VECTOR GRAPHICS IN THE BROWSER WITH HAXE

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VECTOR GRAPHIC

"Vector graphics is the use of geometrical primitives such as points, lines, curves, and shapes or polygon(s), which are all based on mathematical expressions, to represent images in computer graphics"

- wikipedia

DRAWING OPTIONS

SVG

Canvas

WebGL

Flash

Silverlight

Unity

DRAWING OPTIONS

PROS

SVG	Canvas
resolution independence	high performance
easy animations	best for raster graphics (ex. games, image manipulation and pixel-level manipulation)
XML / DOM (inspection)	

DRAWING OPTIONS

CONS

SVG	Canvas
complex scenes make it slow	no DOM
cross-browser issues	no animation API
no pixel drawing	no events

SVG ISSUES

SVG Filters no IE9, iOS Safari, Android 4

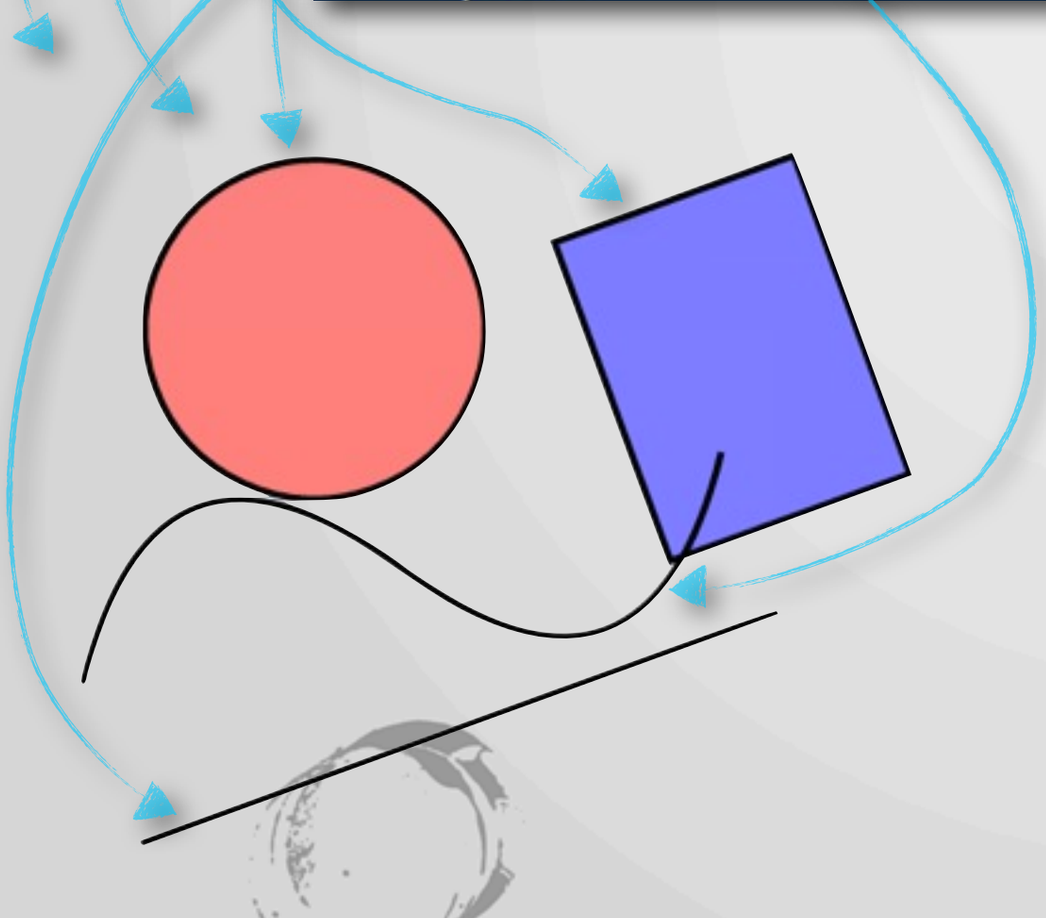
SVG Fonts no IE9, Firefox

SVG SMIL Animation no IE9

CSS Transition no IE9 (always require vendor prefix)

foreignObject no IE9

```html
<!DOCTYPE html>
<html>
<head>
<title>Svg Basics</title>
<style type="text/css">
rect, circle, line, path { stroke: #000; stroke-width: 4; fill: #00f; fill-opacity: 0.5; }
circle { fill: #f00; }
path { fill: none; }
</style>
</head>
<body>
<svg width="550" height="450" xmlns="http://www.w3.org/2000/svg" version="1.1">
    <g transform="translate(-100,0) rotate(-20)">
        <rect x="350" y="200" width="150" height="200"/>
        <circle cx="200" cy="200" r="100"/>
        <line x1="0" x2="400" y1="450" y2="450"/>
        <path d="M0,350 Q100,200 200,350 T400,350"/>
    </g>
</svg>
</body>
</html>
```



SVG BASICS

LIBRARIES

dhx	thx
JavaScript library to handle the DOM	general purpose cross-platform library

THX

color

```
var colorf = Rgb.interpolateSpectrumf();
trace(colorf(0.0).toCss()); // #0000FF
trace(colorf(0.2).toCss()); // #00CCFF
trace(colorf(0.4).toCss()); // #00FF66
trace(colorf(0.6).toCss()); // #66FF00
trace(colorf(0.8).toCss()); // #FFCC00
trace(colorf(1.0).toCss()); // #FF0000
```

date utilities: parsing

```
trace(DateParser.parse("one week ago at noon"));
// 2012-04-06 12:00:00
```

THX

math: equations, scales
data formats: csv, json, ini
string format
localization
geographic projections
graph: Sugiyama
geometry layouts
svg helpers

DHX

dom handling:

attr

style

classed

html / text

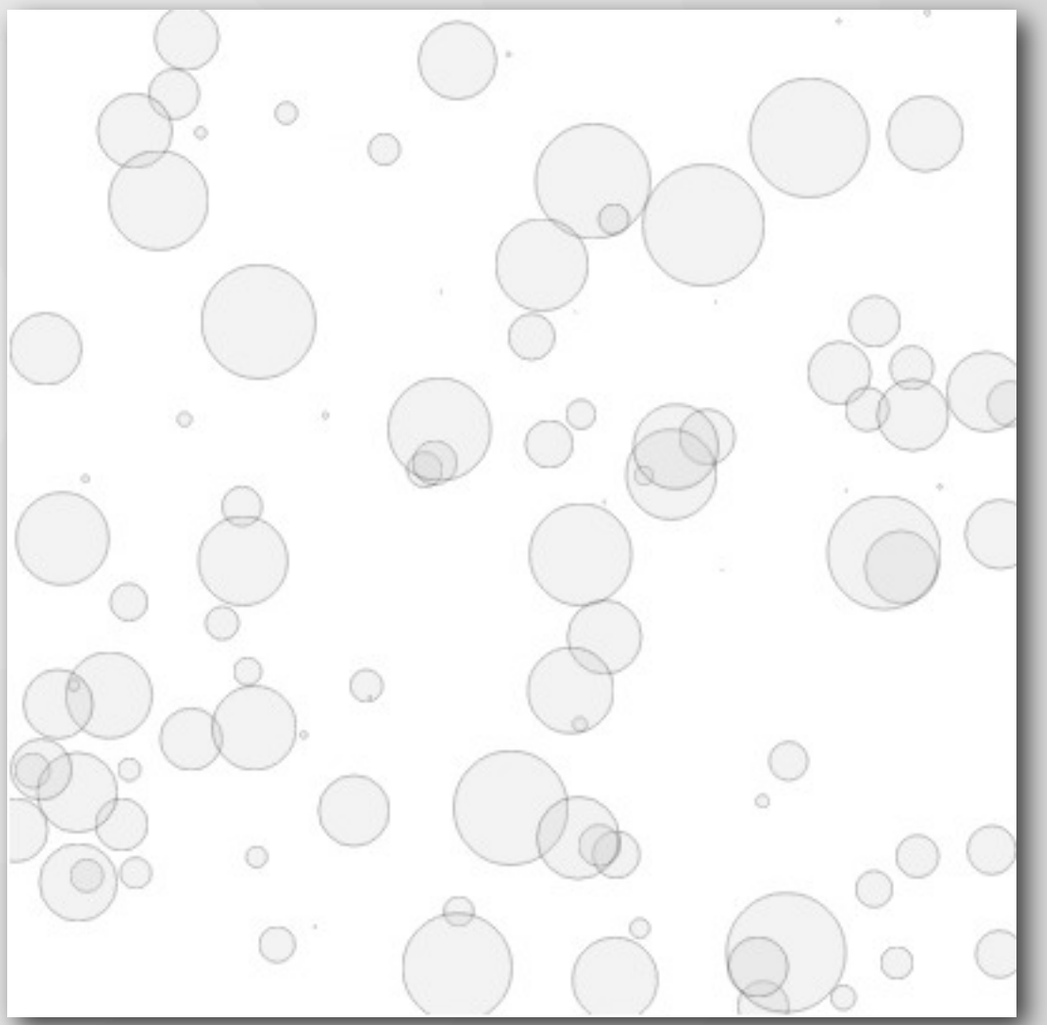
prop

data binding

RANDOM CIRCLES

```
static function main()
{
    var svg = Dom.select("#dhx").append("svg:svg")
            .attr("width").float(600)
            .attr("height").float(600);

    for(i in 0...100)
    {
        svg.append("svg:circle")
            .attr("cx").float(600 * Math.random())
            .attr("cy").float(600 * Math.random())
            .attr("r").float(25 * Math.random())
            .style("opacity").float(0.25)
            .style("fill").string("#cccccc")
            .style("stroke").string("#000000")
        ;
    }
}
```



DHX

data binding

```
var data   = [1,2,4,8],
    hscale = new Linear().domain([0,8]).range([0,100]).scale;
svg.selectAll("circle")
    .data(data)
    .enter()
        .append("svg:circle")
            .attr("cx").floatf(function(_, pos : Int) return pos * 200 + 100)
            .attr("cy").floatf(hscale)
            .attr("r").floatf(hscale)
            .style("fill").color(NamedColors.burlywood)
;
```

RANDOM CIRCLES

```
static function main()
{
    var size = 600, max = 30, radius = 80,
        svg = Dom.select("#dhx").append("svg:svg")
            .attr("width").float(size)
            .attr("height").float(size);

    function rand() {
        var r  = Math.floor(Math.random() * radius),
            sw = Math.floor(Math.random() * r / 2),
            color = Rgb.interpolateRainbowf();
        function pos(s) return r + ((s - 2 * r) * Math.random());
        return {
            x : pos(size),
            y : pos(size),
            r : r - sw,
            sw : sw,
            color : color(Math.random())
        };
    }

    var dataset = [];
    new Timer(100).run = function() {
        if(Math.random() < 0.25 && dataset.length > 0)
            dataset.pop();
        else if(Math.random() < 0.75 && dataset.length < max)
            dataset.push(rand());
        else
            dataset[Math.floor(Math.random() * dataset.length)] = rand();
        render(svg, dataset);
    };
}
```

DHX

transition

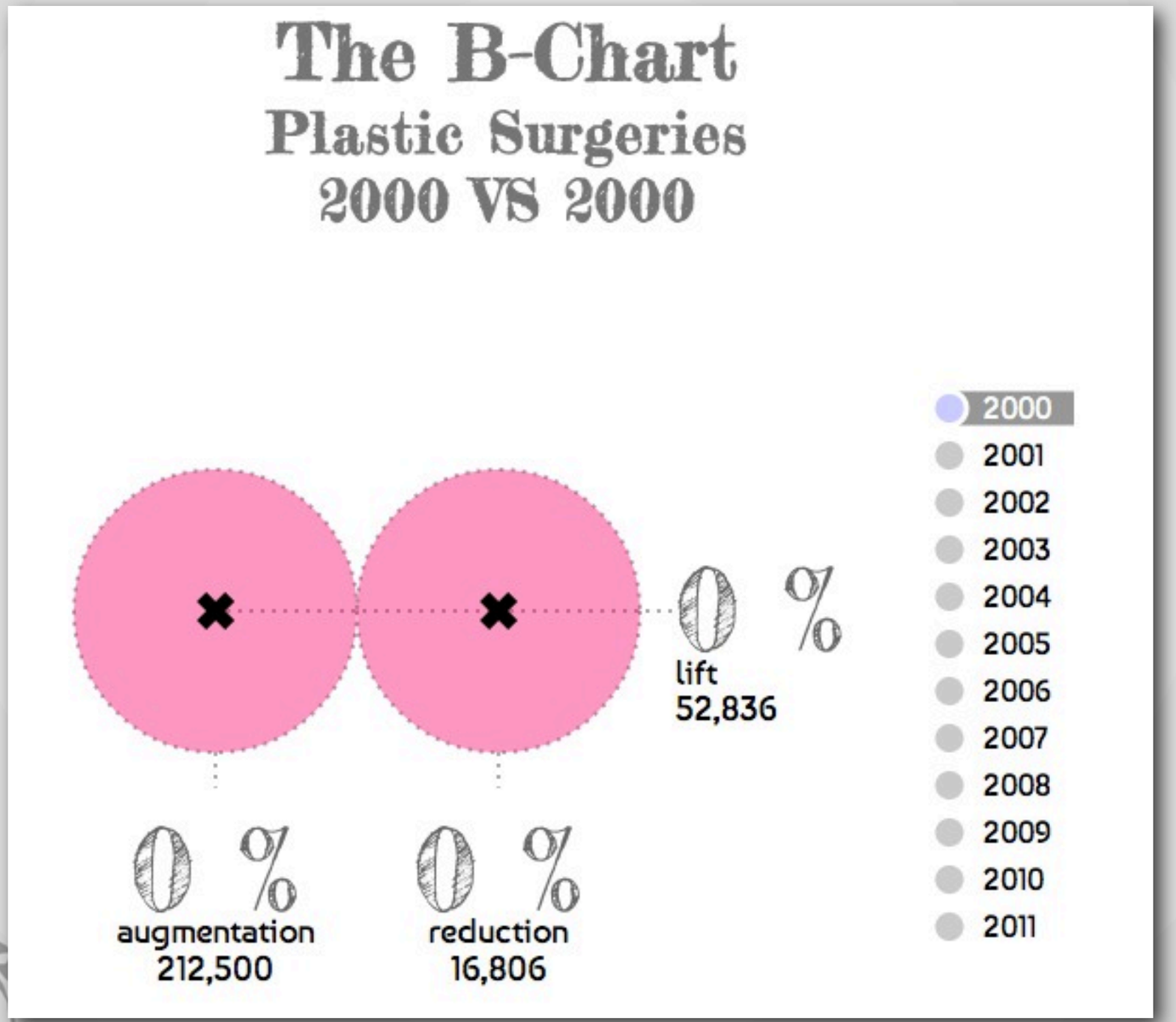
RANDOM CIRCLES

```
static function render(svg : Selection, data : Array<Data>)
{
    var choice = svg.selectAll("circle").data(data);
    choice.enter()
        .append("svg:circle")
            .attr("cx").floatf(function(o, _) return o.x)
            .attr("cy").floatf(function(o, _) return o.y)
            .attr("r").float(0)
            .style("opacity").float(1)
    ;

    choice.update()
        .style("fill").colorf(function(o, _) return o.color)
        .style("stroke").colorf(function(o, _) return o.color)
        .style("fill-opacity").float(0.25)
        .style("stroke-opacity").float(0.5)
        .style("stroke-width").floatf(function(o, _) return o.sw)
        .transition()
            .attr("cx").floatf(function(o, _) return o.x)
            .attr("cy").floatf(function(o, _) return o.y)
            .attr("r").floatf(function(o, _) return o.r)
    ;

    choice.exit()
        .transition()
            .delay(1000)
            .style("opacity").float(0)
            .remove();
}
```

THE B-CHART


The B-Chart
Plastic Surgeries
2000 VS 2000
0 %
lift
52,836
0 %
augmentation
212,500
0 %
reduction
16,806
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

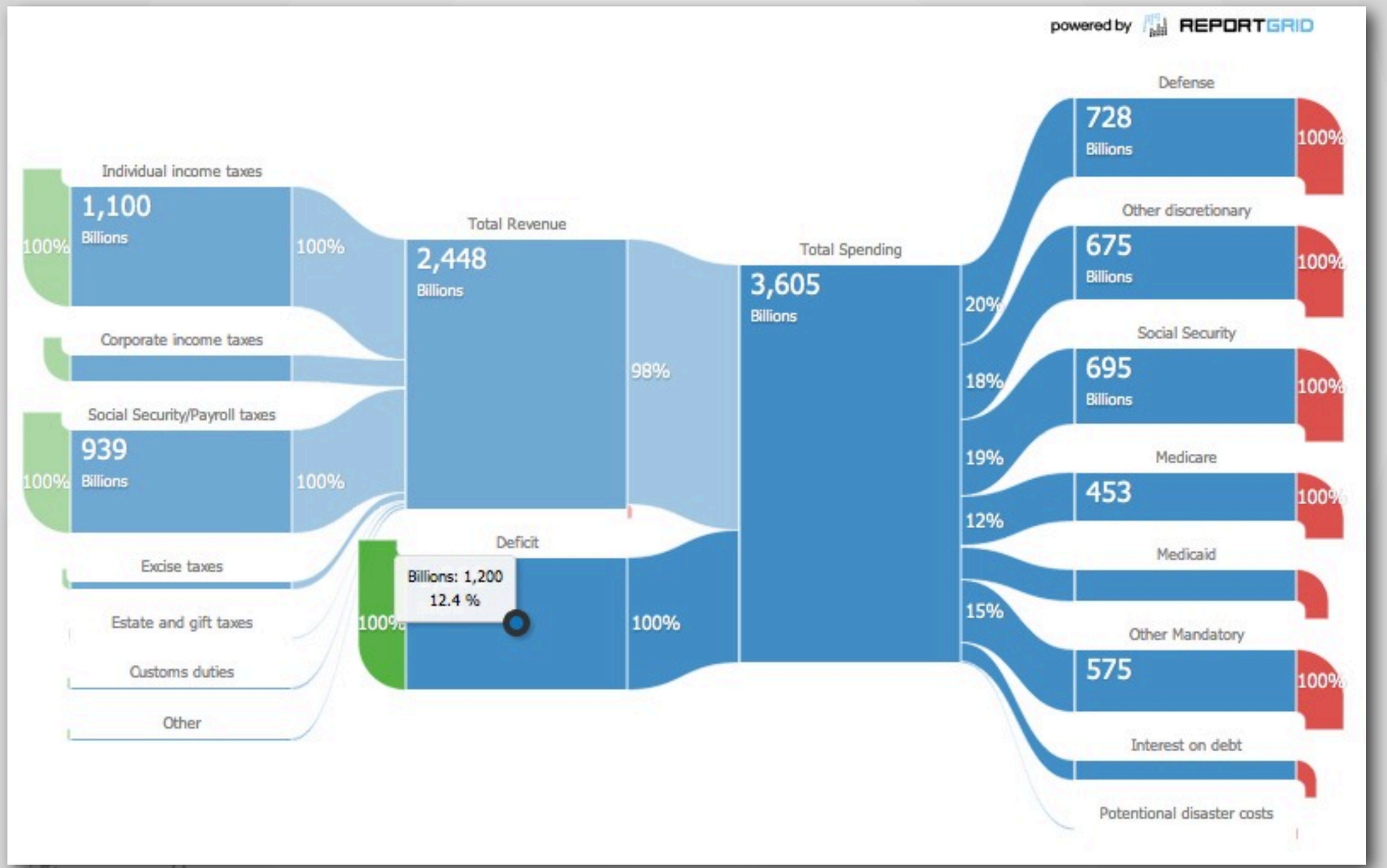
D3 VS DHX

D3 (JavaScript)	dhx (haXe)
`var sel = d3.select(“#chart”);`	`var sel = Dom.select(“#chart”);`
`sel.attr(“x”, 10);`	`sel.attr(“x”).float(10);`

`sel.attr(“x”, function(d) {`
`  return d.value;`
`});`
	`sel.attr(“x”).floatf(`
	`  function(d, _) return d.value`
	`);`

`var v = sel.attr(“x”);`	`var v = sel.attr(“x”).getFloat();`

REPORTGRID


powered by REPORTGRID
Individual income taxes
1,100
Billions
100%
100%
Corporate income taxes
Social Security/Payroll taxes
939
Billions
100%
100%
Excise taxes
Estate and gift taxes
Customs duties
Other
Total Revenue
2,448
Billions
98%
Deficit
Billions: 1,200
12.4 %
100%
100%
Total Spending
3,605
Billions
Defense
728
Billions
100%
20%
Other discretionary
675
Billions
100%
18%
Social Security
695
Billions
100%
19%
Medicare
453
100%
12%
Medicaid
15%
Other Mandatory
575
100%
Interest on debt
Potentional disaster costs

OTHER HAXE LIBS

gm2d
hydrax
xinf
domtools
Nx

JAVASCRIPT LIBRARIES

D3
paperjs
processingjs
dojo/gfx
Raphael

LEGACY SOLUTIONS

server-side rendering:

PhantomJS
WKHTML2PDF/
WKHTML2IMAGE

client side:

Google Chrome Frame

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