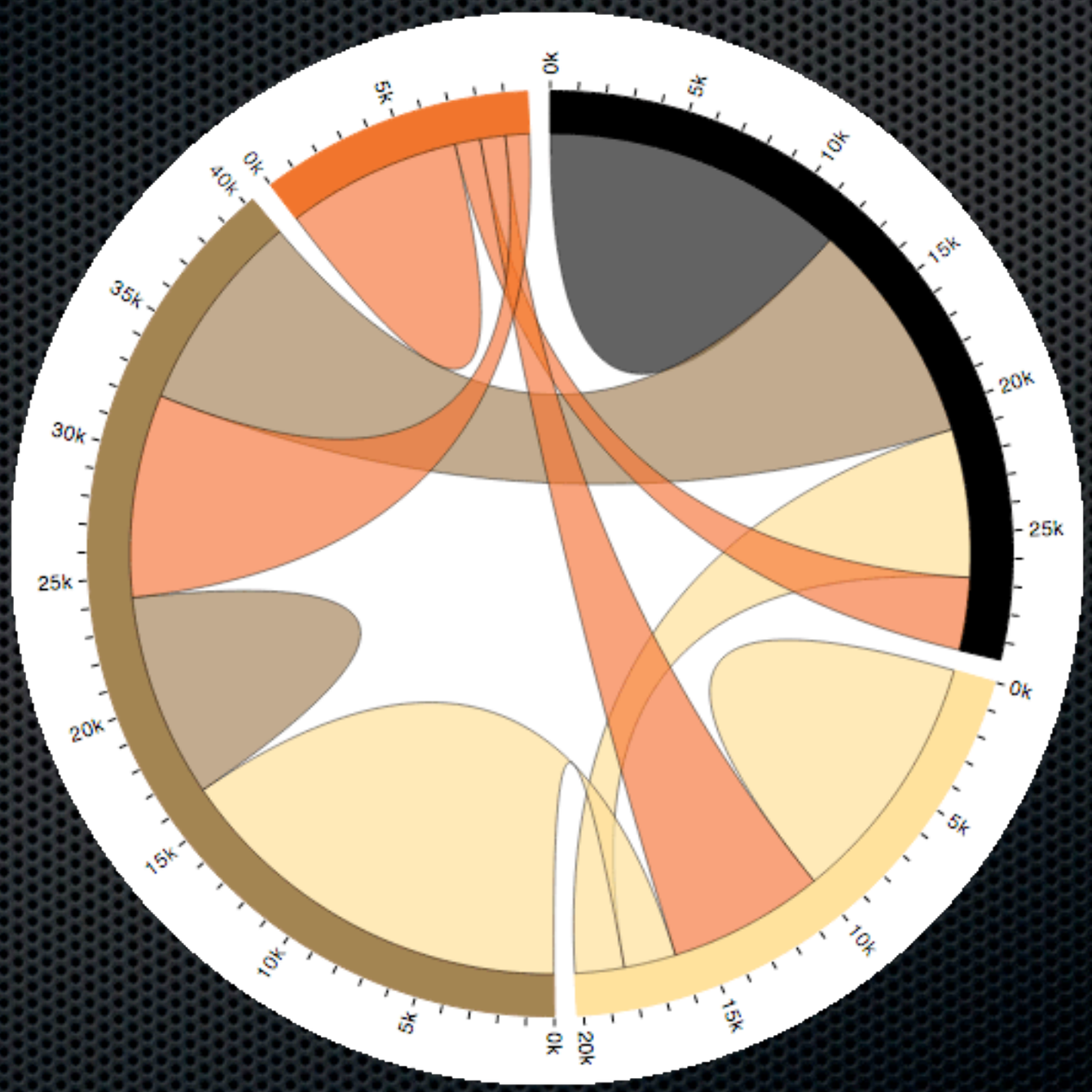
D3 Example #1: InfoQ Topics

Arbor.js

vs.

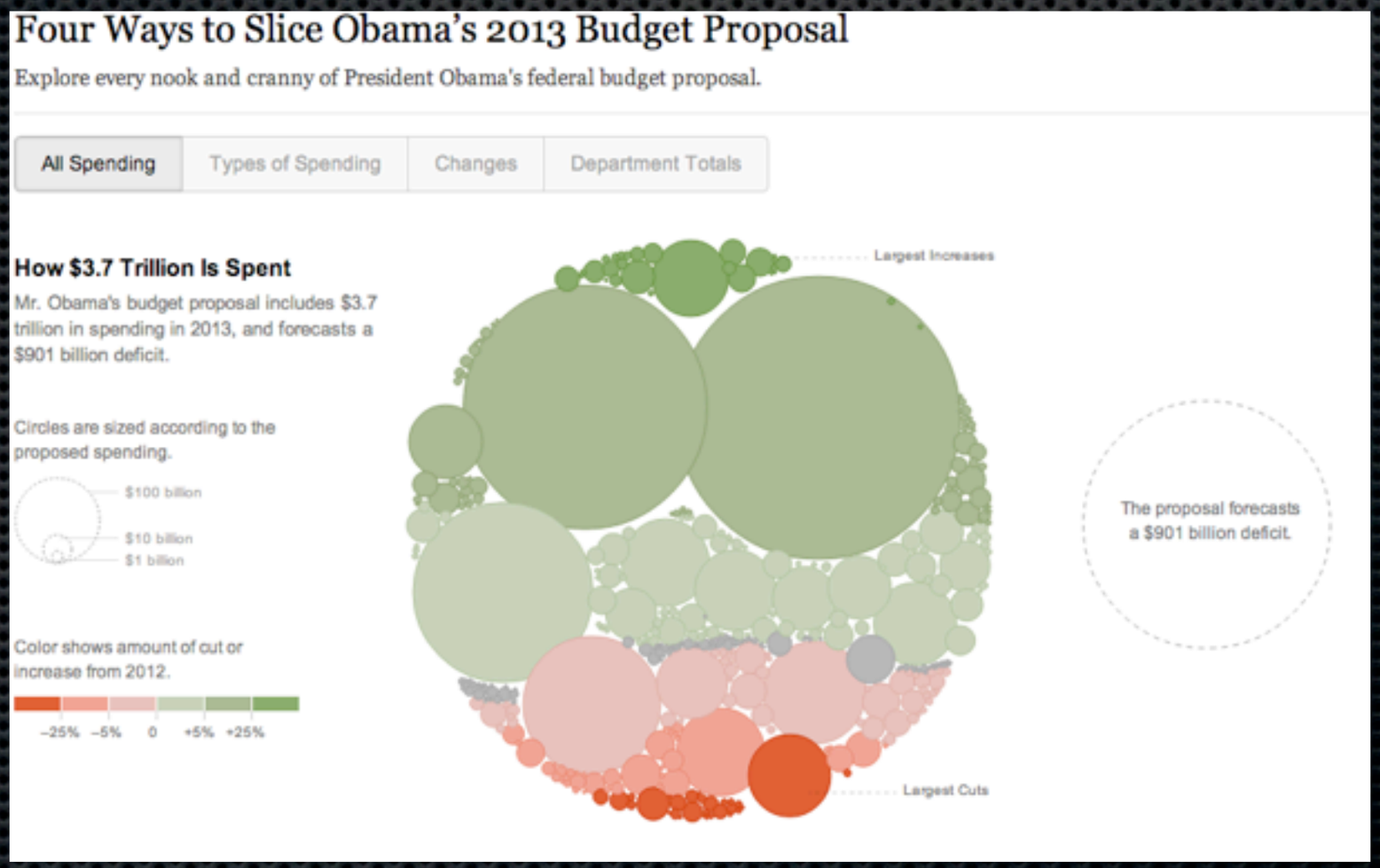
D3 Zoobable Partition Layout

D3 Example #2: Chord Diagram



D3.js Remote Demo

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



Interactive **object model** on top of Canvas

Define classes

Observe Obj

Create/remove Obj

Iterate over Obj

Clone Obj

Initialize Obj

Fabric.js

Simple shapes & paths

Scale, move, rotate, transform

Dynamic manipulation of text

Filters for images

SVG -> Canvas parser

Serialize canvas into JSON string

Fabric.js Structure

- [local demo]

Fabric.js

```
var myRect = new fabric.Rect({
  width: 100, height: 50,
  fill: 'red', stroke: 'black'
});
var canvas = new fabric.Canvas('my-canvas');
canvas.add(myRect);
canvas.renderAll();
```

Canvas

```
var canvas = document.getElementById('my-canvas');
var ctx = canvas.getContext('2d');

ctx.beginPath();
ctx.rect(188, 50, 200, 100);
ctx.fillStyle = 'red';
ctx.fill();
ctx.lineWidth = 5;
ctx.strokeStyle = 'black';
ctx.stroke();
```

Case Study

InfoQ Research:
Community-driven insight into trends, behaviors and technologies

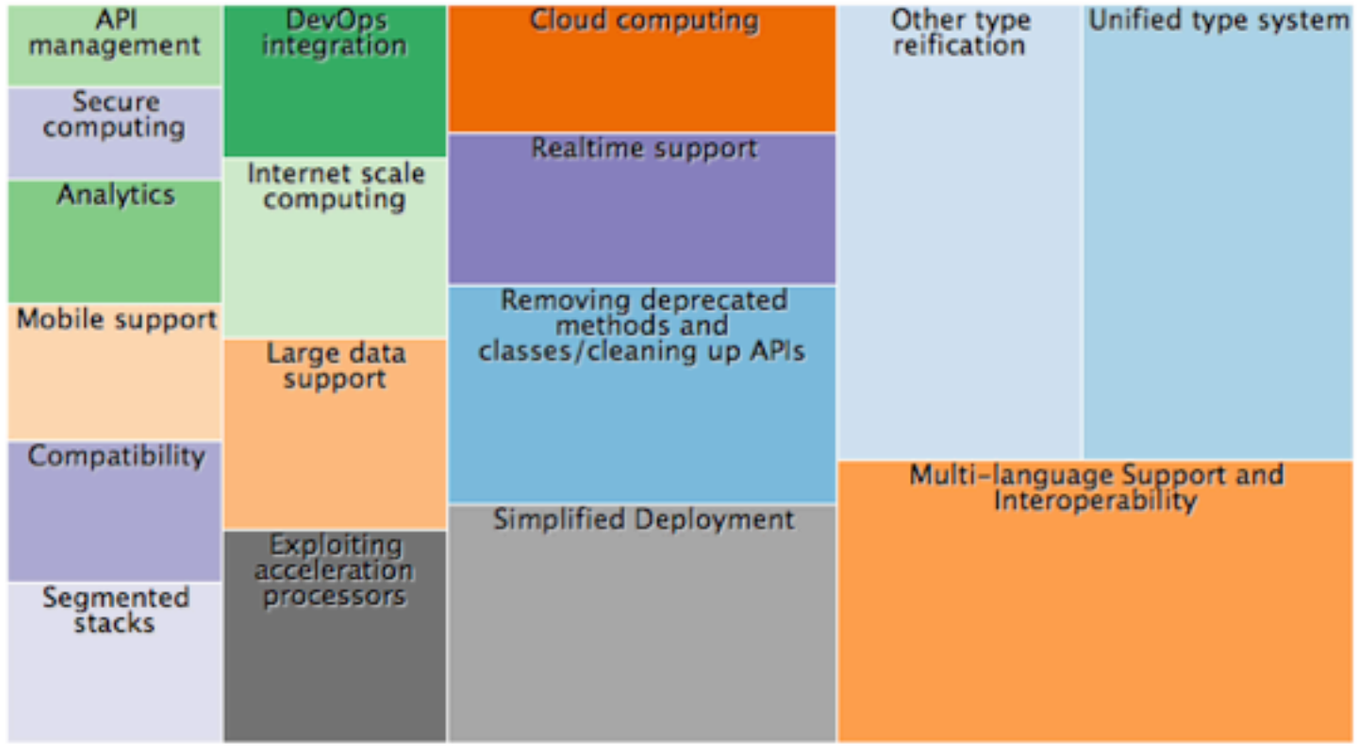
Vote Now! | Results | Analysis

Votes left: 0 / 8
Max dots/option: 4

Submit Vote ⇒

- Multi-language Support and Interoperability
- Unified type system
- Other type reification
- Simplified Deployment
- Removing deprecated methods and classes/cleaning up APIs
- Realtime support
- Cloud computing
- Exploiting acceleration processors
- Large data support
- Internet scale computing
- DevOps integration
- Segmented stacks
- Compatibility
- Mobile support
- Analytics
- Secure computing
- API management

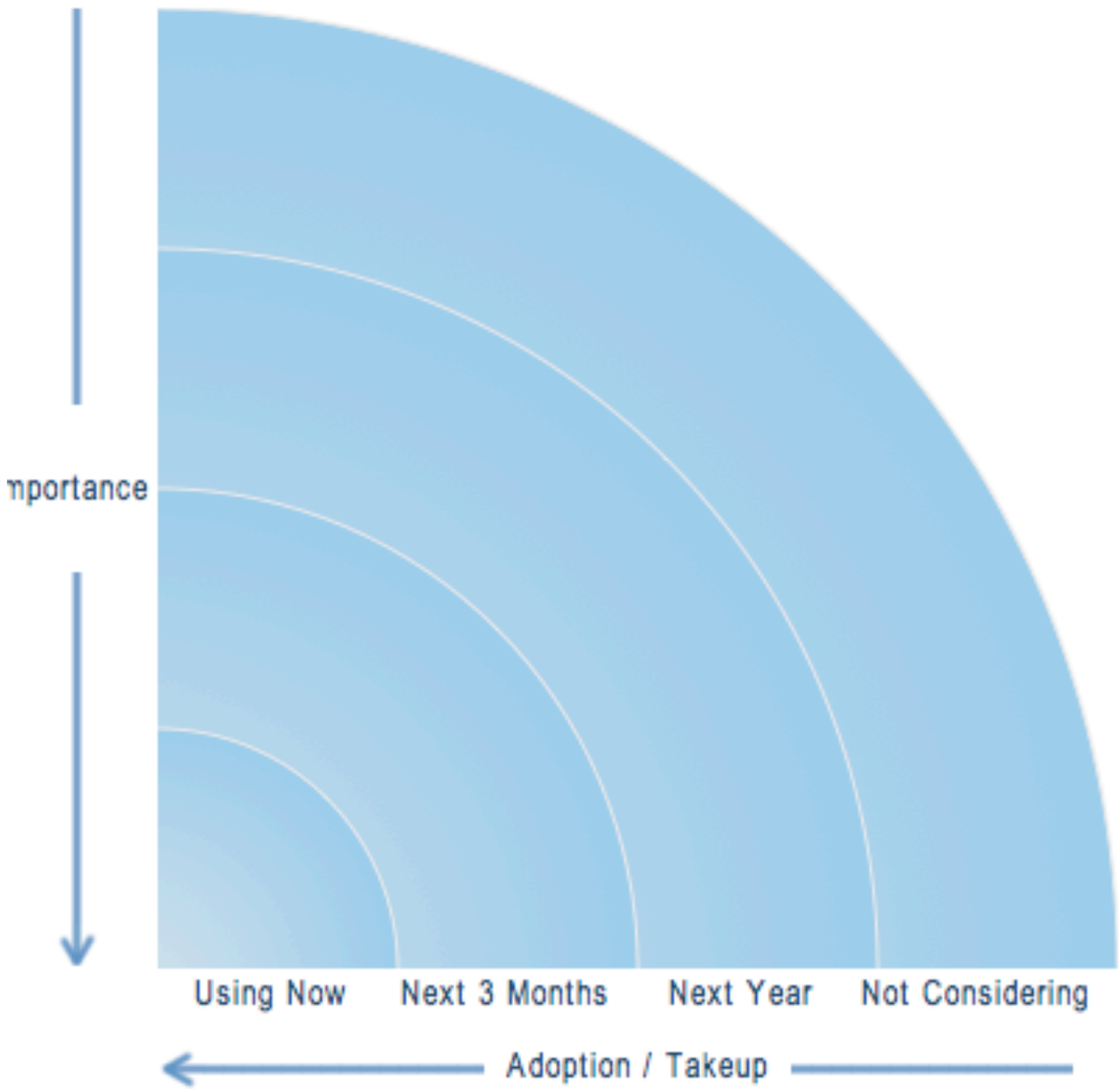
Total number of participants: **582**



Option	Dots	Percentage	Standard Deviation
Multi-language Support and Interoperability	669	15%	1.62
Unified type system	567	13%	1.42
Other type reification	506	11%	1.38
Simplified Deployment	420	9%	1.18
Removing deprecated methods and classes/cleaning up APIs	391	9%	1.11
Realtime support	270	6%	0.91
Cloud computing	228	5%	0.8
Exploiting acceleration processors	216	5%	0.78
Large data support	197	4%	0.73
Internet scale computing	185	4%	0.73
DevOps integration	157	3%	0.67
Segmented stacks	153	3%	0.62
Compatibility	139	3%	0.62
Mobile support	135	3%	0.64
Analytics	122	3%	0.56
Secure computing	91	2%	0.47
API management	80	2%	0.42

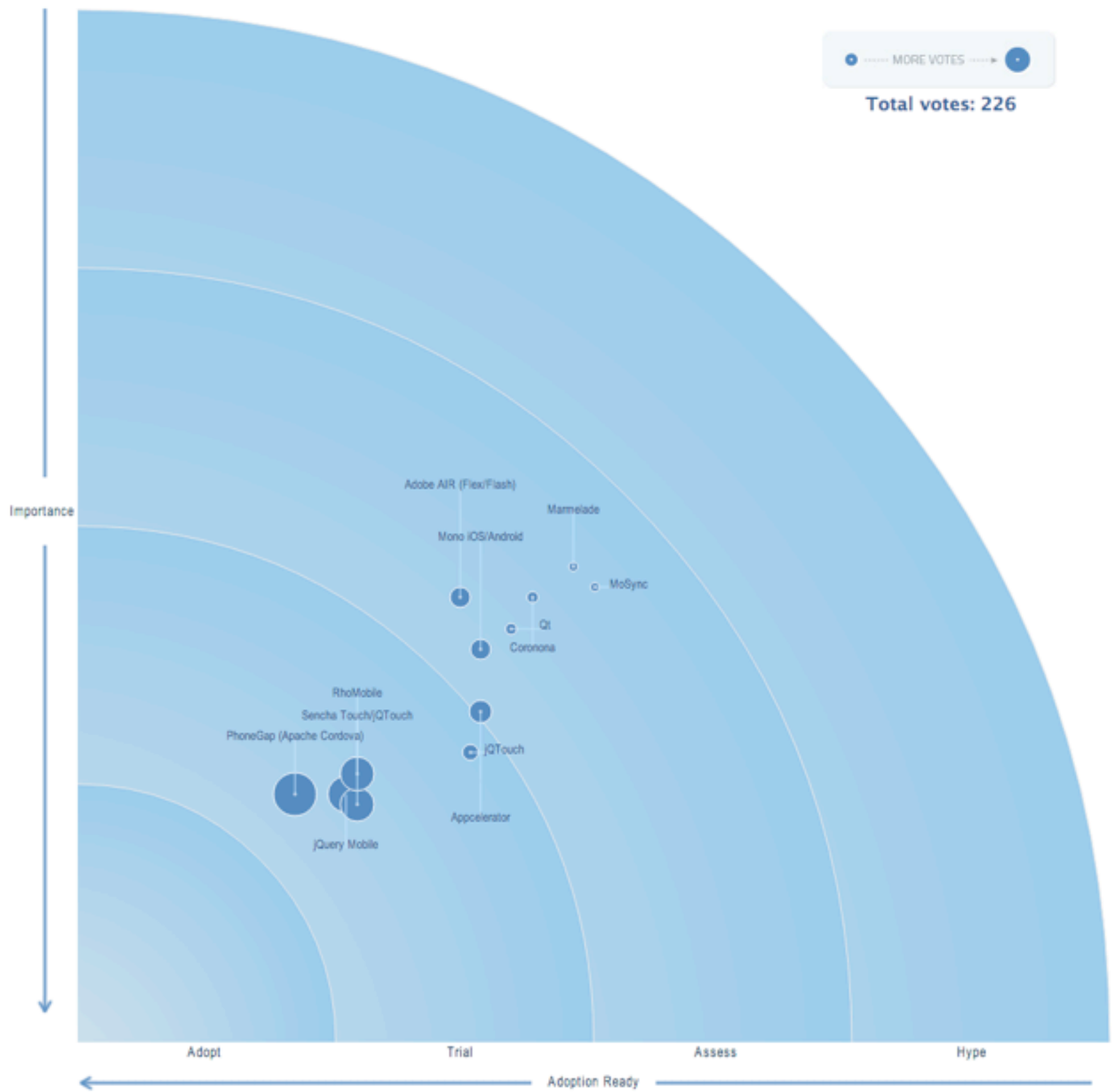
Vote Now! | Average | Analysis

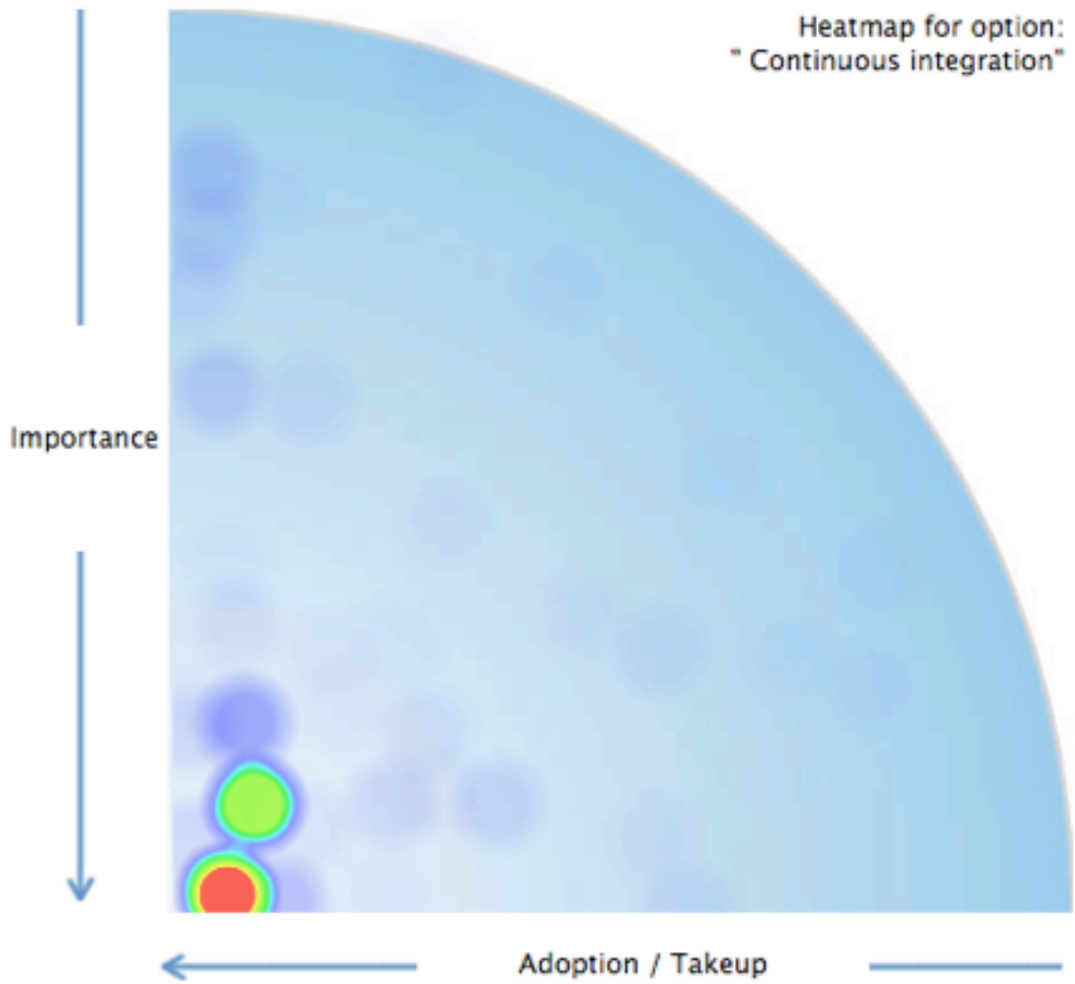
Submit Vote ⇒

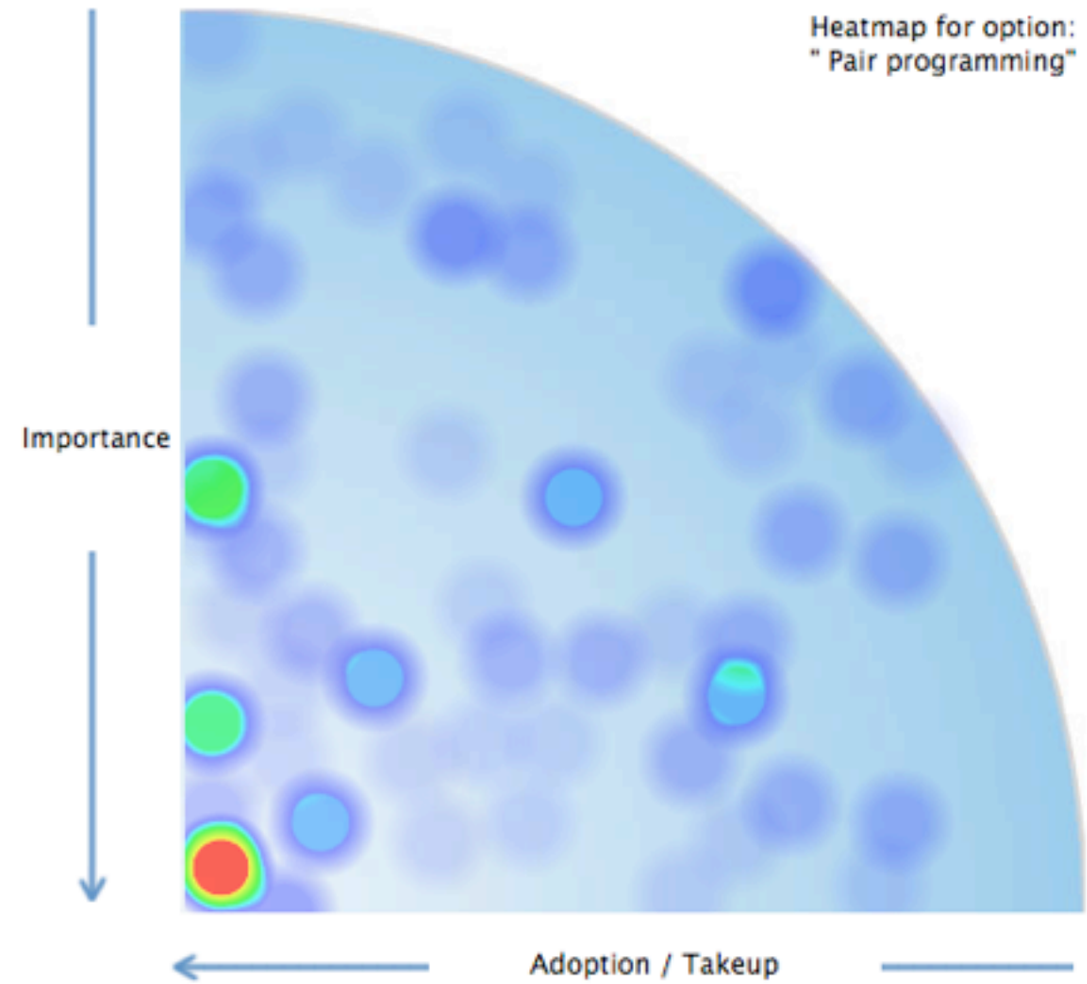


Drag ✣ →

- ✣ Continuous integration
- ✣ Test driven development (TDD)
- ✣ User stories
- ✣ Automated Unit Testing
- ✣ Product Backlog Grooming
- ✣ Peer code reviews
- ✣ Relative estimation
- ✣ Explicit Definition of Done for Stories
- ✣ Automated Regression Testing
- ✣ Acceptance test driven development (ATDD)
- ✣ Pair programming
- ✣ Explicit Definition of Done for Iterations
- ✣ Automated Acceptance Testing
- ✣ Automated System Testing
- ✣ Explicit Definition of Done for Releases
- ✣ Up front architecture
- ✣ Definition of Done includes quality goals
- ✣ Social contract/working agreements


MORE VOTES
Total votes: 226
Importance
Adobe AIR (Flex/Flash)
Marmelade
Mono iOS/Android
MoSync
Qt
Coronona
RhoMobile
Sencha Touch/jQTouch
PhoneGap (Apache Cordova)
jQTouch
Appcelerator
jQuery Mobile
Adopt
Trial
Assess
Hype
Adoption Ready


Heatmap for option:
" Continuous integration"
Importance
Adoption / Takeup


Heatmap for option:
" Pair programming"
Importance
Adoption / Takeup


KEEP
CALM
AND
BUILD
VISUALIZATIONS
@synodinos

Questions?

twitter.com/**synodinos**

Yummy visualizations

Food as a means of data expression, aka edible diagrams:
http://data-cuisine.net/data-dishes/taste-of-migration/