



## HTML5图形图像技术分享

<http://weibo.com/zswang> @王集鹄



<http://graphic.duapp.com/>



HTML5现状



SVG探索



Canvas探索



曲线变换



综合应用



回顾





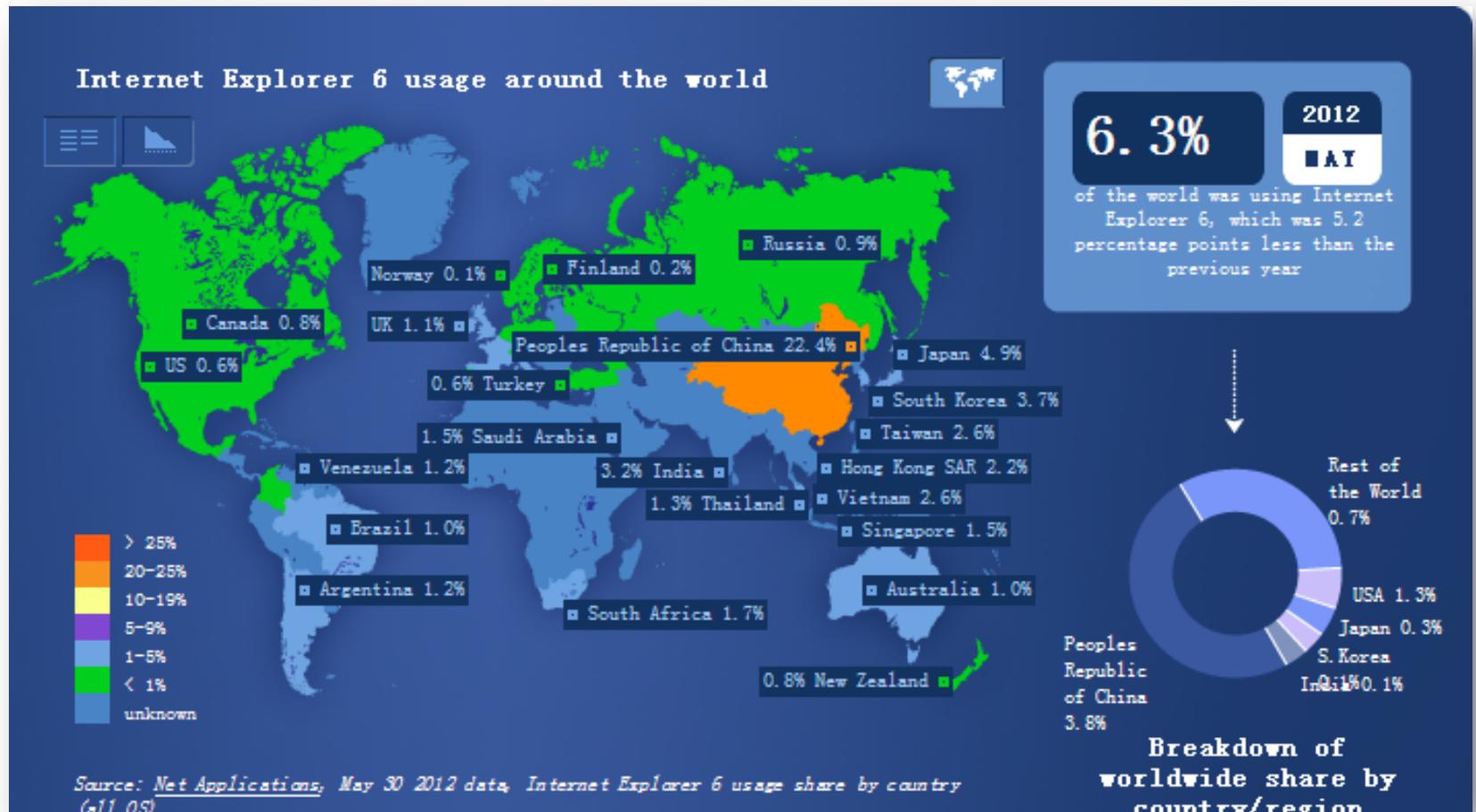
[Tweet](#)

1 Year 11 Months 0 Weeks 2 Days 1 Hour 10 Minutes 25 Seconds

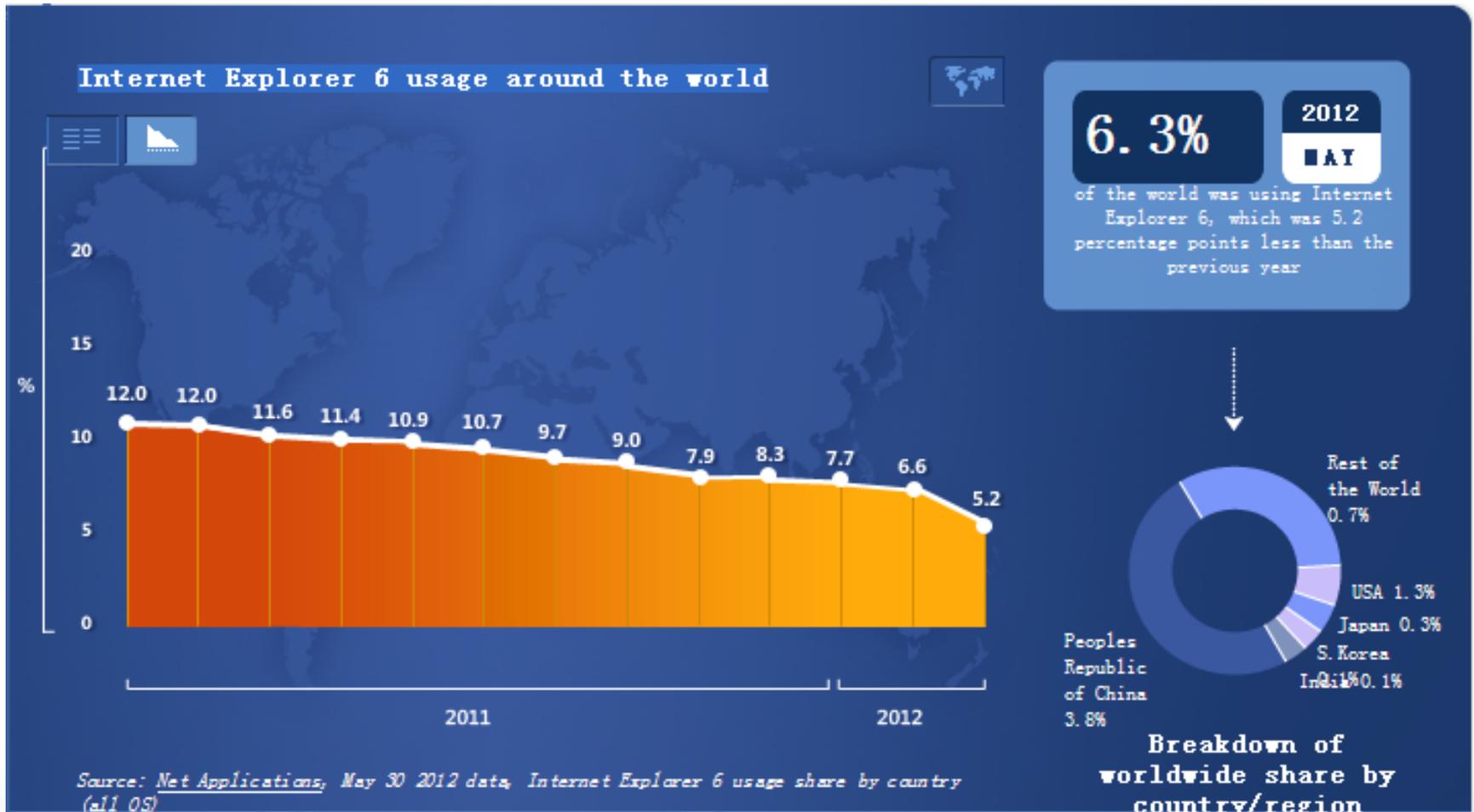
UNTIL IE6 IS DEAD

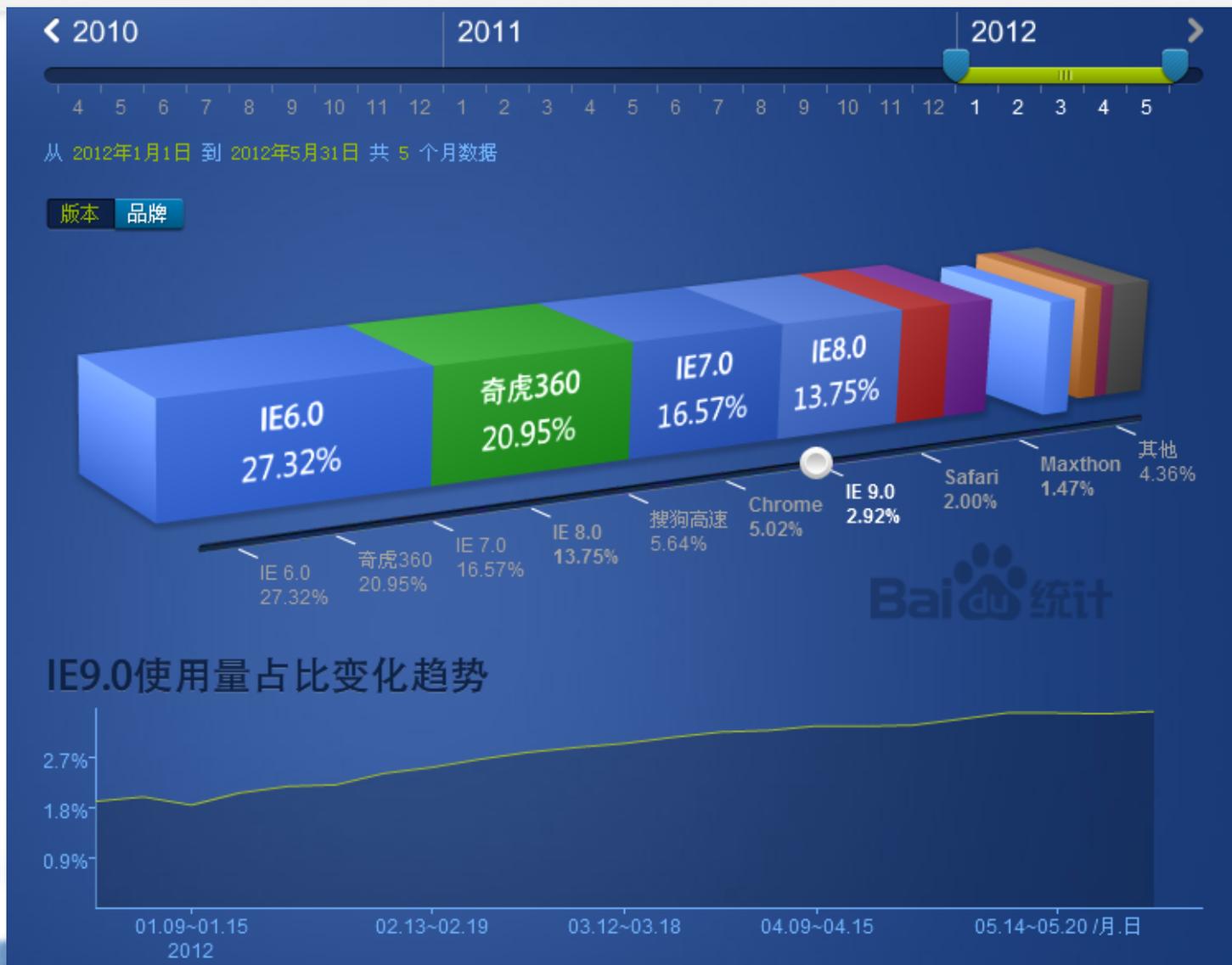
<http://>

# Internet Explorer 6 usage around the world



# Internet Explorer 6 usage around the world





Feature	Safari on iOS	Android Browser		Google Chrome	Amazon Silk	BlackBerry Browser		Nokia Browser		Internet Explorer	Opera		Firefox	webOS Browser	
	iPhone, iPad	Phones (1.0-2.0)	Tablets (3.0+)	Android 4.0	Kindle Fire	Phones	Tablet	Meego - Nokia OS	Symbian	Windows Phone	Mobile	Mini	Android	Phones 1.1-2.1	TouchPad 3.0
Web Workers W3C API Threading and background process communications	✓ 6.0+			✓		✓	✓	✓			✓		✓		
Canvas API W3C API 2D Drawing API	✓	✓	✓	✓	✓	✓	✓	✓	Anna+	✓	✓	✓	✓	✓	✓
SVG W3C Working Group Scalable Vector Graphics	✓	✓ 4.0+	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		
CSS 3 Basic W3C Standard opacity, backgrounds, text effects, rounded corners	✓	✓	✓	✓	✓	✓	✓	6.0	Anna+	✓	✓	✓	partial	✓	✓
CSS 3 Transforms 2D W3C Standard rotate, translate, scale, skew, matrix	✓	✓ 2.0+	✓	✓	✓	✓	✓	6.0	Anna+	✓	✓	✓	partial	✓	✓
CSS 3 Transforms 3D W3C Standard scale3d, translate3d, Perspective, Backface	✓	✓ 4.0+	✓	✓			✓	✓					✓ 11+		
CSS 3 Transitions W3C Standard Animations between two states	✓	✓ 2.0+	✓	✓	✓	✓	✓	6.0	Anna+		✓		✓	✓	✓
CSS 3 Animations W3C Standard Animations with keyframes	✓	✓ 2.0+	✓	✓		✓	✓	6.0	Anna+				✓	✓	✓
WebGL Khronos Group API 3D Canvas for the web		✓ 2.3 only on Sony Xperia					✓ 2.0+				✓ 12+ (android)		✓		

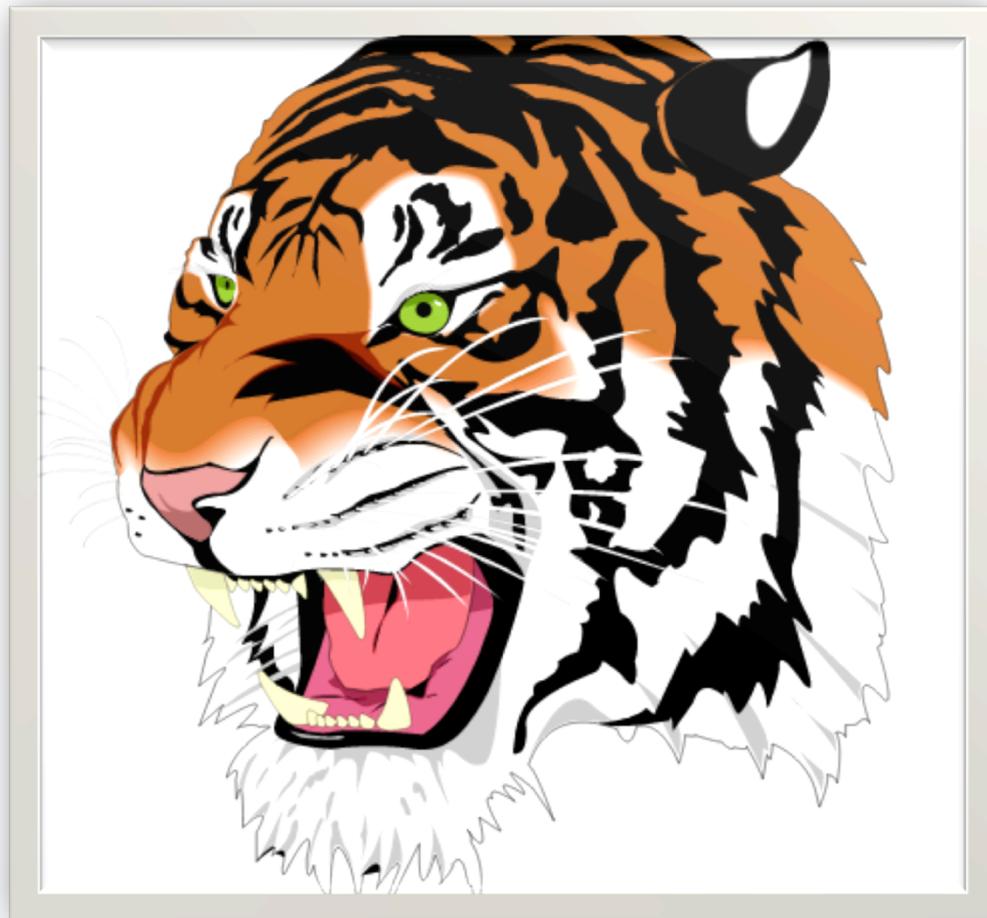




34 SERVER(25,000)  
12 WORLD IS FULL  
8 LANGUAGE  
300,000~850,000



```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<svg version="1.0" xmlns="http://www.w3.org/2000/svg" ?>
  <defs>
    <linearGradient x1="99.7" x2="100" y1="0" y2="100" ?>
      <stop offset="0" stop-color="white" ?>
    </linearGradient>
  </defs>
  <use xlink:href="#box" ?>
  <use xlink:href="#circle" ?>
  <use xlink:href="#circle" ?>
  <line x1="100" y1="300" ?>
  <!--add more content here-->
  <circle cx="90" cy="100" r="10" ?>
</svg>
```



<http://www.w3.org/TR/SVG>



<http://dmitrybaranovskiy.github.io/raphael/>



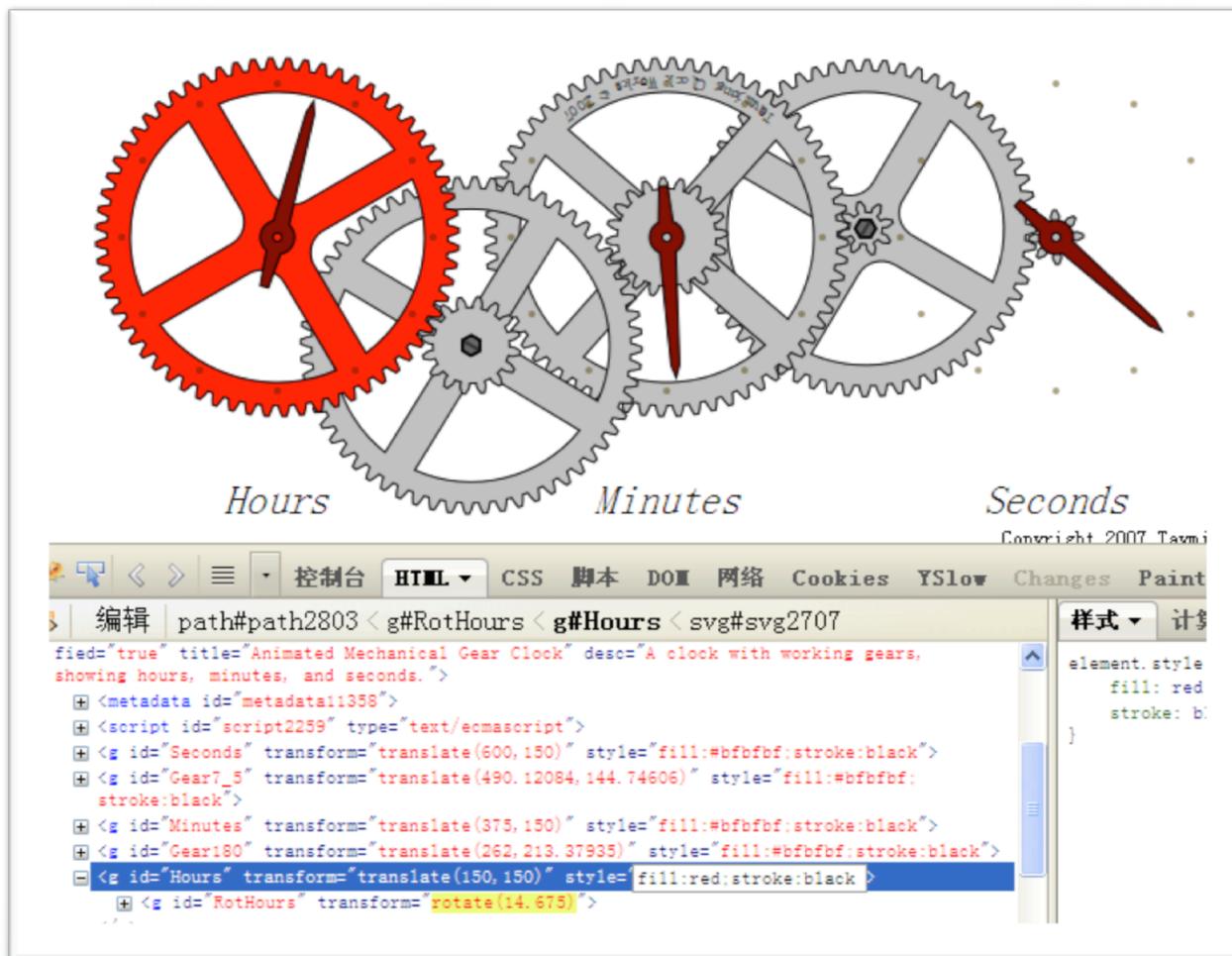


SVG

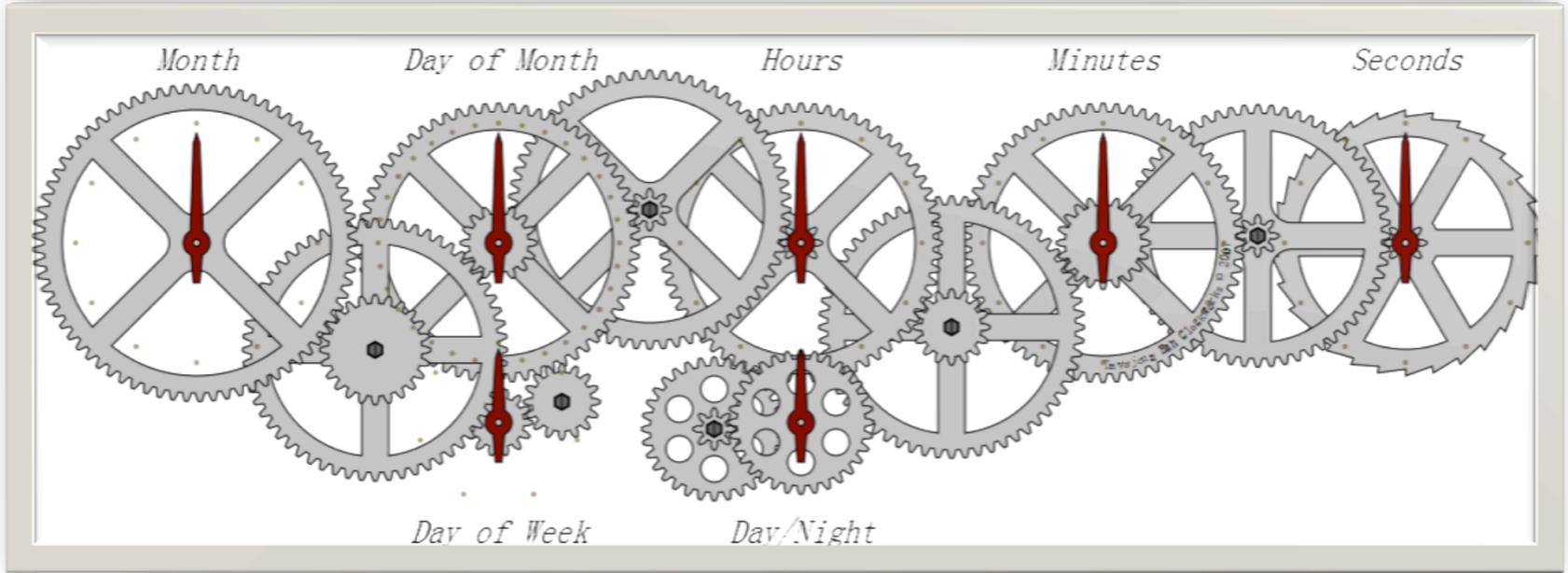


PNG

Demo



<http://tasmjong.free.fr/INKSCAPE/DRAWINGS/clock.svg>  
<http://tasmjong.free.fr/INKSCAPE/DRAWINGS/clock2.svg>

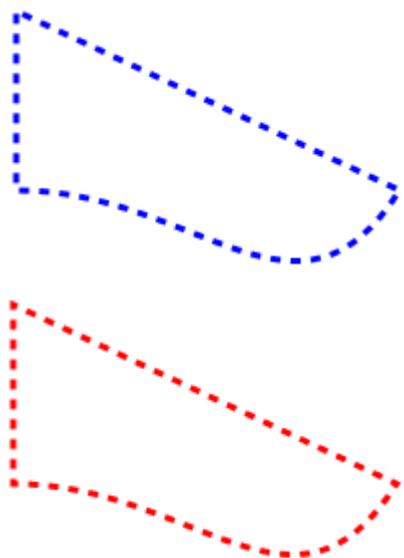




Demo

<object data="http://tavmjong.free.fr/INKSCAPE/DRAWINGS/clock2.svg"></object>

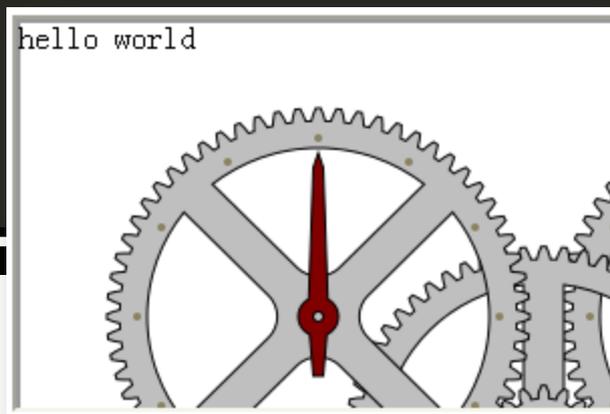




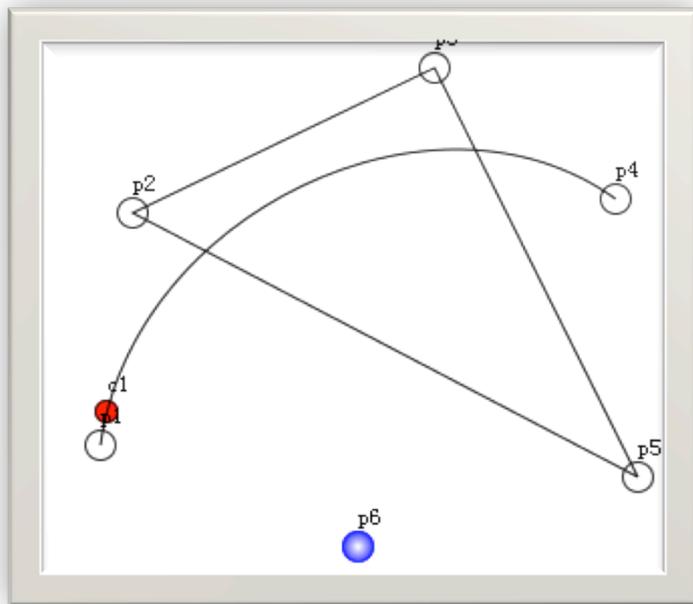
```
1 <svg width="100%" height="100%" version="1.1"
2   xmlns="http://www.w3.org/2000/svg">
3 <path stroke-dasharray="5 5"
4   stroke-dashoffset="0"
5   stroke-width="3"
6   stroke="red"
7   fill="none"
8   d="M 10,10 L 10,100 C 100,100 150,180 200,100 Z">
9   <animate begin="0s"
10    attributeName="stroke-dashoffset"
11    from="5"
12    to="55"
13    dur="3s"
14    repeatCount="indefinite"/>
15 </path>
16 </svg>
```

Demo

```
1 <head>
2   <style>
3   textarea{
4     background: url("http://tvmjong.free.fr/INKSCAPE/DRAWINGS/clock.svg");
5     width: 300px;
6     height: 200px;
7   }
8   </style>
9 </head>
10 <body>
11   <textarea>hello world</textarea>
12 </body>
```



Demo



**point:** p1=x1, y1

p1=172, 261

p2=188, 144

p3=338, 71

p4=428, 137

p5=439, 277

p6=300, 312

**change:** c1=p1, p2...

**rate:** r1=p1, p2...

50%

c1=p1, p2, p3, p4

**path:** ■ p1 L p2

**path:** ■ p1 C p2 p3 p4

M p1 C p2 p3 p4

M p5 p2 p3 p5

Demo

MIT and the Beerware license, feel free to use it in your projects.

[Contributions on github](#) and feedback is very appreciated. If you have any questions or suggestions, [please](#)

If you'd like to know how heatmap.js works here is [an article about the inner life of heatmap.js](#)

You always wanted an easy way to add heatmap.js to your Wordpress installation?

Please check out the [Wordpress Visitor Heatmap Plugin](#)

It sets up a tracking script and visualizes recorded data for admins so you can study it.

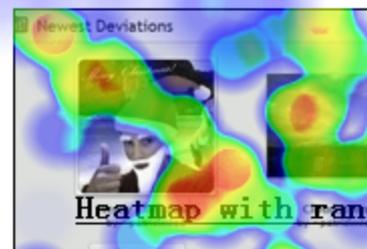
## What is a heatmap?

You've never heard of heatmaps? No problem! In short: a heatmap is a graphical representation of datapoint frequency, usually red spots on a heatmap are highly frequent spots and blue ones are less frequent spots. detailed explanation check [wikipedia](#)

## Usage demonstrations

Display website's realtime heatmap

- [Heatmap based on static data](#)
- [Realtime heatmap based on mouse movement data](#)



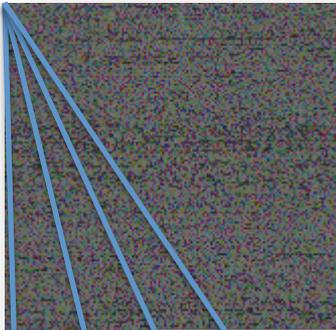
Demo

<http://www.patrick-wied.at/static/heatmapjs/>

```
1 function text2points(text){
2     context.font = font;
3     canvas.width = context.measureText(text).width;
4     canvas.height = size;
5     context.clearRect(0, 0, canvas.width, canvas.height);
6     context.font = font;
7     context.textAlign = 'left';
8     context.textBaseline = 'top';
9     context.fillText(text, 0, 0);
10
11     var data = context.getImageData(0, 0, canvas.width, canvas.height).data;
12     var results = {
13         width: canvas.width,
14         height: canvas.height,
15         data: {}
16     };
17     for (var y = 0, p = 0, h = results.height; y < h; y++) {
18         for (var x = 0, w = results.width; x < w; x++) {
19             if (data[p + 3]) {
20                 results.data[[x, y]] = true;
21             }
22             p += 4;
23         }
24     }
25     return results;
26 }
```

[Demo](#)

Demo



```

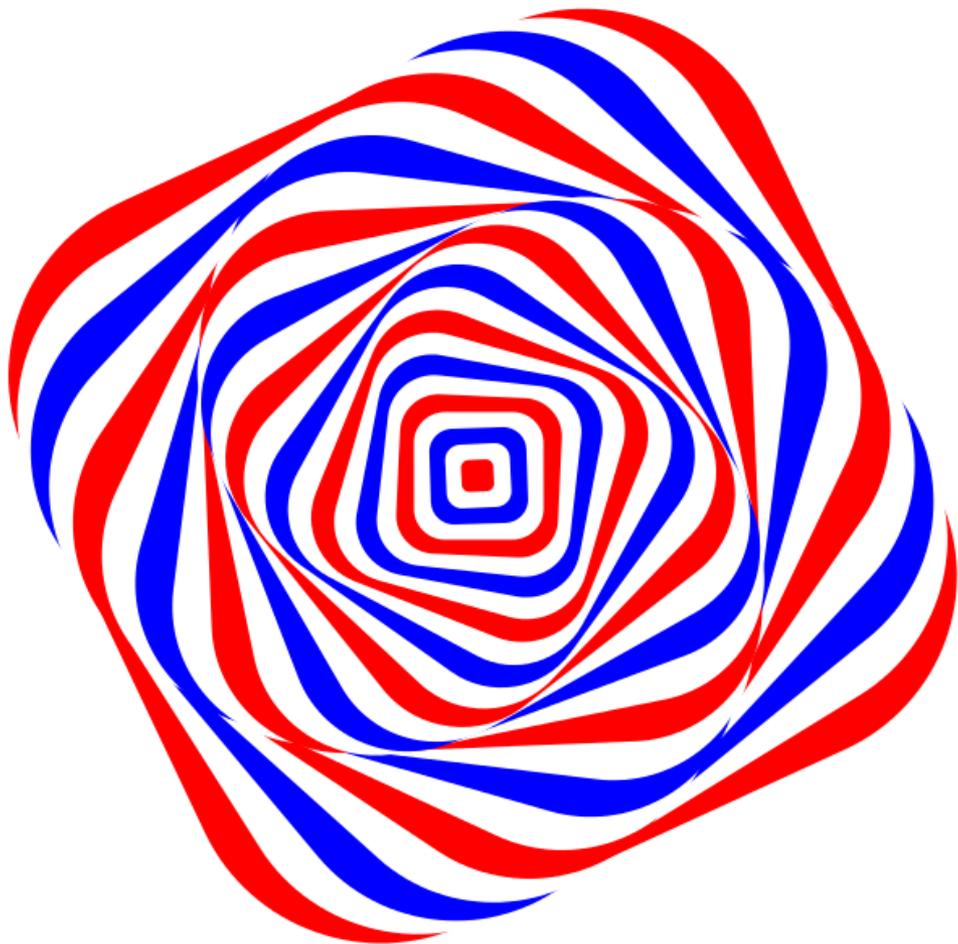
15  /*
16   * Tangram
17   * Copyright 2009 Baidu Inc. All rights reserved.
18   */
19
20  /**
21   * @namespace T Tangram七巧板
22   * @name T
23   * @version 1.5.2.1
24  */
25
26  /**
27   * 声明baidu包
28   * @author: allstar, erik, meizz, berg
29   */
30  var T,
31      baidu = T = baidu || {version: "1.5.2.1"};
32
33  //提出guid, 防止在与老版本Tangram混用时
34  //在下一行错误的修改window[undefined]
35  baidu.guid = "$BAIDU$";
36
37  //Tangram可能被放在闭包中
38  //一些页面级别唯一的属性, 需要挂载在window[baidu.guid]上
39  baidu.$$ = window[baidu.guid] = window[baidu.guid] || {global: {}};

```

```
1 window.requestAnimFrame = (function(){
2   return window.requestAnimationFrame ||
3     window.webkitRequestAnimationFrame ||
4     window.mozRequestAnimationFrame ||
5     window.oRequestAnimationFrame ||
6     window.msRequestAnimationFrame ||
7     function(/* function */ callback, /* DOMElement */ element){
8       window.setTimeout(callback, 1000 / 60);
9     };
10 })();
```

<http://code.google.com/p/cakejs/source/browse/trunk/src/cake.js#28>





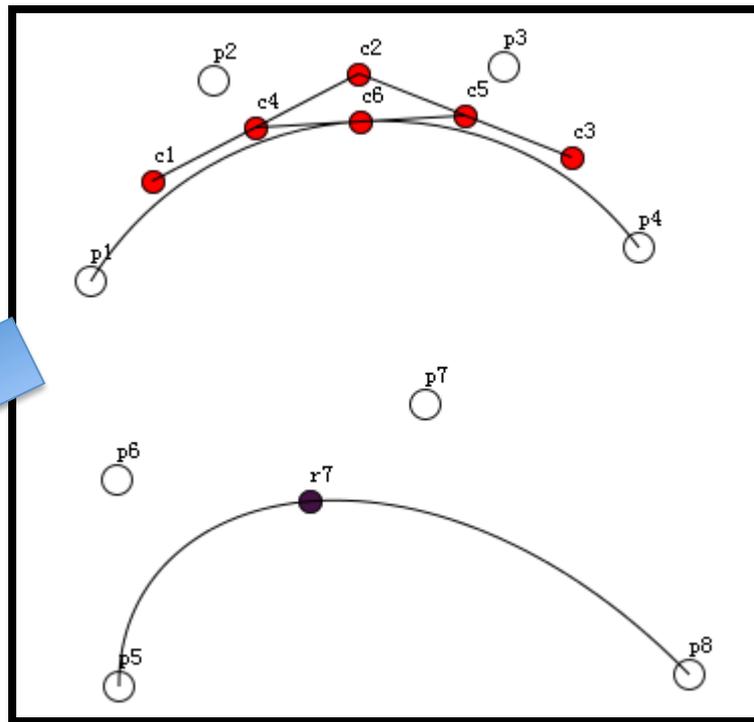
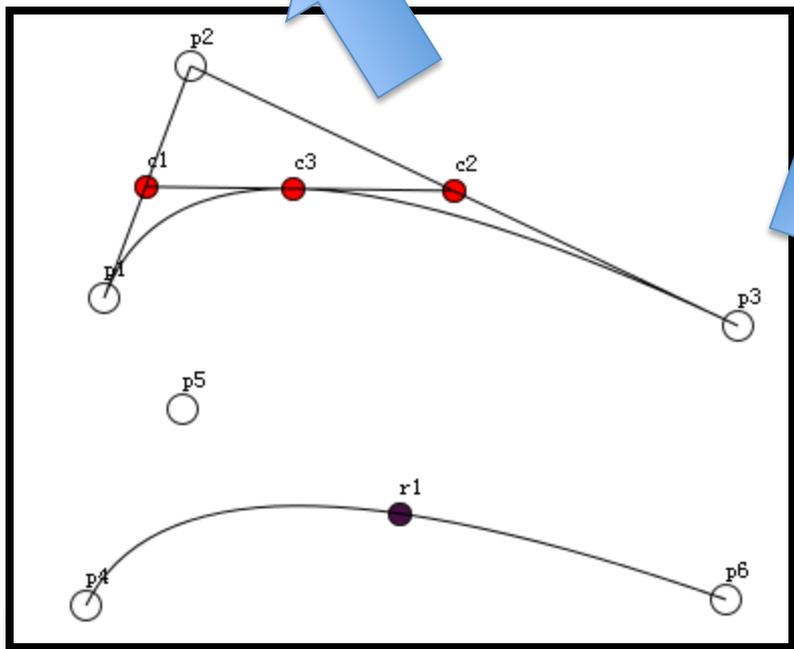
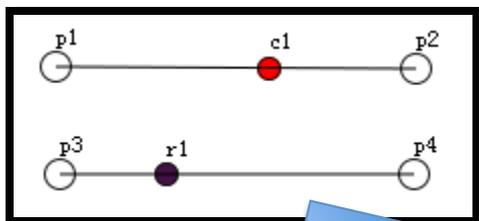
<http://paperjs.org>



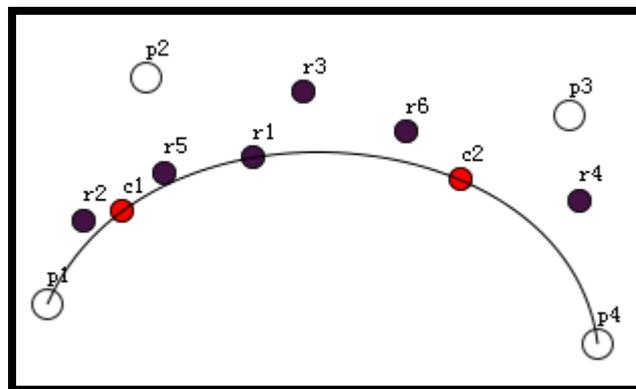
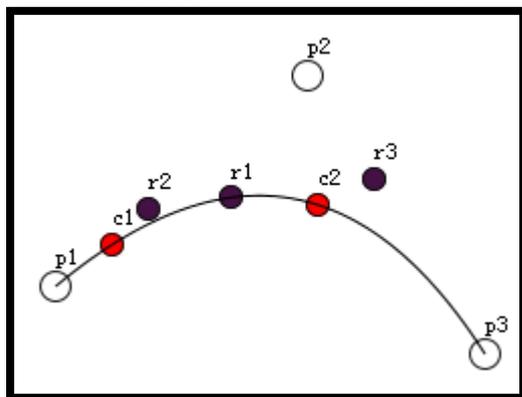
$n$ 阶贝塞尔曲线可如下推断。给定点 $P_0$ 、 $P_1$ 、 $\dots$ 、 $P_n$ ，其贝塞尔曲线即

$$B(t) = \sum_{i=0}^n \binom{n}{i} P_i (1-t)^{n-i} t^i = P_0 (1-t)^n + \binom{n}{1} P_1 (1-t)^{n-1} t + \dots + P_n t^n, t \in [0, 1].$$

```
1 ▽ function bezier(curve, rate){
2   if (!curve || !curve.length) return [];
3   if (curve.length == 1) return [curve[0][0], curve[0][1]];
4 ▽   if (curve.length == 2) return [
5       curve[0][0] + (curve[1][0] - curve[0][0]) * rate,
6       curve[0][1] + (curve[1][1] - curve[0][1]) * rate
7   ];
8   var temp = [];
9   for (var i = 1; i < curve.length; i++){
10      temp.push(bezier([curve[i - 1], curve[i]], rate));
11   }
12   return bezier(temp, rate);
13 }
```



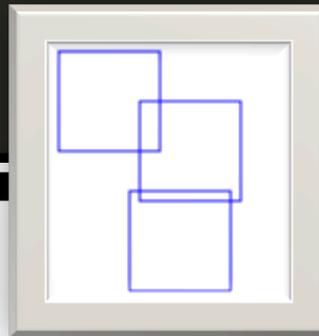
Demo



```
1 function cutBezier(curve, rate){
2   if (!curve || curve.length < 2) return;
3   var pa = curve[0], pb = curve[curve.length - 1],
4       ta = [], tb = [],
5       ra = [], rb = [];
6   for (var i = 0; i < curve.length; i++){
7     ta.push(curve[i]);
8     ra.push(bezier(ta, rate));
9
10    tb.unshift(curve[curve.length - i - 1]);
11    rb.unshift(bezier(tb, rate));
12  }
13  return [ra, rb];
14 }
```

Demo

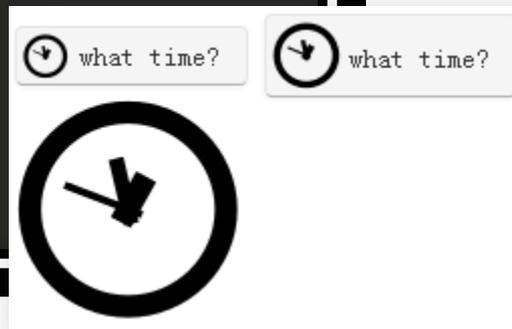
```
1 <script src="http://ace-engine.googlecode.com/svn/trunk/scripts/ace-template.js"></script>
2 <div><script id="templateSvg" type="text/template">
3 <svg width="800px" height="600px" viewBox="0 0 800 600" xmlns="http://www.w3.org/2000/svg">
4   <desc>http://weibo.com/zswang</desc>
5   <defs></defs>
6   forEach(function(item){
7     <rect x="#{item.x}" y="#{item.y}" width="50" height="50" stroke="blue" fill="none"/>
8   });
9 </svg>
10 </script></div>
11 <script>
12 var templateSvg = document.getElementById('templateSvg');
13 templateSvg.parentNode.innerHTML = AceTemplate.format(templateSvg, [
14   { x: 10, y: 10 },
15   { x: 50, y: 35 },
16   { x: 45, y: 80 }
17 ]);
18 </script>
```



Demo

<http://code.google.com/p/ace-engine/wiki/AceTemplate>  
<https://github.com/BaiduFE/BaiduTemplate>

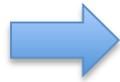
```
<g transform="translate(15, 15) rotate(#{minuteAngle})">
  <line x1="0" y1="2" x2="0" y2="-7" stroke-width="2">
    <animateTransform attributeName="transform" attributeType="XML"
      type="rotate" from="0" to="360"
      dur="1h"
      calcMode="paced"
      repeatCount="indefinite"/>
  </line>
</g>
```



```
1 .icon-time36 {
2   background-image: url("data:image/svg+xml; charset=utf-8,%3Csvg%20width%3D%2236
3   background-repeat: no-repeat;
4   background-position: 3px 3px;
5 }
```

```
1 void function(){
2     var d = document;
3     var svg = d.getElementById('svg');
4     var canvas = d.getElementById('canvas');
5     var context = canvas.getContext('2d');
6     var templateSVG = d.getElementById('templateSVG');
7     var img = d.createElement('img');
8     img.src = 'data:image/svg+xml; charset=utf-8,' +
9         encodeURIComponent(templateSVG.innerHTML);
10    img.onload = function(){
11        context.drawImage(img, 0, 0);
12    };
13 }();
```

SVG脚本



Img



Canvas

Demo

DataURL

drawImage()

- ✓ HTML5发展现状
- ✓ SVG两种加载方式 `<object>` `<img>`
- ✓ Canvas的像素处理，包括二进制存储
- ✓ Canvas动画原理，性能，时间轴
- ✓ SVG Path辅助工具 – 路径编辑器
- ✓ 贝赛尔曲线两个公式：计算轨迹 切分曲线
- ✓ SVG + 前端模板组合
- ✓ Canvas中绘制SVG

谢谢！

<http://weibo.com/zswang> @王集鹤

