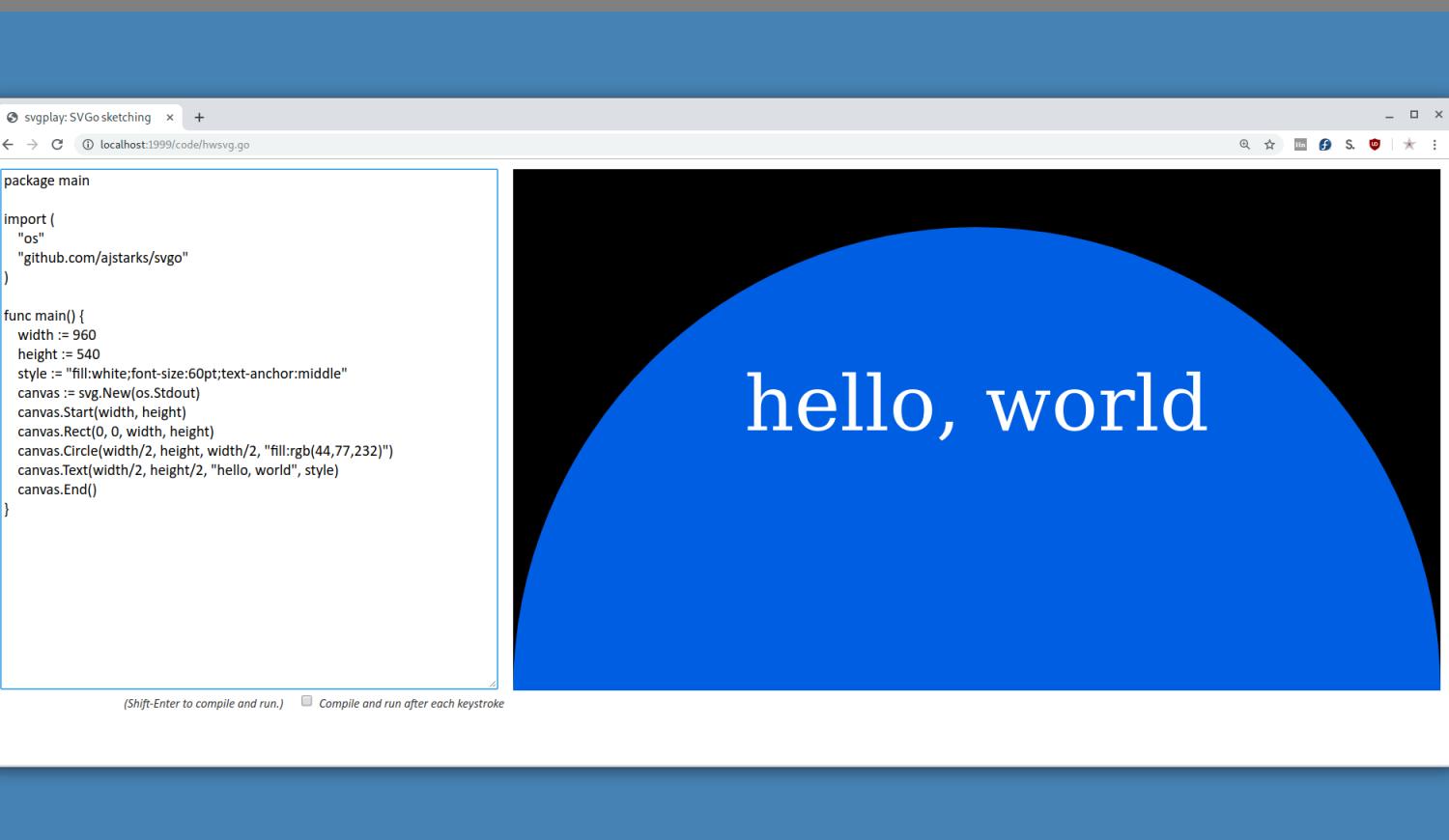
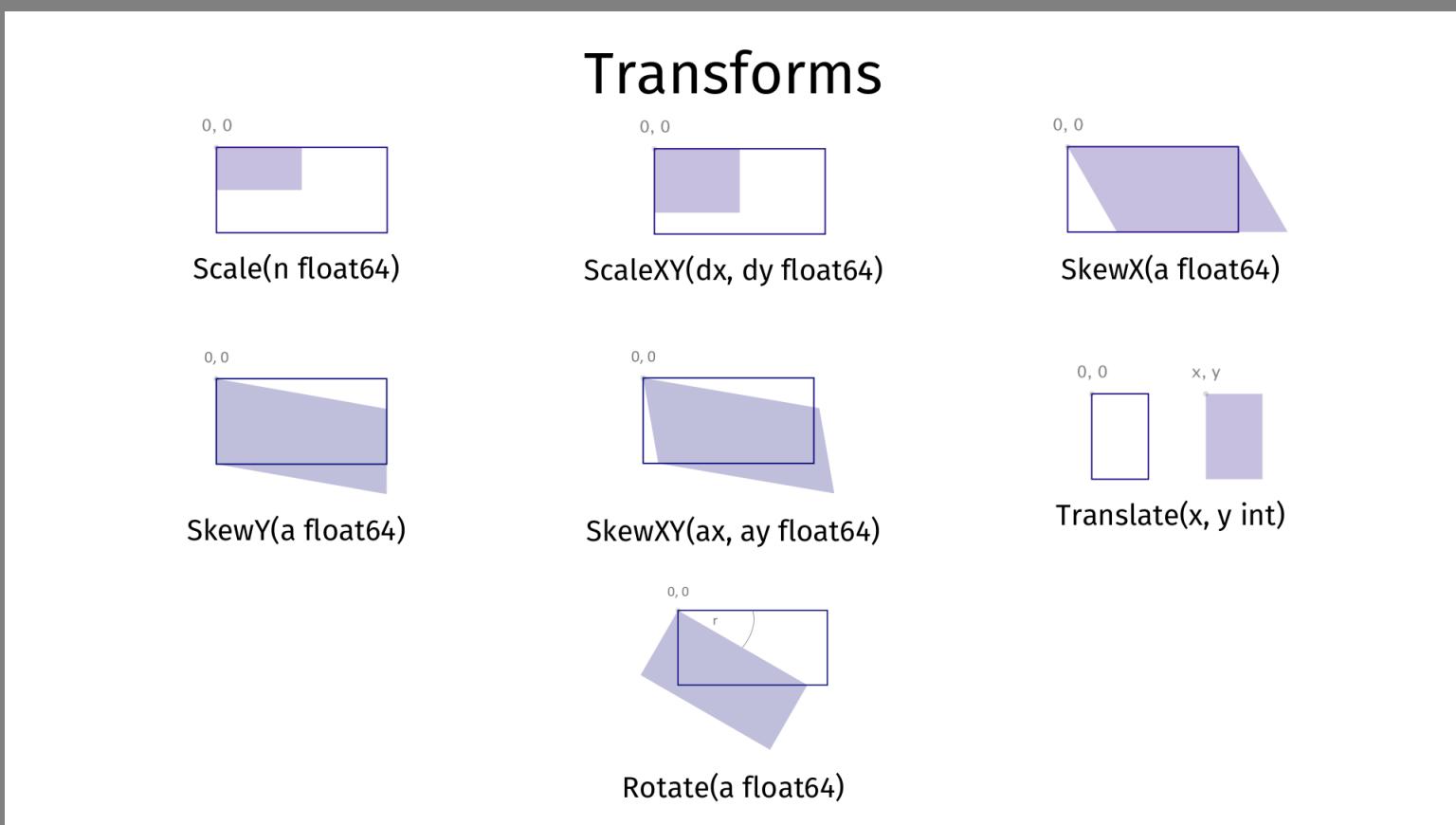




SVG

Workshop

You will learn:



SVGo API

Sketching with code

SVGo with other APIs



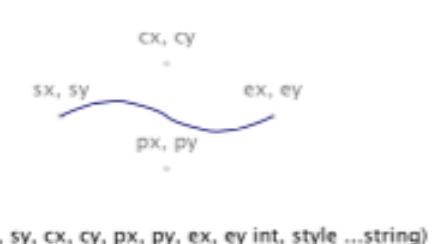
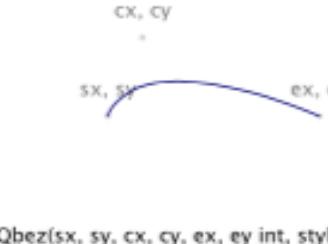
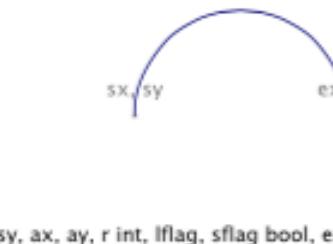
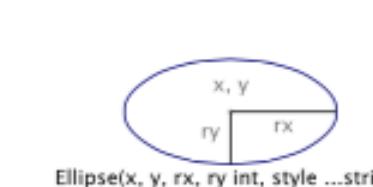
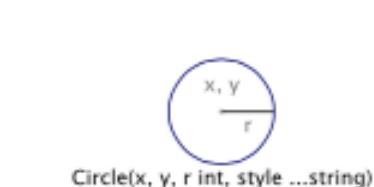
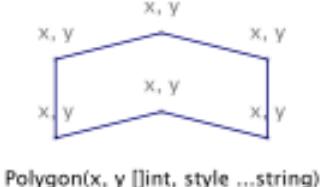
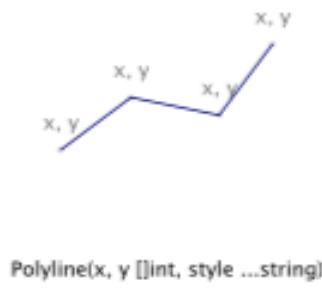
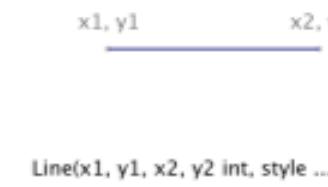
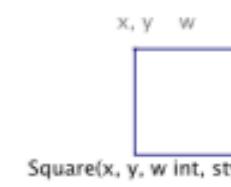
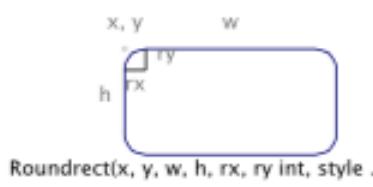
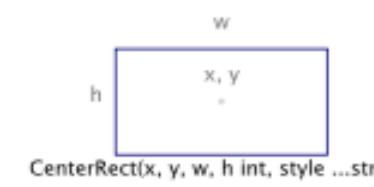
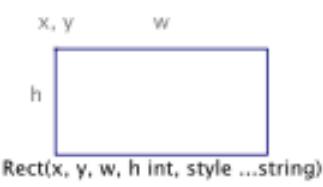
Scalable Vector Graphics



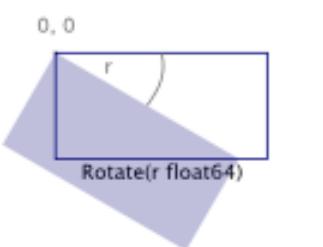
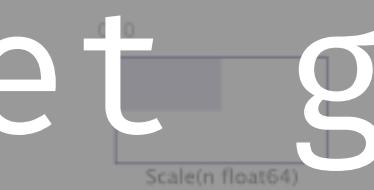
io.Writer

SVG Go Library

github.com/ajstarks/svg

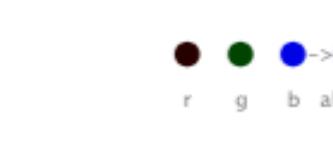
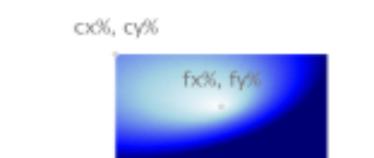
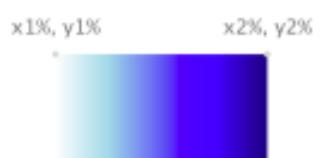
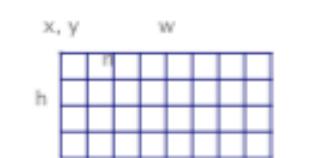
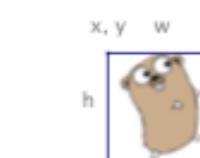


\$ go get github.com/ajstarks/svg



hello, this is SVG

It's time & "dandy" to draw text along

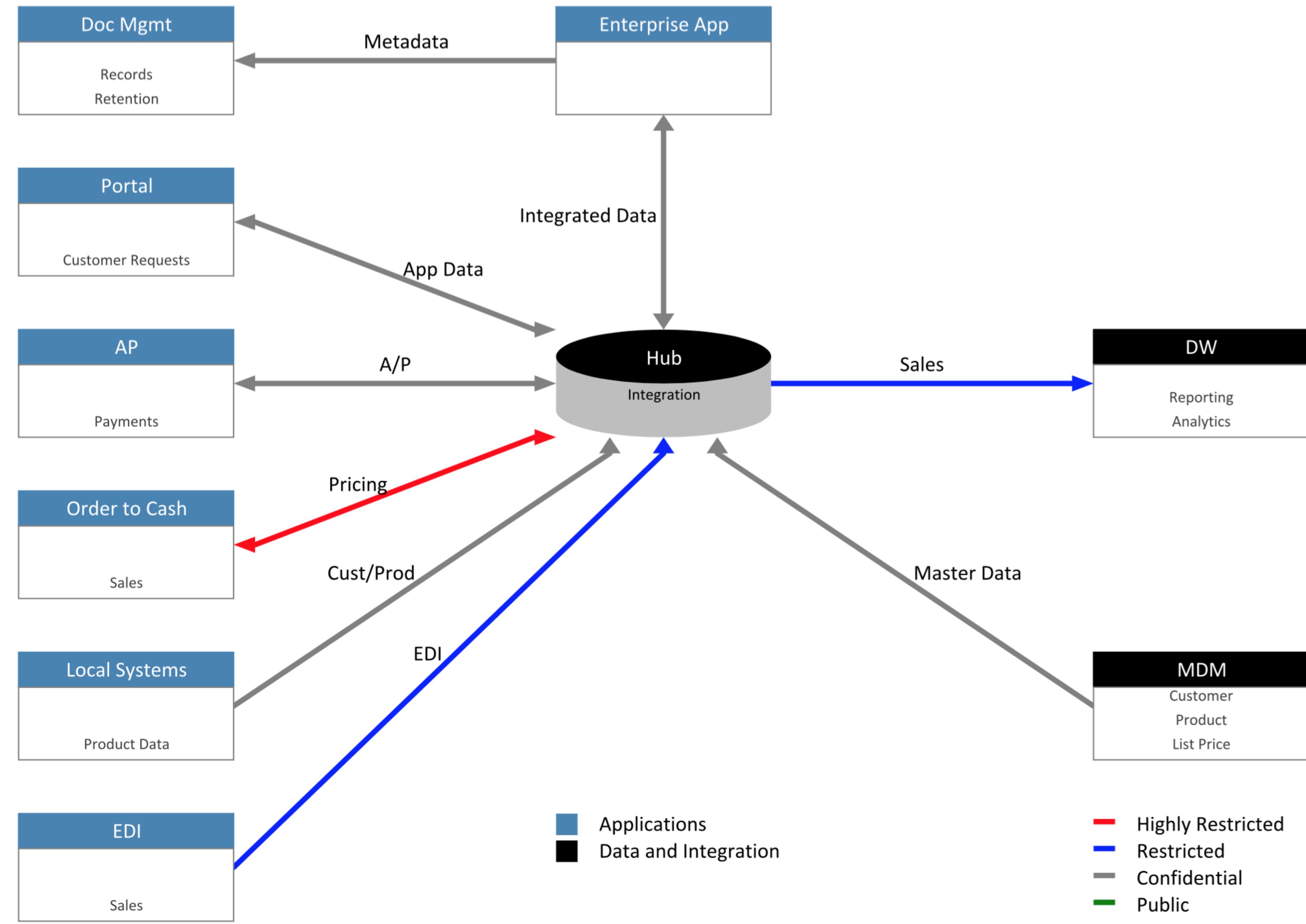


specify destination
begin/end the document
begin/end the document with viewport
begin/end group with attributes
begin/end group style
begin/end group transform
begin/end group id
begin/end clip path
begin/end a definition block
begin/end markers
begin/end pattern
set the description element
set the title element
define a script
begin/end mask element
begin/end link to href, with a title
use defined objects

SVGo Clients in the Repo

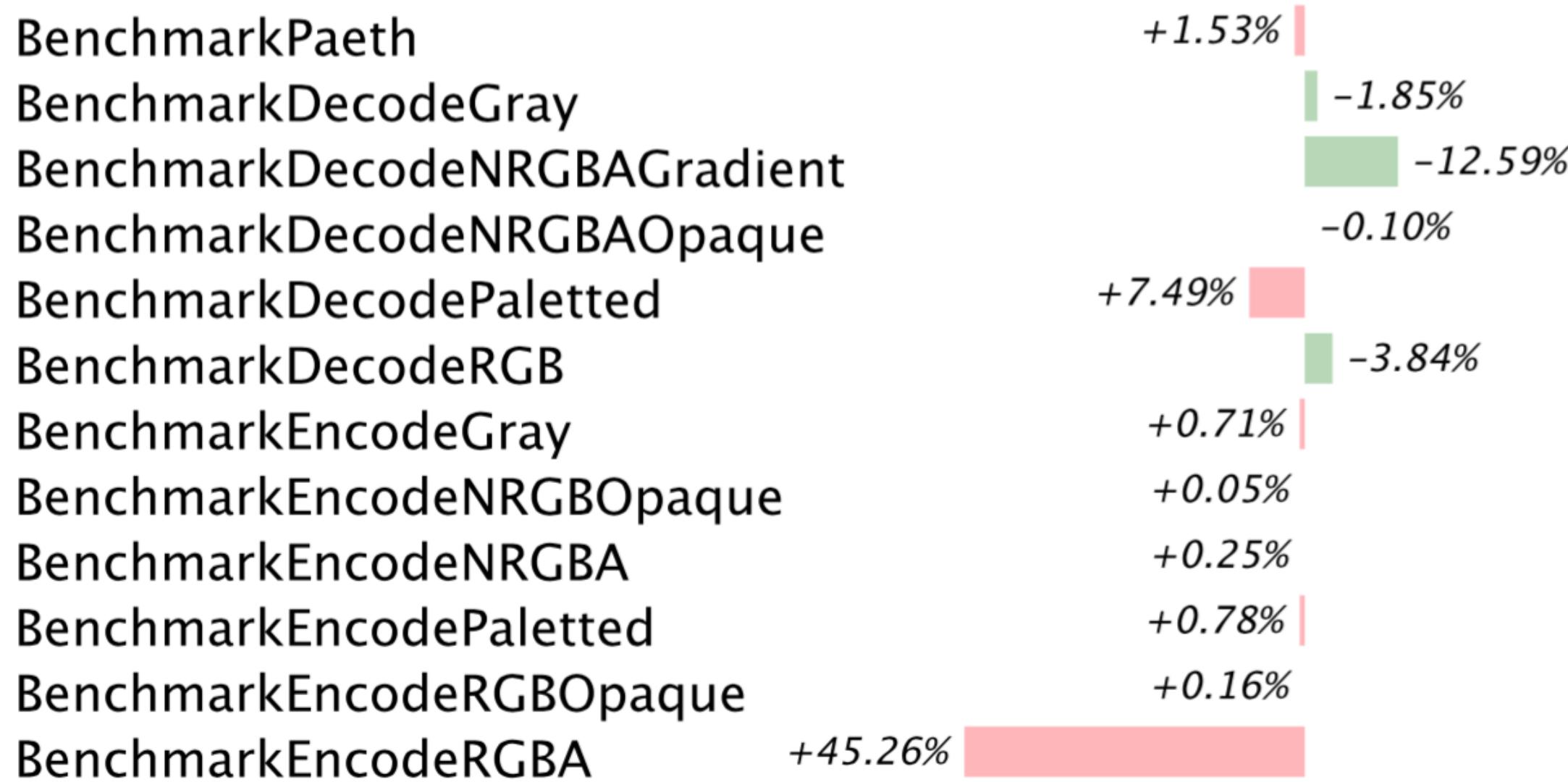
svgdef	Creates a SVG representation of the API	pattern	Test patterns
android	The Android logo	planets	Show the scale of the Solar system
bubtrail	Bubble trails	pmap	Proportion maps
bulletgraph	Bullet Graphs (via Stephen Few)	randcomp	Compare random number generators
colortab	Display SVG named colors with RGB values	richter	Gerhard Richter's 256 colors
compx	Component diagrams	rl	Random lines
flower	Random flowers	skewabc	Skew ABC
fontcompare	Compare two fonts	stockproduct	Visualize product and stock prices
f50	Get 50 photos from Flickr from a query	svgopher	SVGo Mascot
fe	Filter effects	svgplay	SVGo sketching server
funnel	Funnel from transparent circles	svgplot	Plot data
gradient	Linear and radial gradients	svgrid	Compose SVG files in a grid
html5logo	HTML5 logo with draggable elements	tsg	Twitter Search Grid
imfade	Show image fading	tumblrgrid	Tumblr picture grid
lewitt	Version of Sol Lewitt's Wall Drawing 91	turbulence	Turbulence filter effect
ltr	Layer Tennis Remixes	vismem	Visualize data from files
marker	Test markers	webfonts	"Hello, World" with Google Web Fonts
paths	Demonstrate SVG paths	websvg	Generate SVG as a web server

SVGo Clients



benchpng.txt

image/png package: Go 1.3 vs Go 1.4





```
structlayout -json bytes Reader | structlayout-svg -t bytes.Reader > reader.svg
```

Go Programming Language Release History

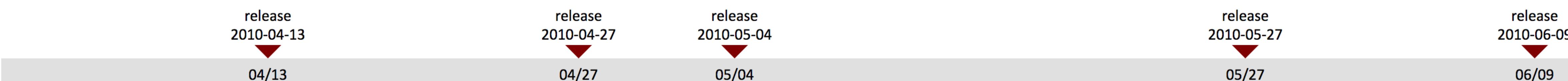
4Q 2009



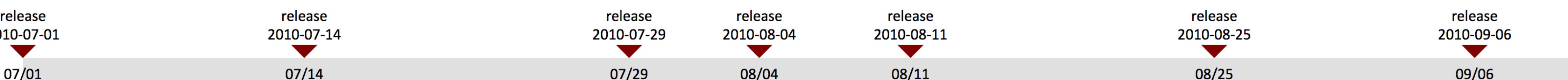
1Q 2010



2Q 2010



3Q 2010



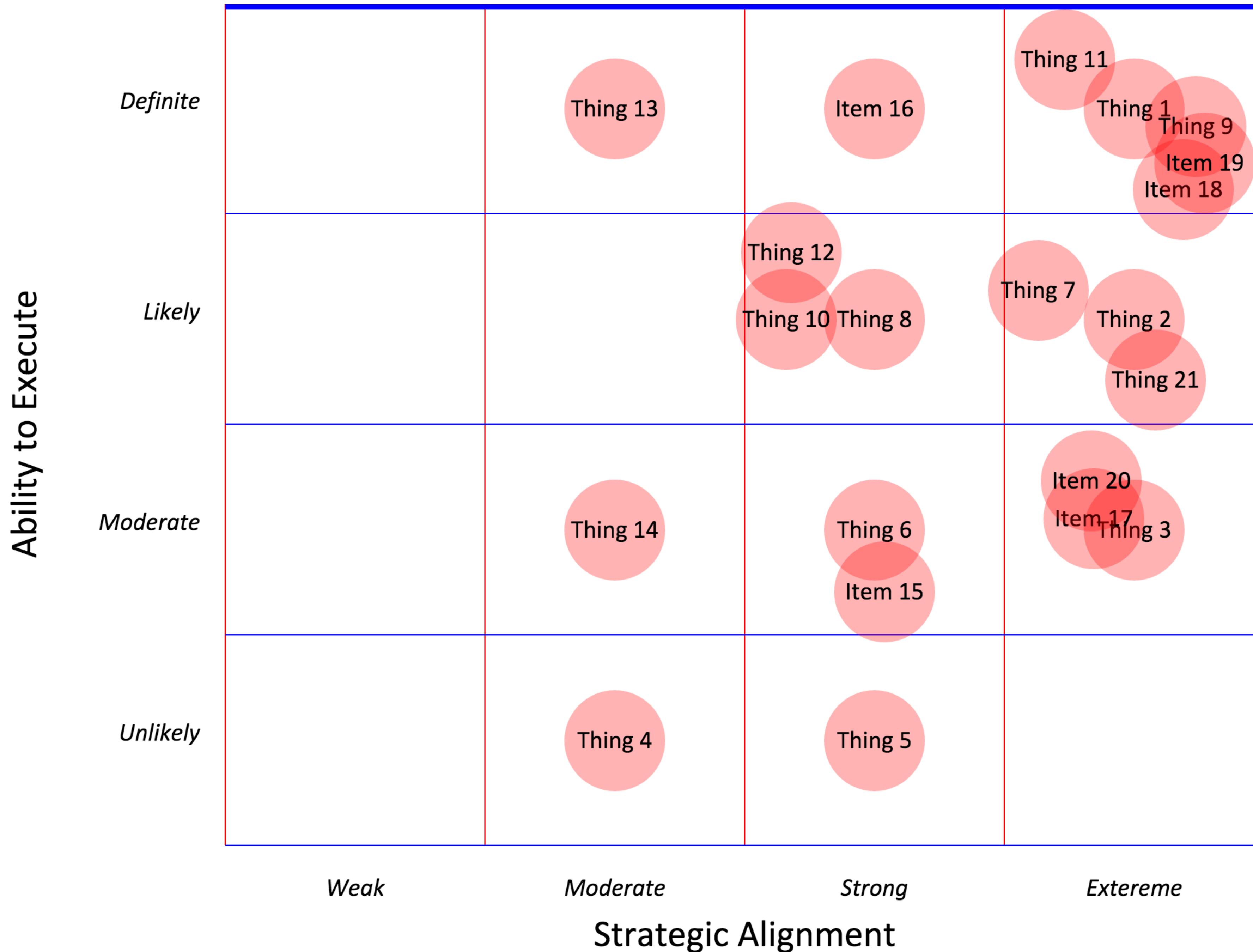
4Q 2010



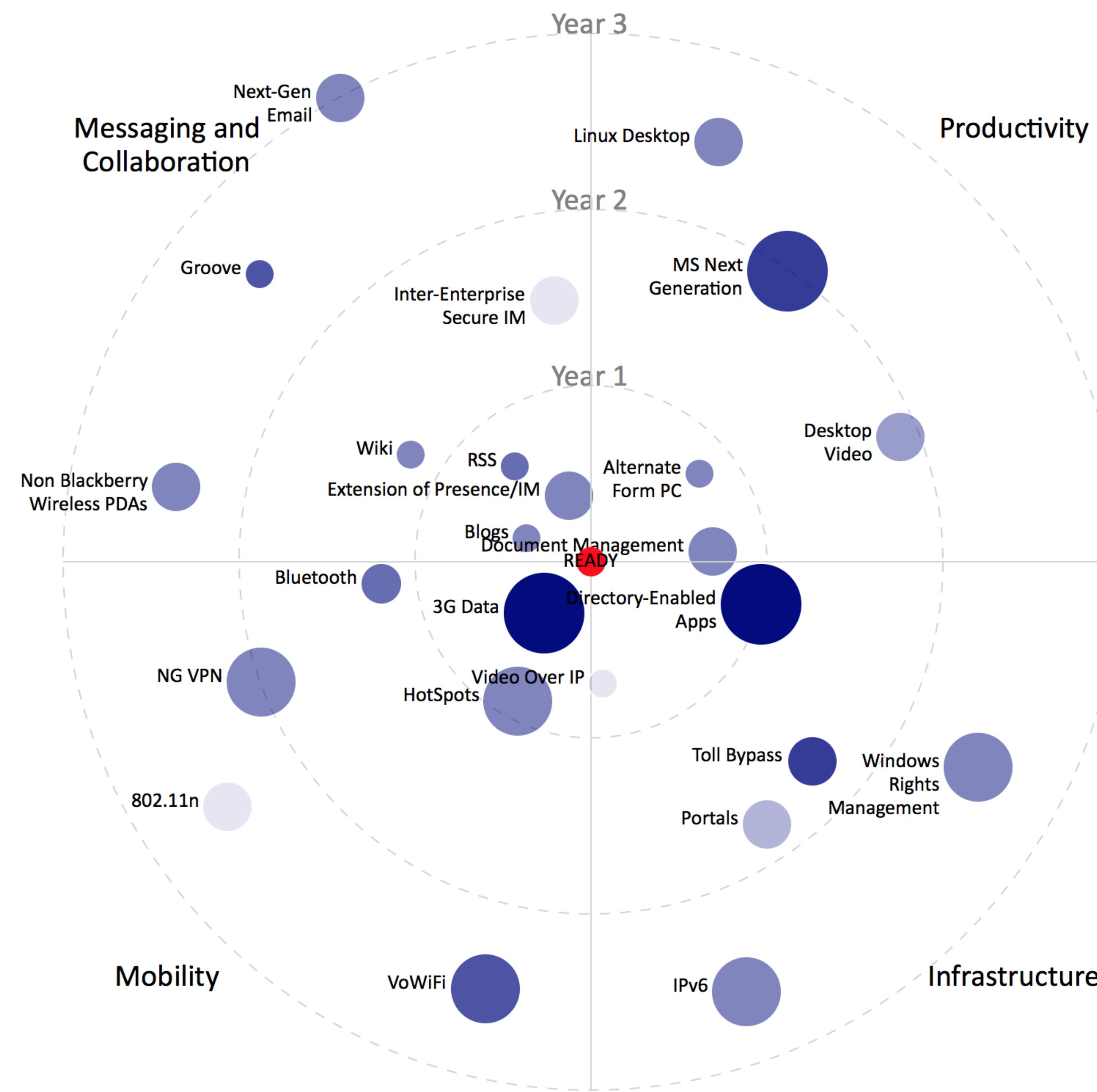


Sample Bullet Graph

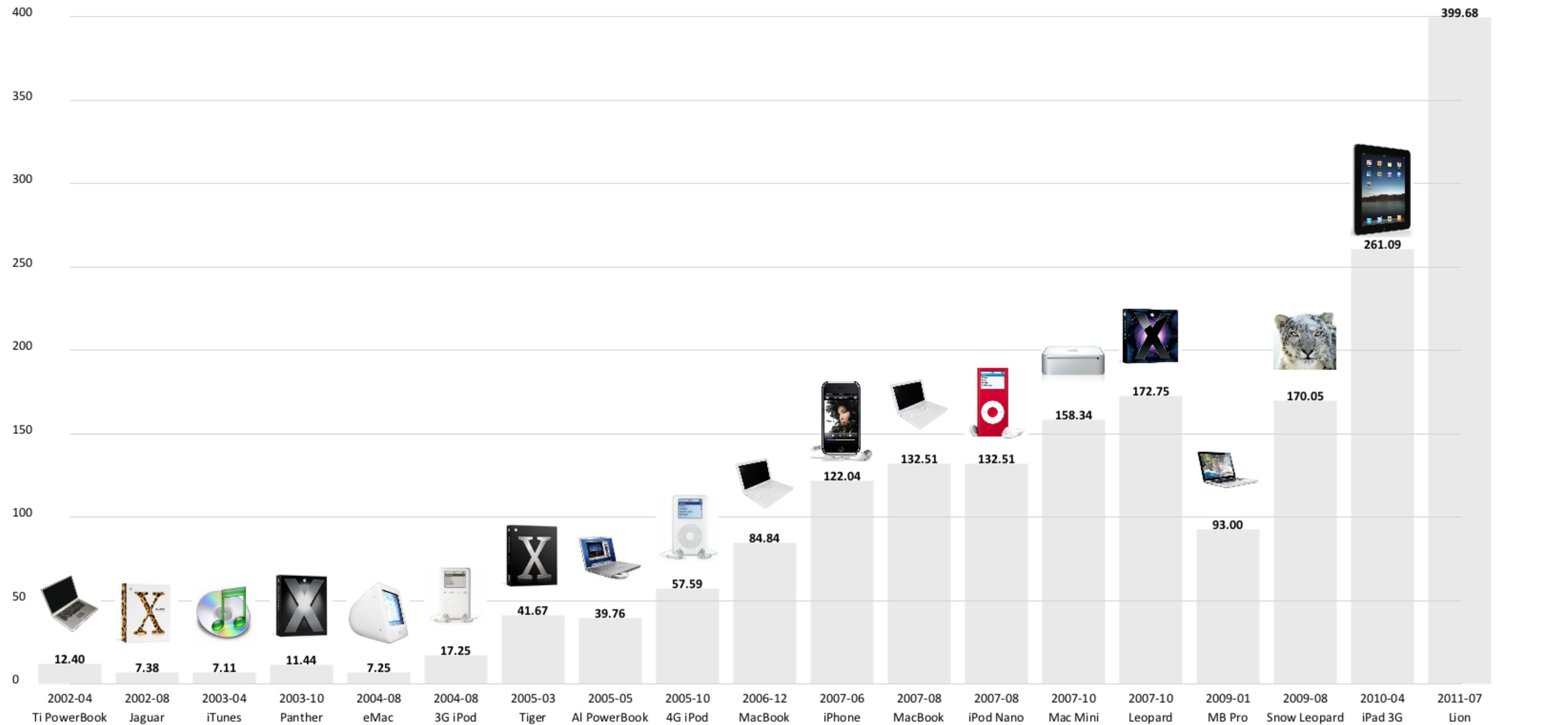
The bullet graph features a single, primary measure (for example, current year-to-date revenue) compares that measure to one or more other measures to enrich its meaning, for example, compared to a target), and displays it in the context of qualitative ranges of performance, such as poor, satisfactory, and good.



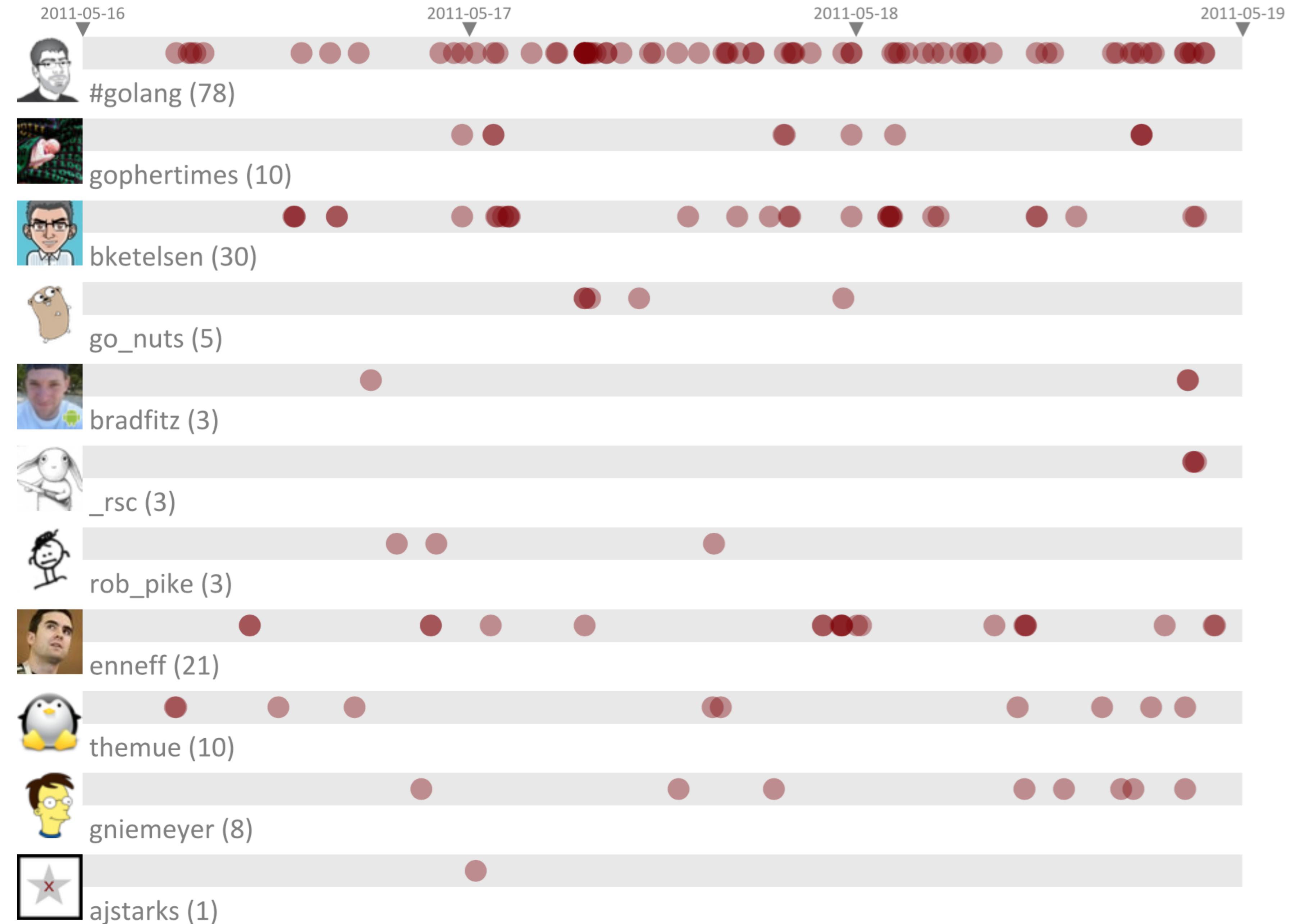




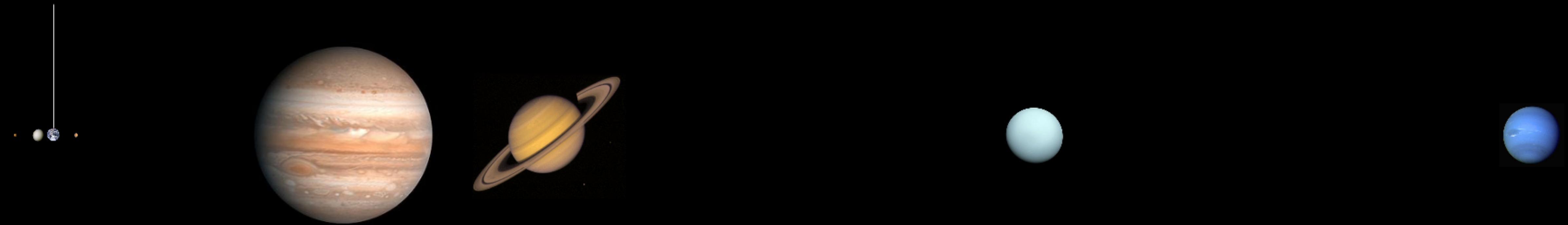
Apple Purchases and Stock Price



Twitter Update Frequency



You are here



JONES

- LAYER TENNIS SEASON 4 WEEK 6 MATCH COMMENTARY BY MIKE MONTEIRO -

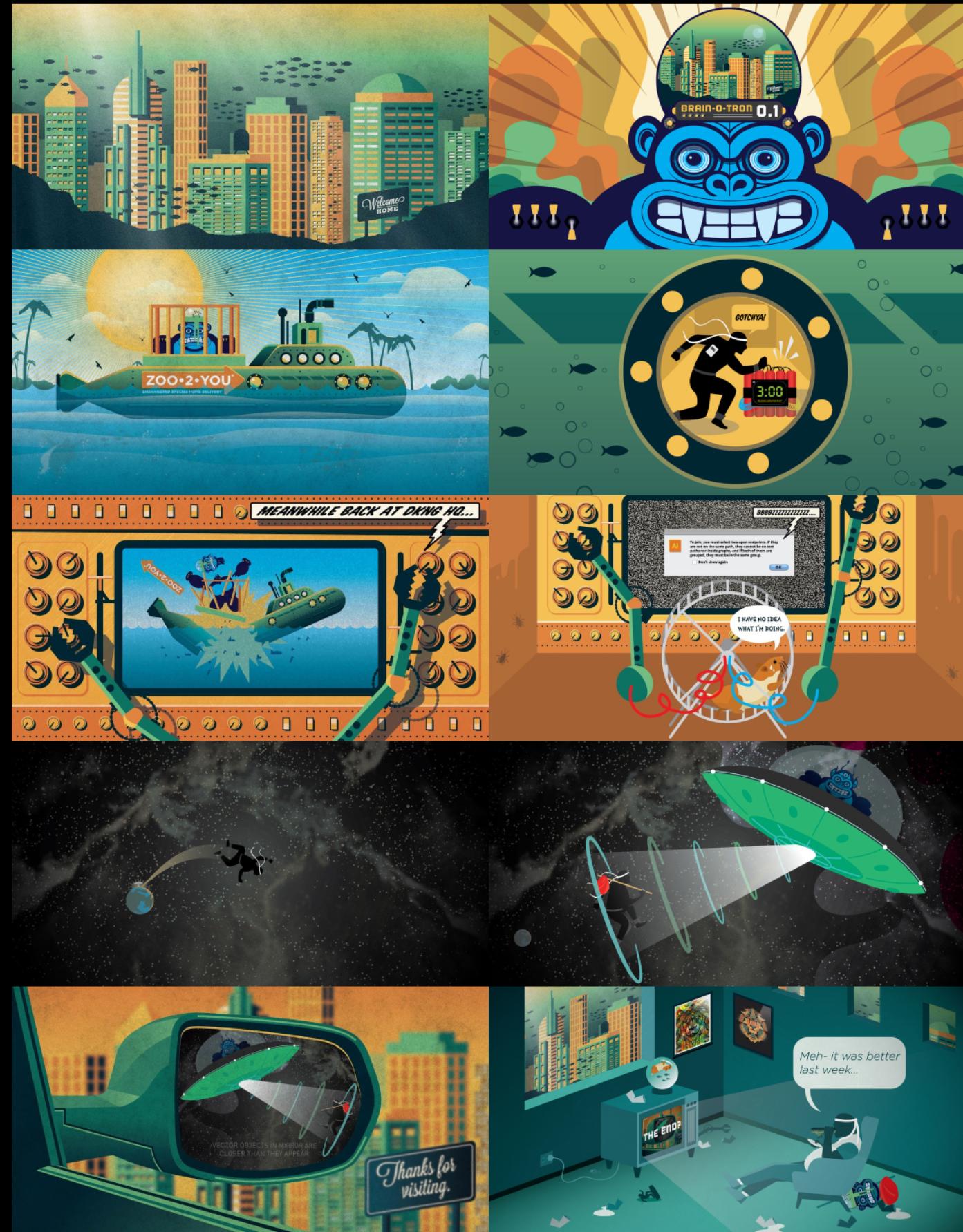
MONTIEL



DKNG

- LAYER TENNIS SEASON 4 WEEK 7 MATCH COMMENTARY BY JOHN GRUBER -

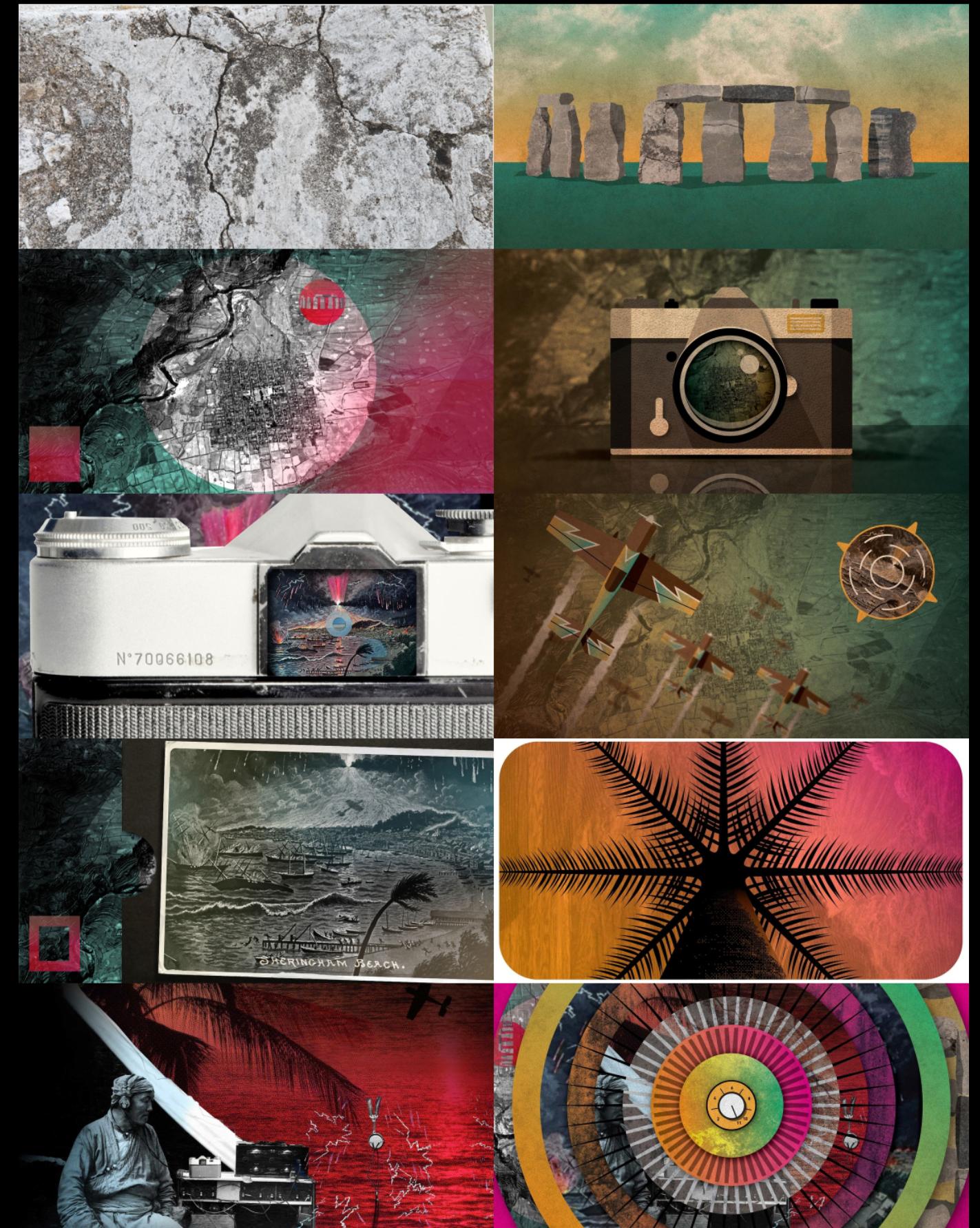
DDL



ANDERSON

- LAYER TENNIS SEASON 4 PLAYOFF QUARTERFINAL COMMENTARY BY BRYAN BEDELL -

DKNG



CONTINO
CASSARO



PUTNAM
STOCKS



WHITE
TAYLOR



HALL
WARREN



STRAWBERRY LUNA
DOUBLENAUT



JONES
MONTIEL



DKNG
DDL



SHAWNA X
STEVENS



TAYLOR
JONES



PUTNAM
RAJKUMAR



REYES
WHITE



ANDERSON
DKNG



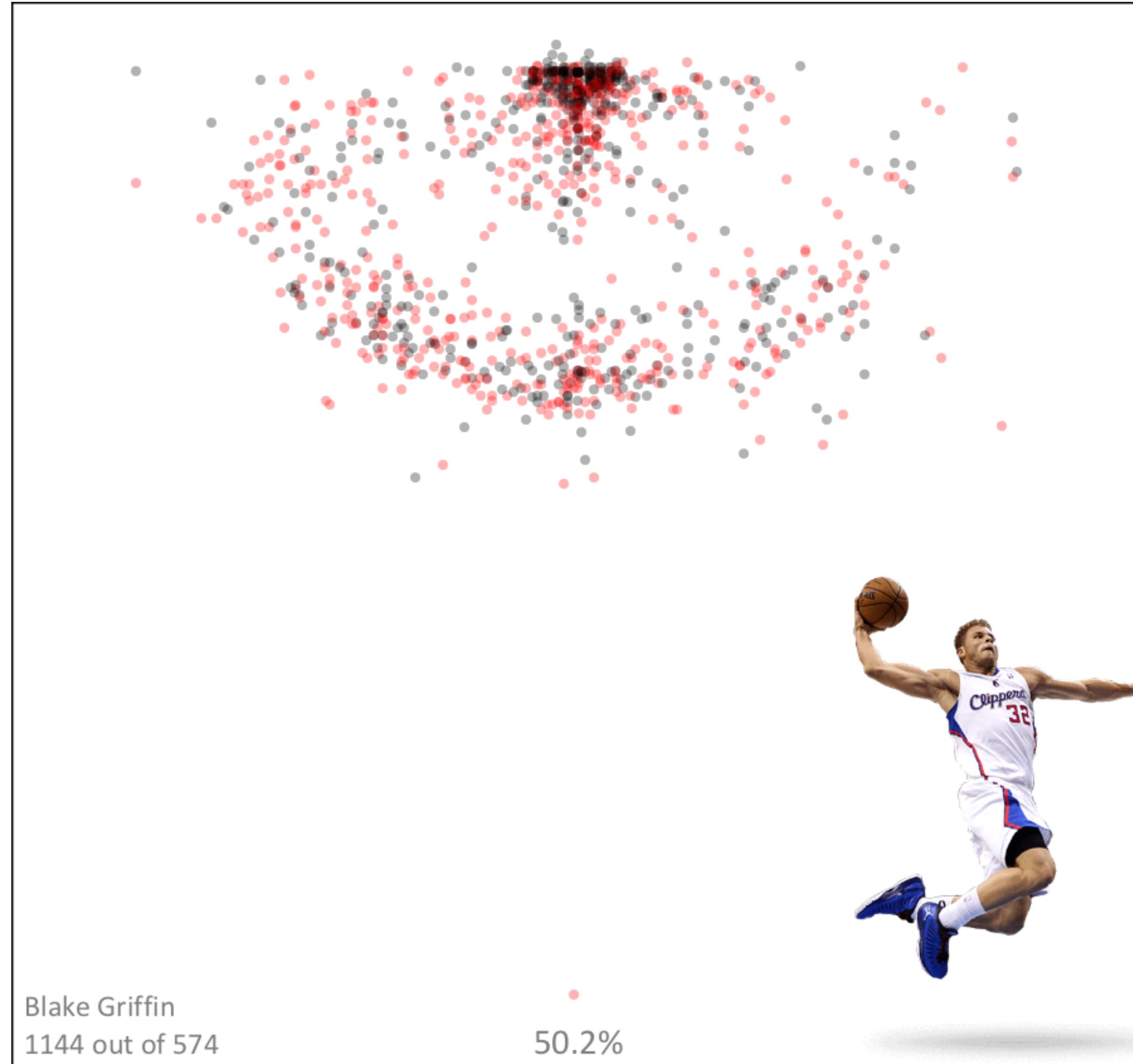
TAYLOR
WHITE

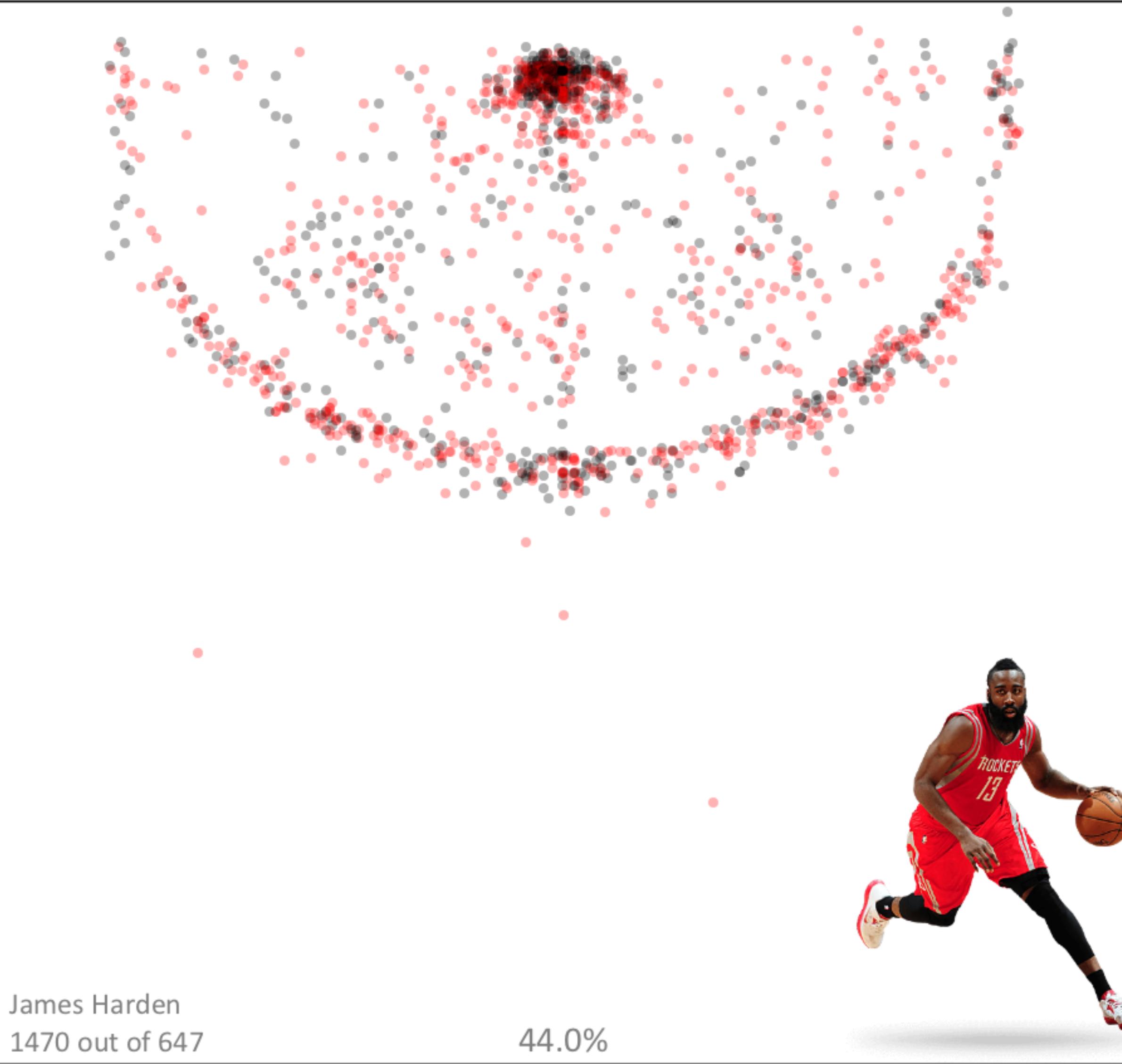


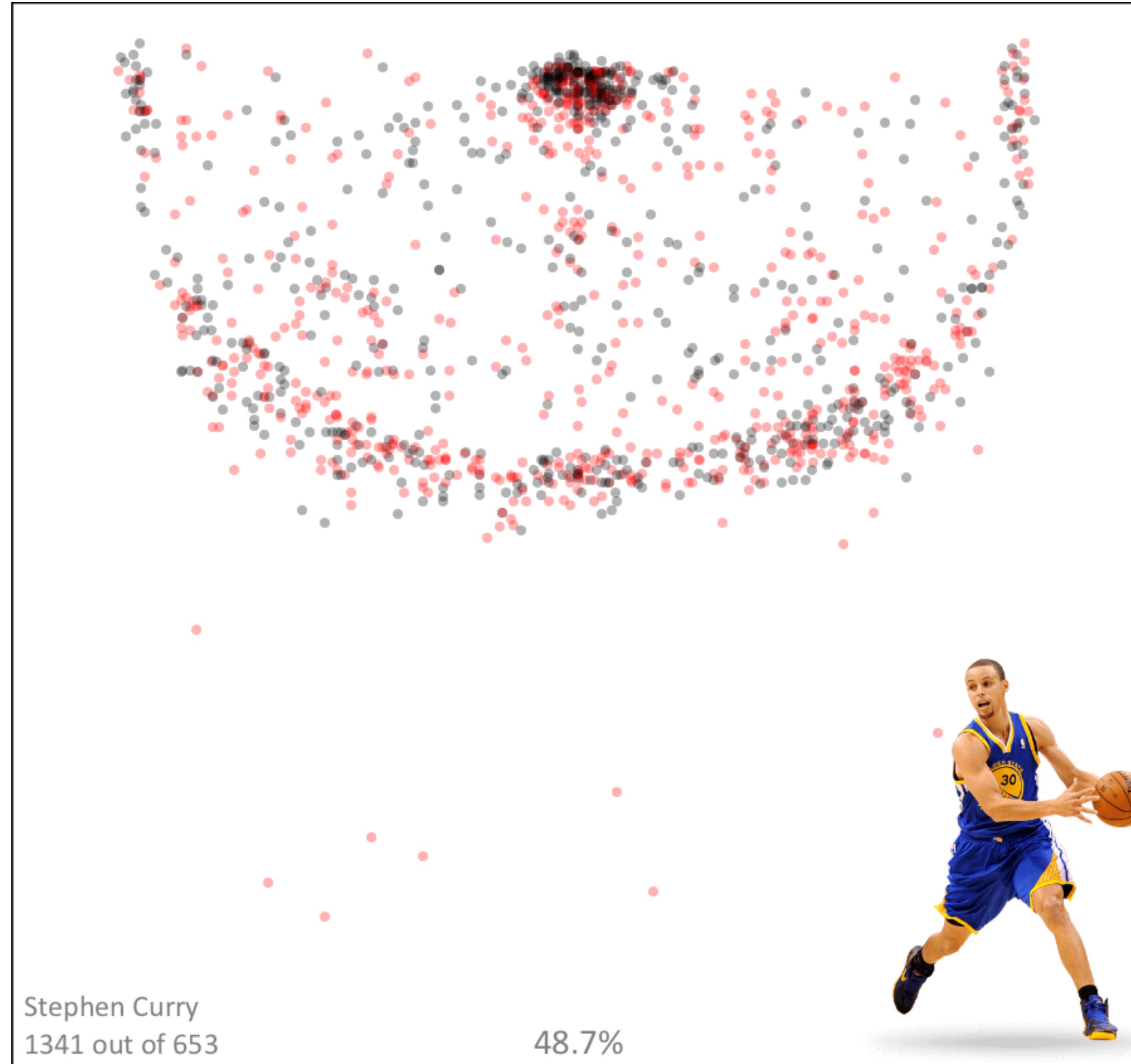
RAJKUMAR
ANDERSON



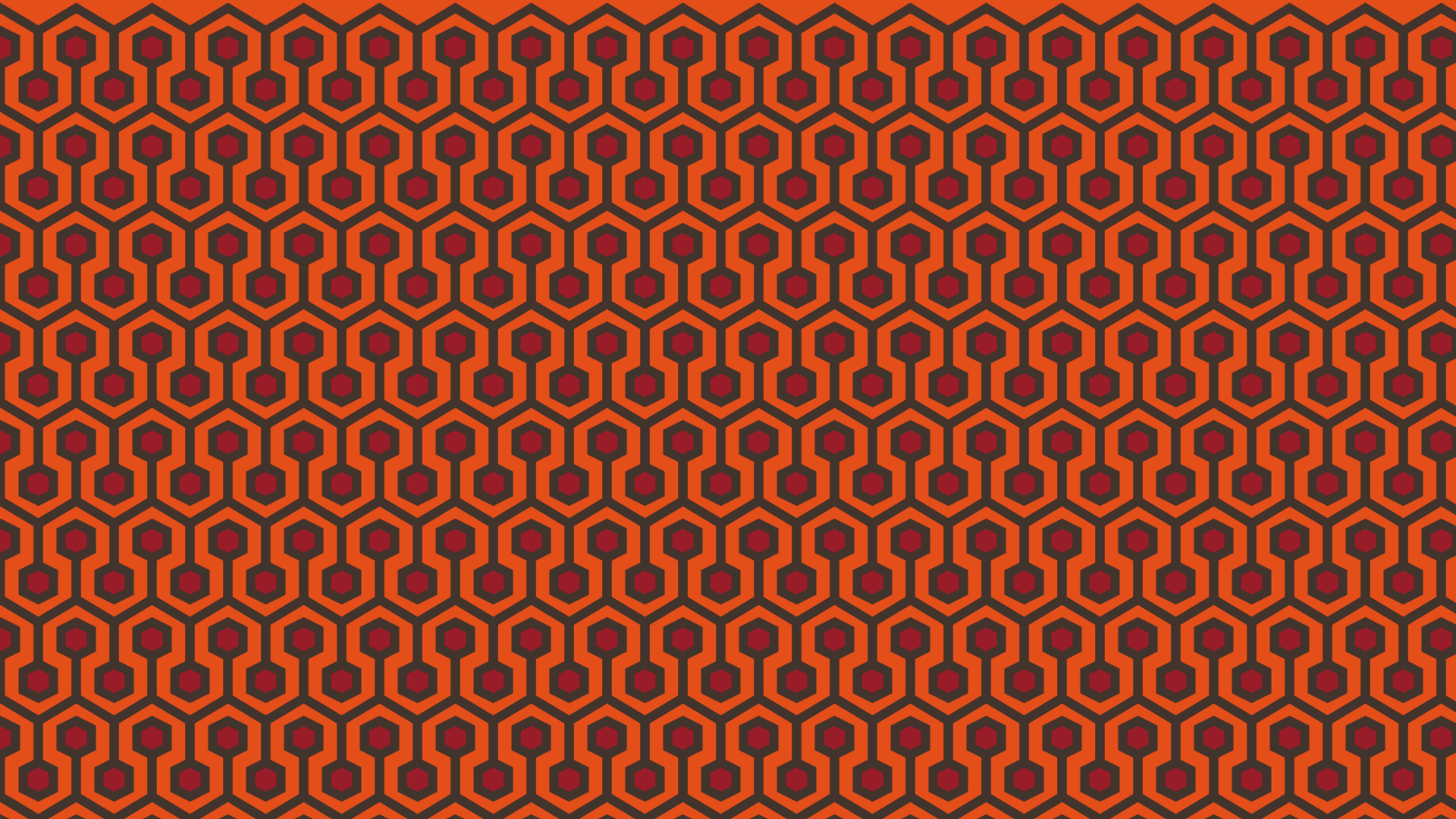
ANDERSON
WHITE













```
canvas.Def()
canvas.Gid("unit")
canvas.Polyline(xl, yl, "fill:none")
canvas.Polygon(xp, yp)
canvas.Gend()
```

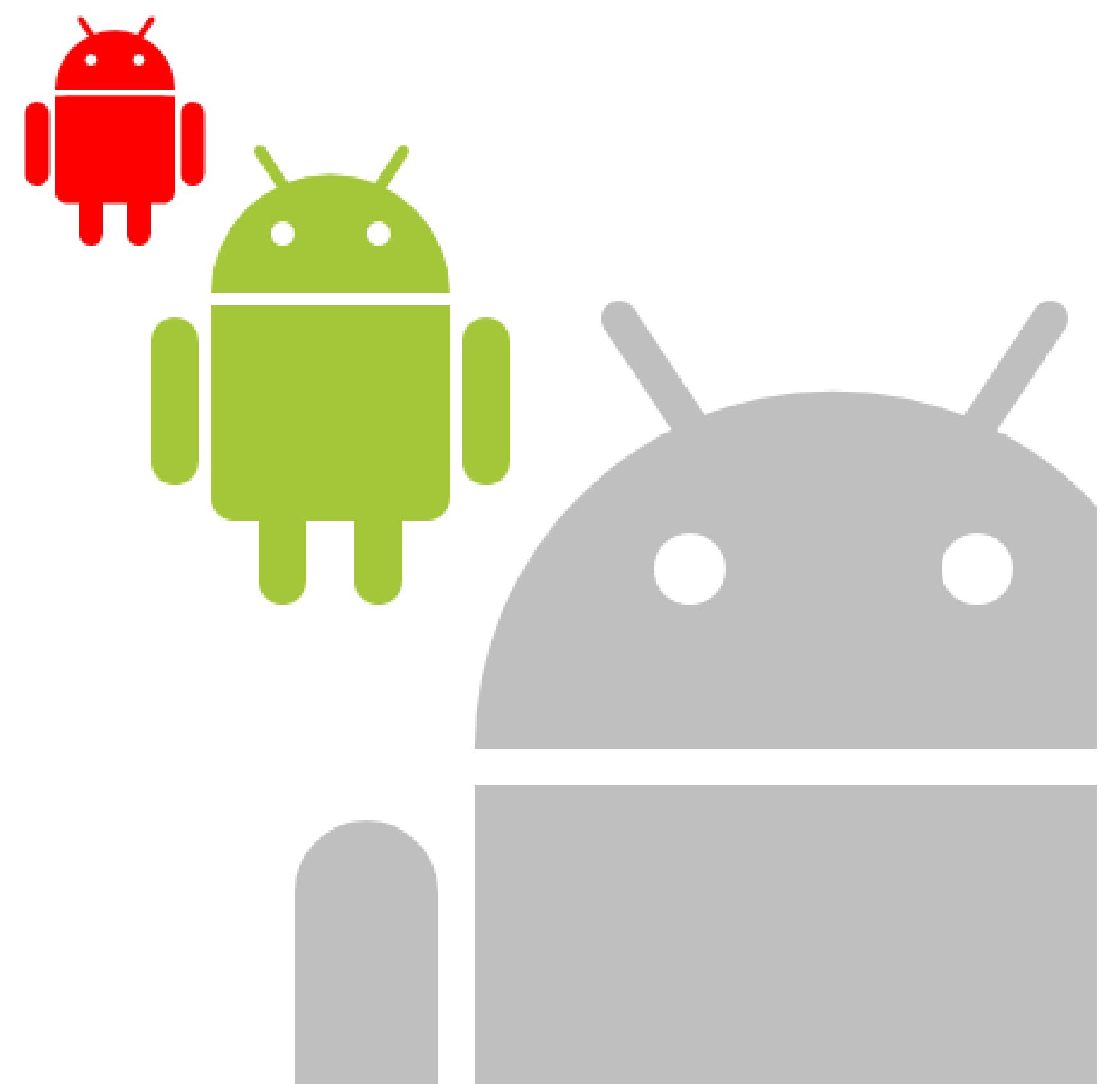


```
canvas.Gid("runit")
canvas.TranslateRotate(150, 180, 180)
canvas.Use(0, 0, "#unit")
canvas.Gend()
canvas.Gend()
canvas.DefEnd()
```



```
for y := 0; < height; y += 130 {
    for x := 100; x < width; x+=100 {
        canvas.Use(x, y, "#unit")
        canvas.Use(x, y, "#runit")
    }
}
```

SVGo API Design



Scale



Roundrect



rgb(164,198,57)

Line

Circle

Arc

Line

Rect

Element

Rect

Arguments

(100,200,250,125)

```
<rect x="100" y="200" width="250" height="125"/>
```

(100, 200)



125

250

Element	Arguments	CSS Style
Rect	(100,200,250,125, "fill:gray;stroke:blue")	

```
<rect x="100" y="200" width="250" height="125"  
style="fill:gray;stroke:blue"/>
```

(100, 200)



125

250

Element

Rect

Arguments

(100,200,250,125,

`id='box'`, `fill='gray'`, `stroke='blue'`)

Attributes

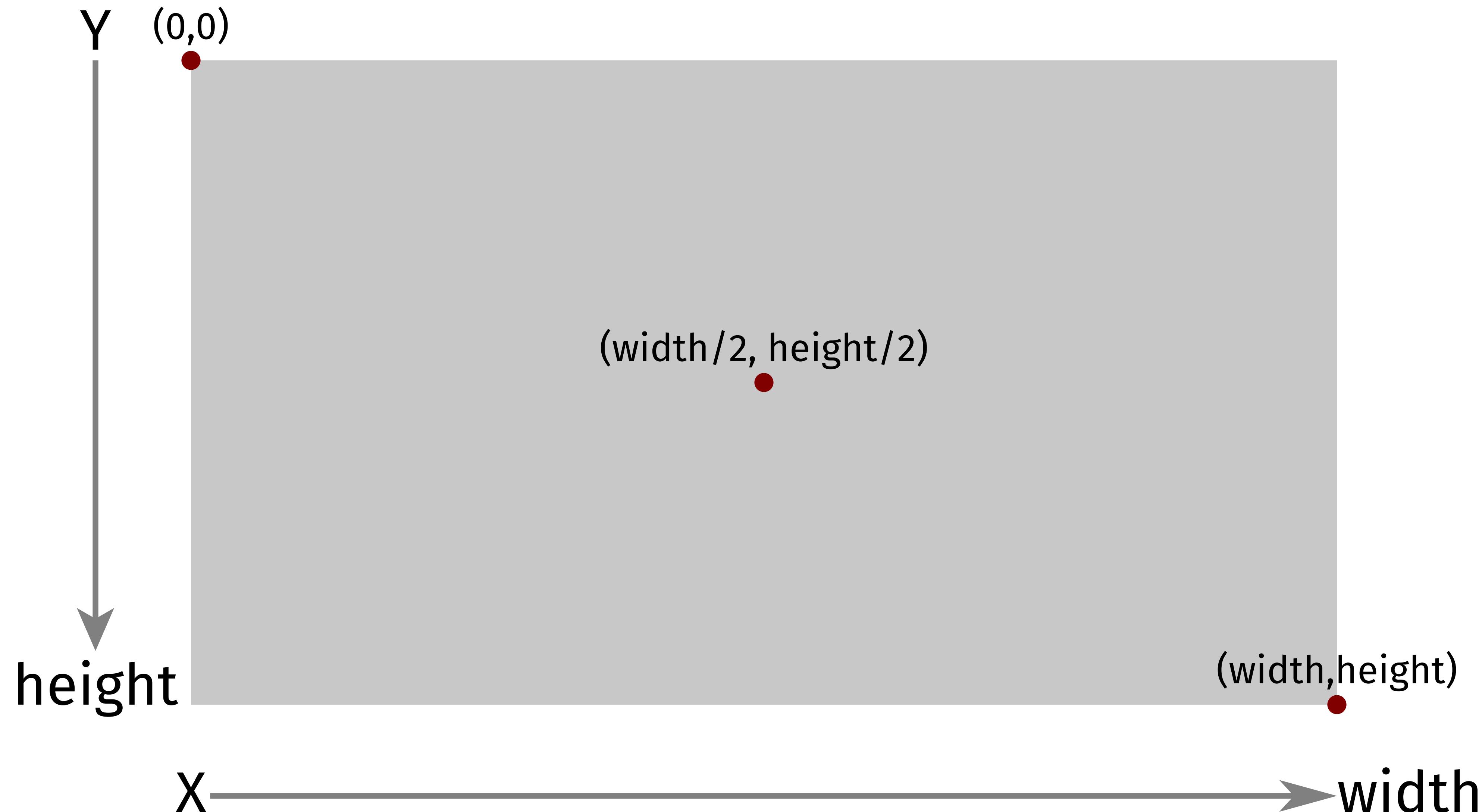
```
<rect x="100" y="200" width="250" height="125"  
      id='box' fill='gray' stroke='blue'/>
```

(100, 200)



125

250



Rect(0,0,width,height)

hello,
world

(width/2, height/2)

(width/2, height)

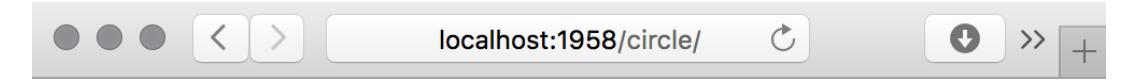
```
package main

import (
    "os"
    "github.com/ajstarks/svg"
)

func main() {
    width := 960
    height := 540
    style := "fill:white;font-size:60pt;text-anchor:middle"
    canvas := svg.New(os.Stdout)
    canvas.Start(width, height)
    canvas.Rect(0, 0, width, height)
    canvas.Circle(width/2, height, width/2, "fill:rgb(44,77,232)")
    canvas.Text(width/2, height/2, "hello, world", style)
    canvas.End()
}
```

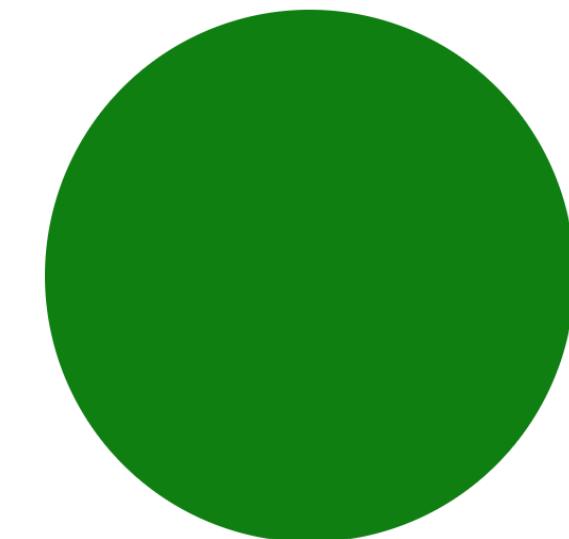
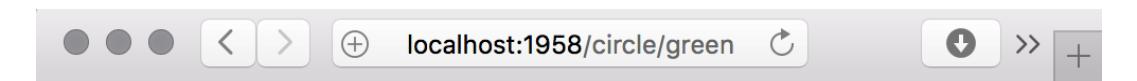


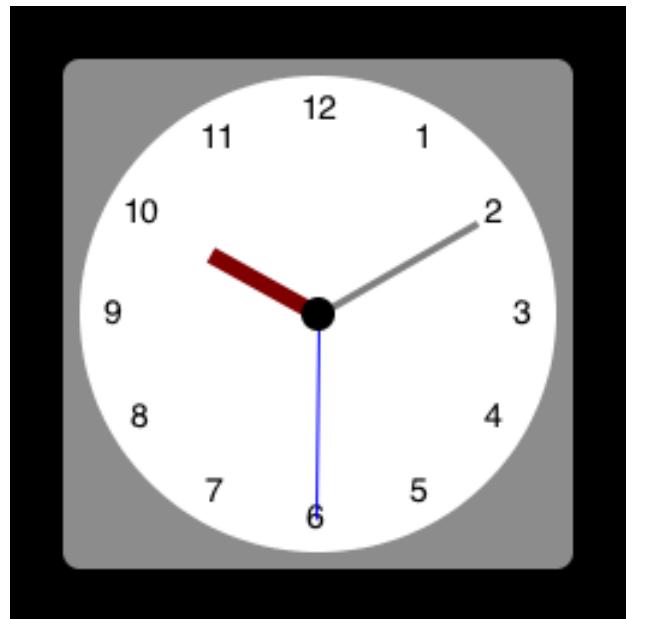
```
const defaultstyle = "fill:rgb(127,0,0)"
```



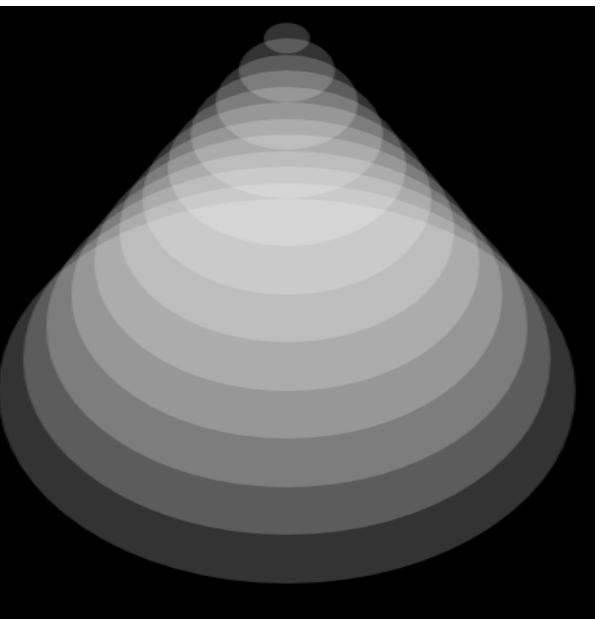
```
func circle(w http.ResponseWriter, req *http.Request) {
    w.Header().Set("Content-Type", "image/svg+xml")
    s := svg.New(w)
    s.Start(500, 500)
    s.Title("Circle")
    s.Circle(250, 250, 125, shapestyle(req.URL.Path))
    s.End()
}
```

```
func shapestyle(path string) string {
    i := strings.LastIndex(path, "/") + 1
    if i > 0 && len(path[i:]) > 0 {
        return "fill:" + path[i:]
    }
    return defaultstyle
}
```

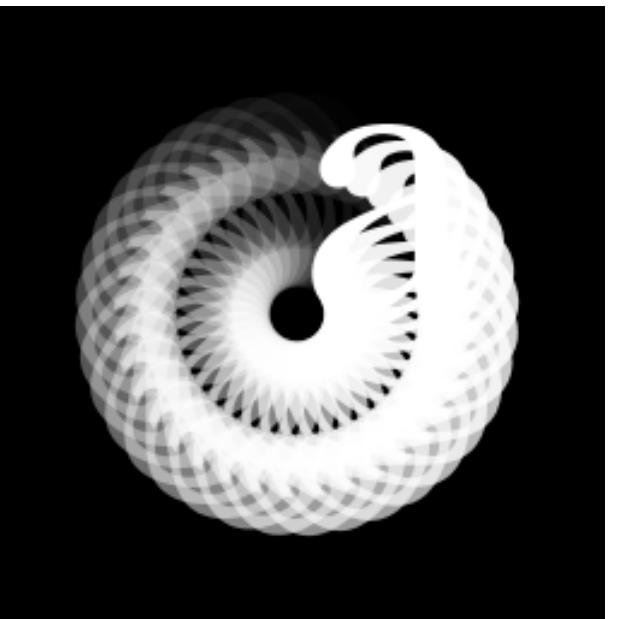




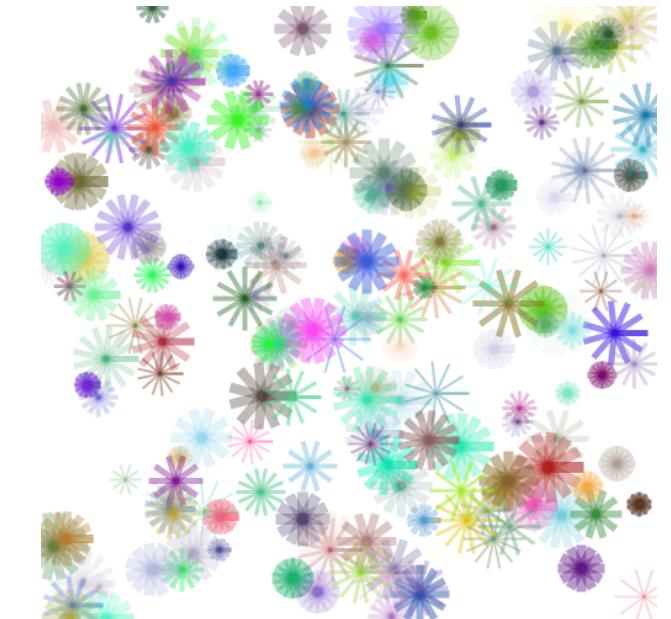
clock



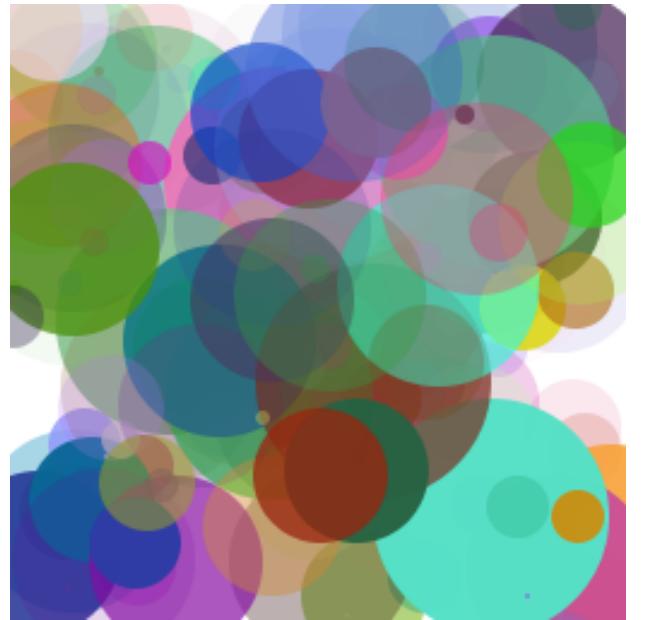
funnel



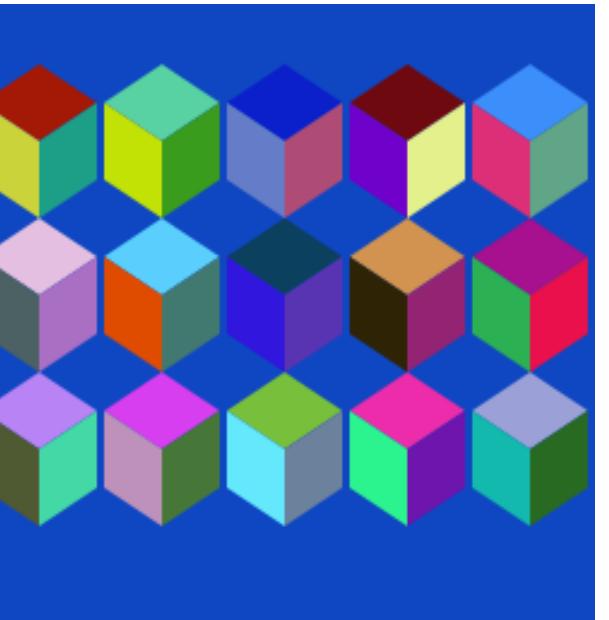
rotext



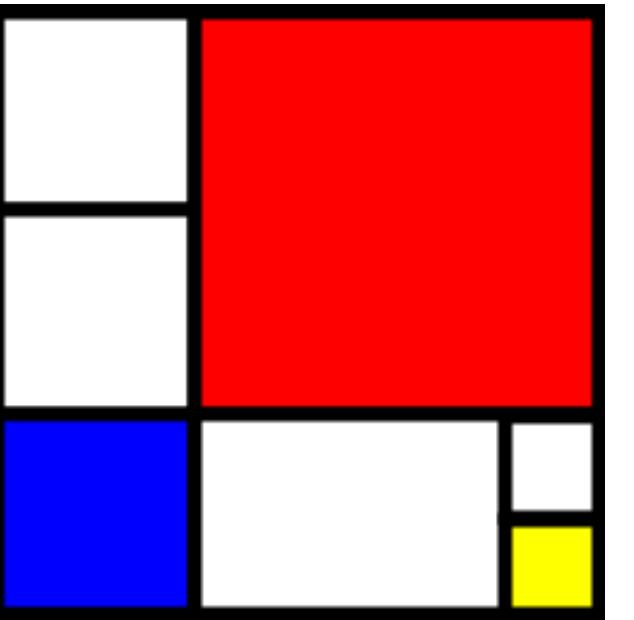
flower



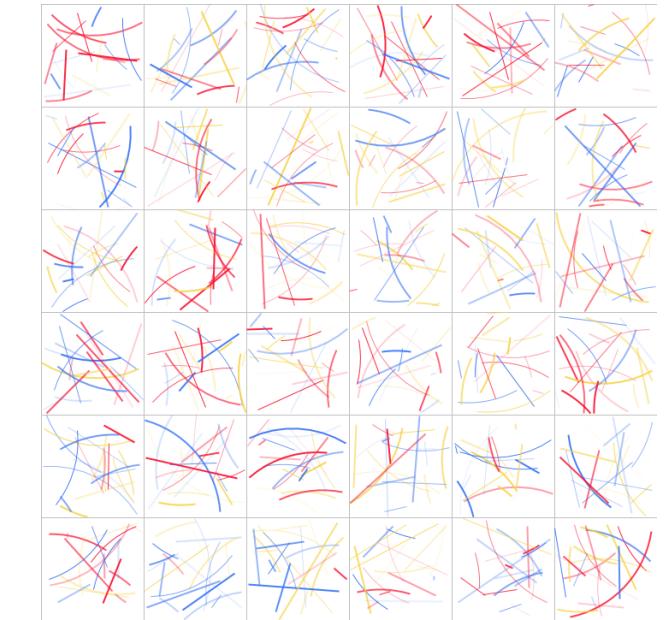
rshape



cube



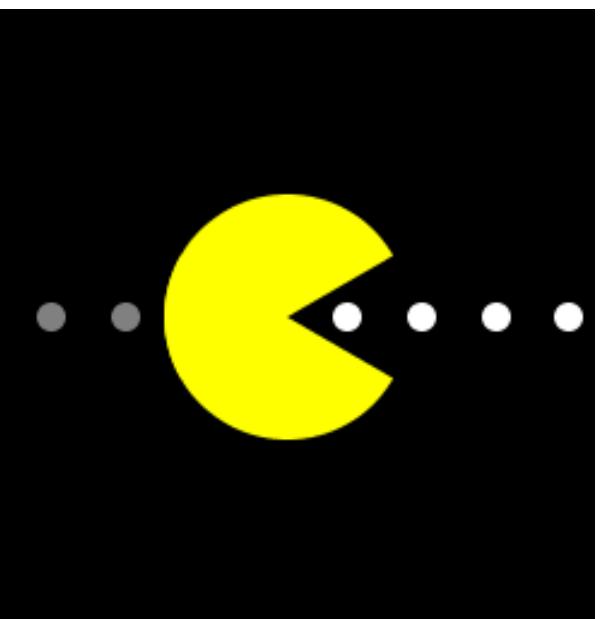
mondrian



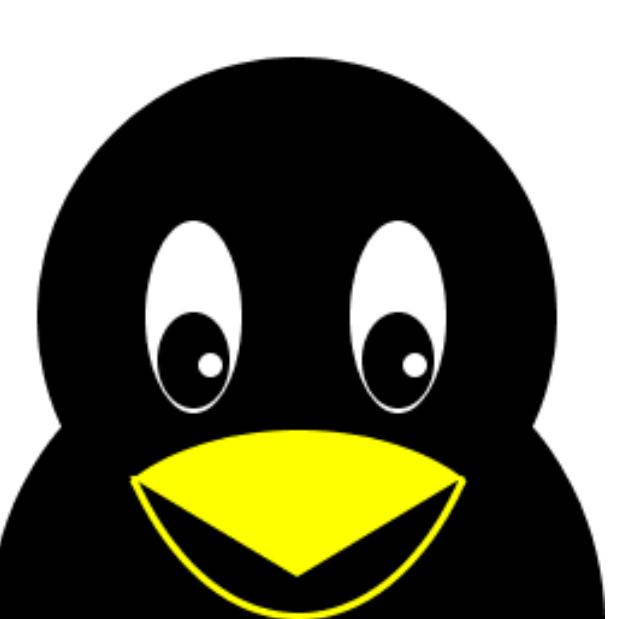
lewitt



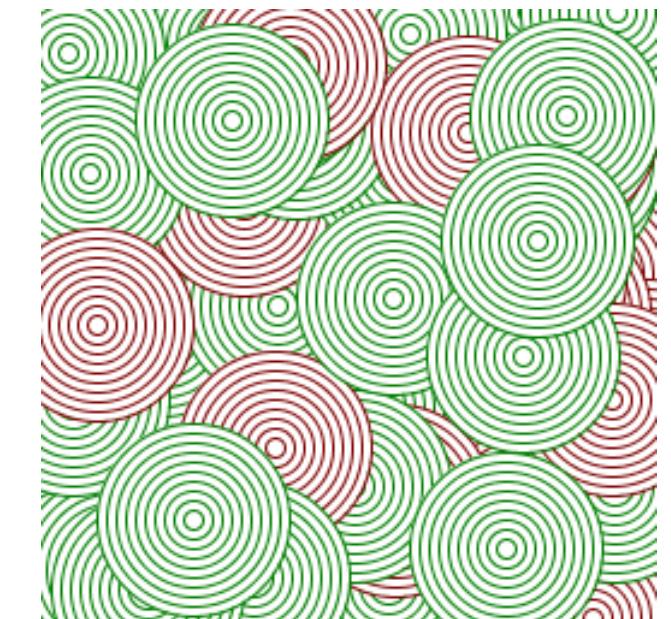
face



pacman

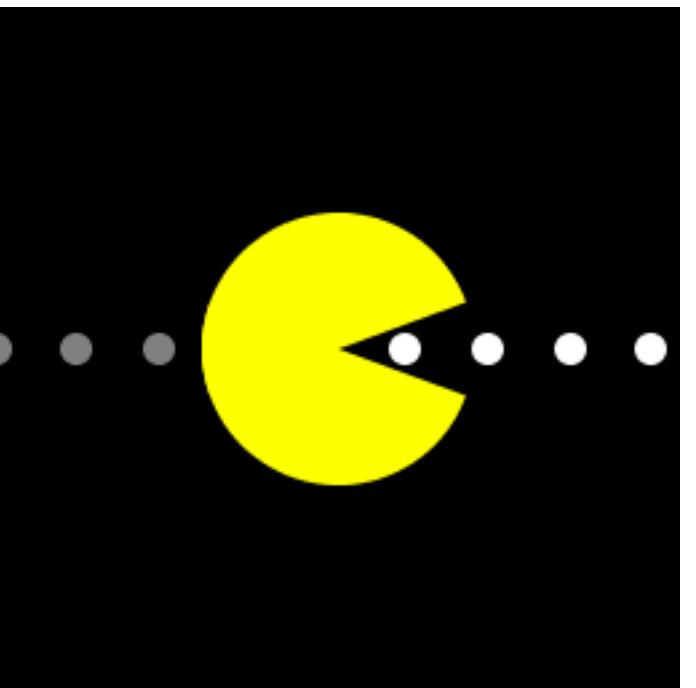


tux

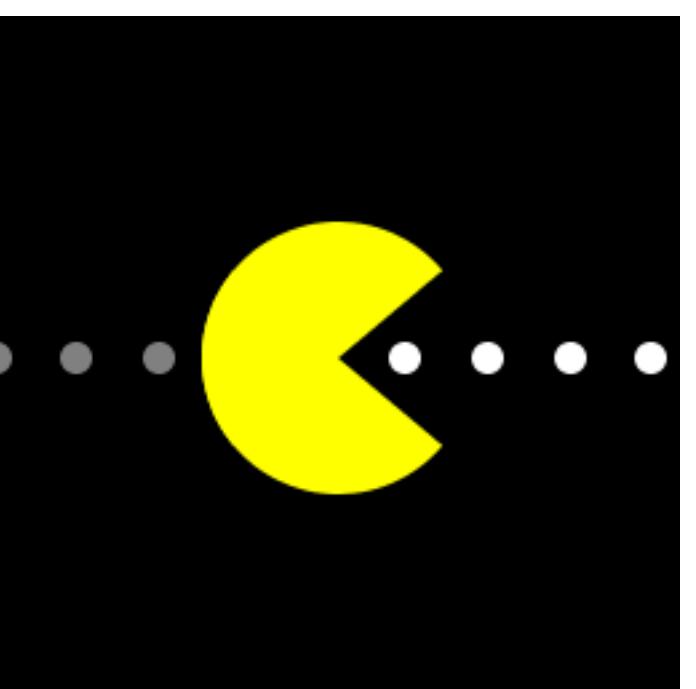


concentric

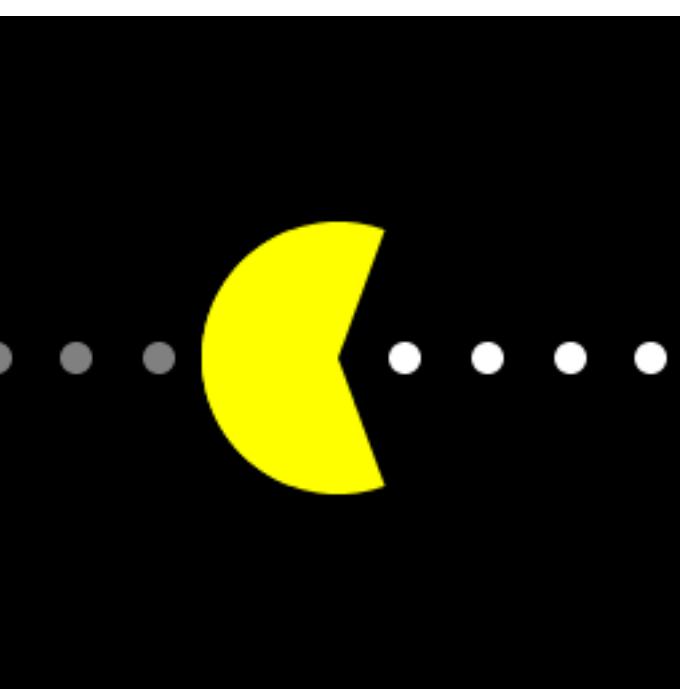
/pacman/?angle=20



/pacman/?angle=40



/pacman/?angle=70

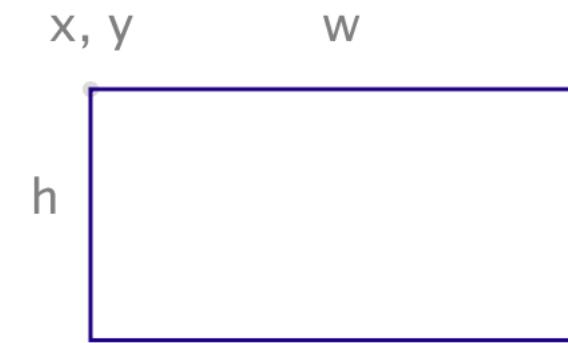


API Reference

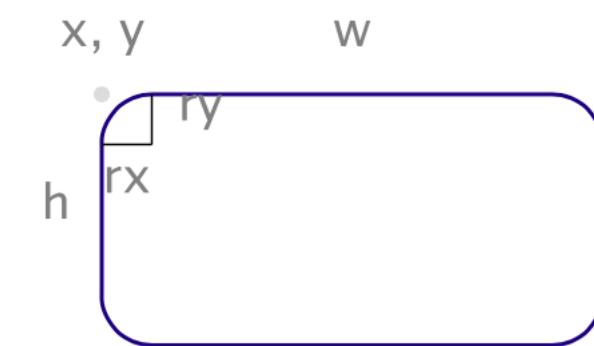
SVGo Method Categories

- Starting and Ending
- Metadata
- Utility
- Groups and Definitions
- Markers and Patterns
- Links
- Masking and Clipping
- Transforms
- Skewing
- Shapes
- Paths, Lines and Curves
- Images and Text
- Colors and Gradients
- Filter Effects

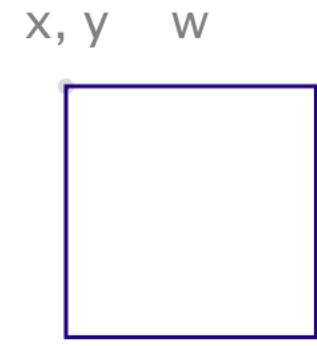
Shapes



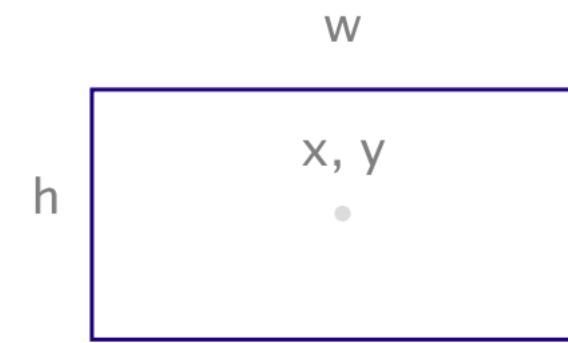
Rect(x, y, w, h int, s string...)



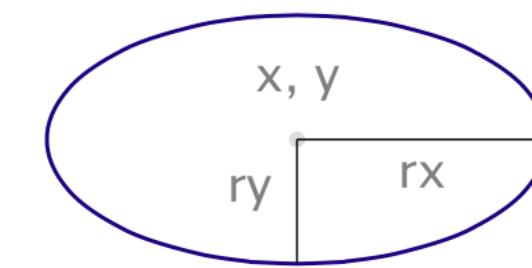
Roundrect(x, y, w, h, rx, ry int, s string...)



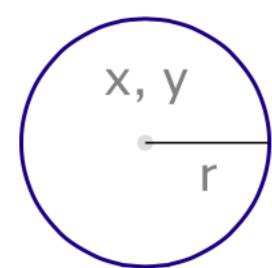
Square(x, y, l int, s string...)



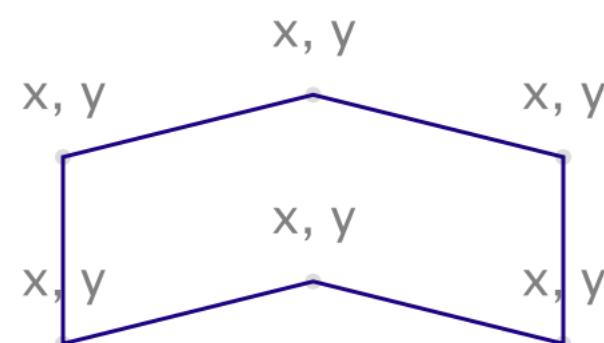
CenterRect(x, y, w, h int, s string...)



Ellipse(x, y, w, h int, s string...)



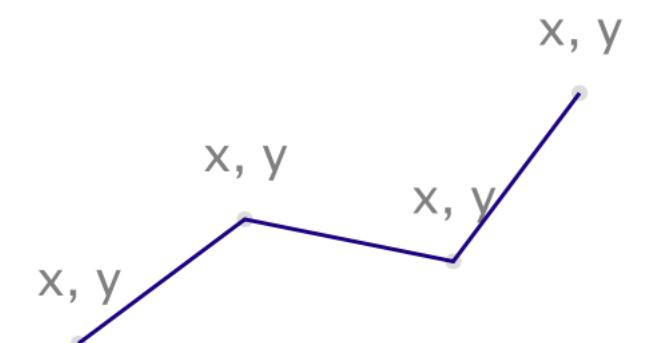
Circle(x, y, r int, s string...)



Polygon(x, y []int, s string...)



Line(x1, y1, x2, y2 int, s string...)

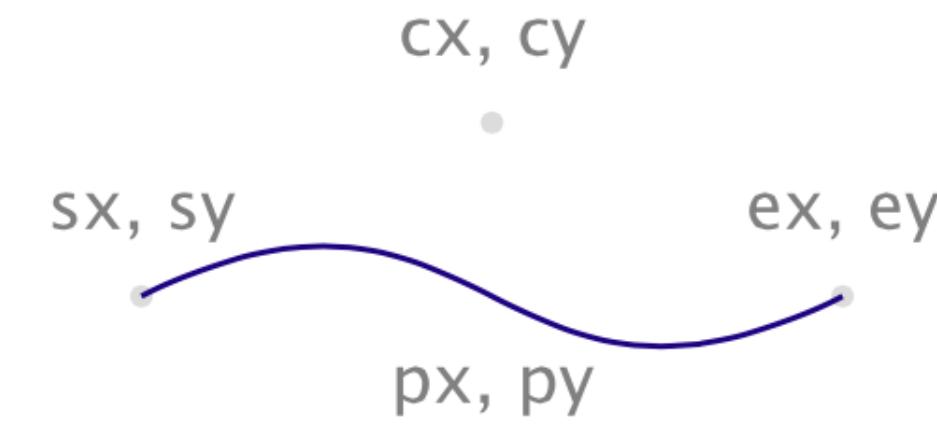


Polyline(x, y []int, s string...)

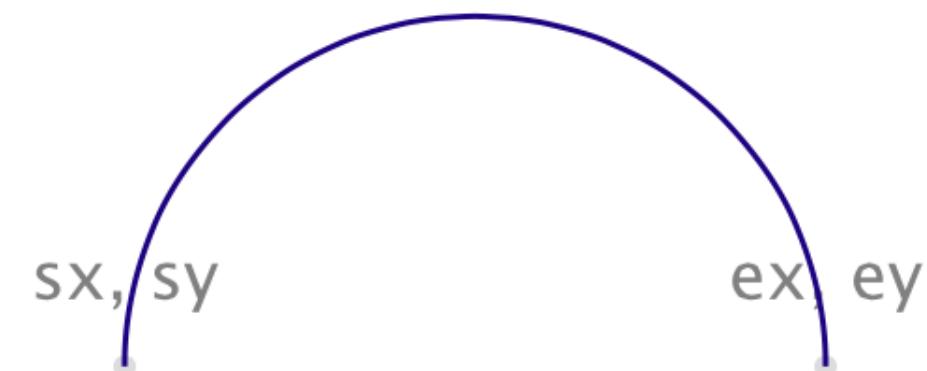
Curves and Paths



`Bezier(sx, sy, cx, cy, ex, ey int, s string...)`



`QBez(sx, sy, cx, cy, px, py, ex, ey int, s string...)`

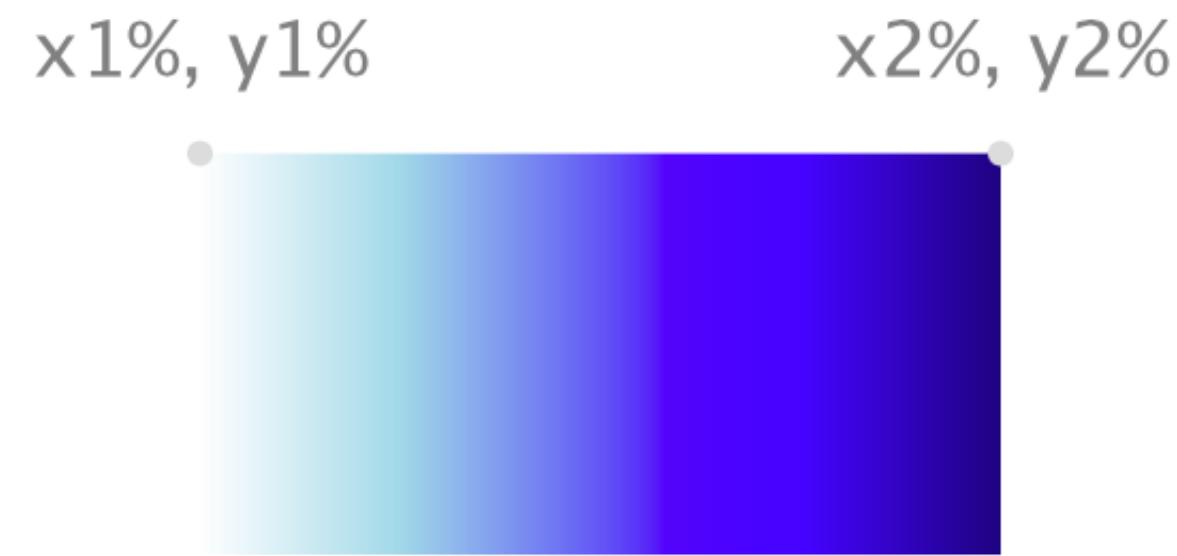


`Arc(sx, ax, ay, r int, dir, large bool, ex, ey int, s string...)`

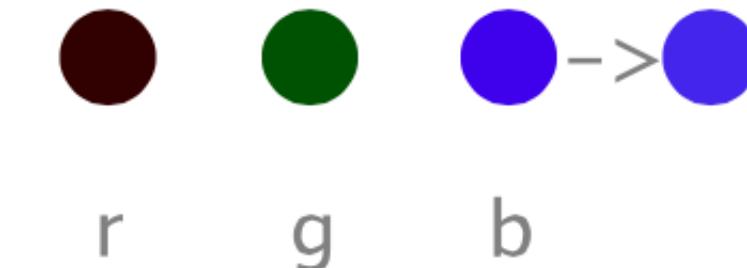


`Path(d string, s string...)`

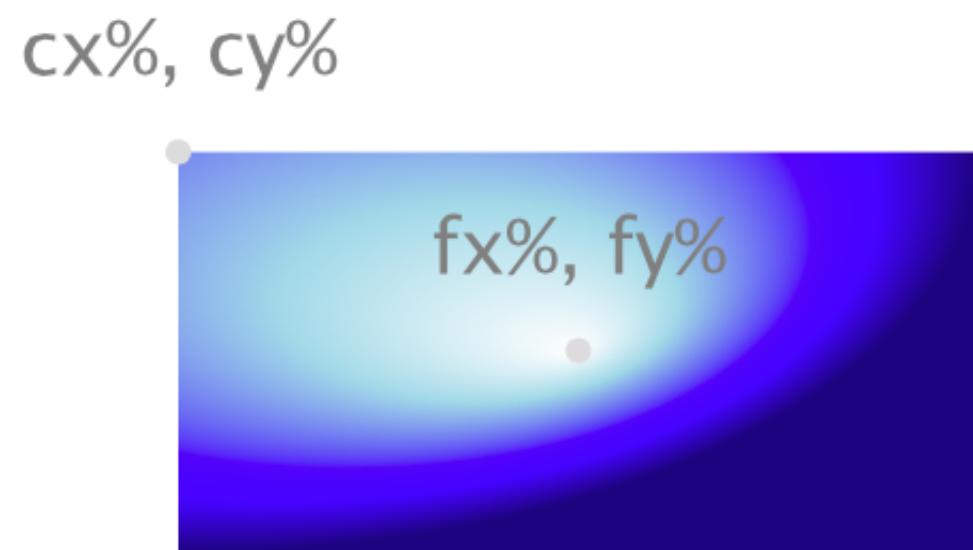
Gradients and Colors



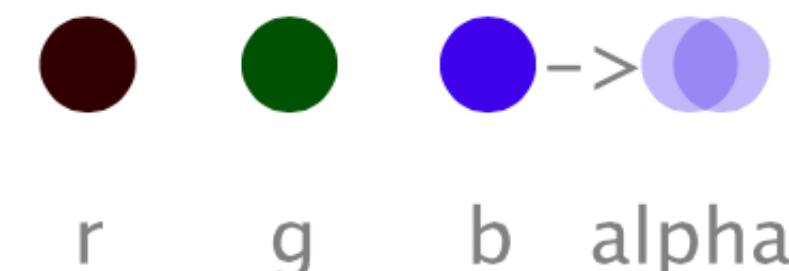
LinearGradient(id string, x1, y1, x2, y2 uint8, sc []Offcolor)



RGB(r, g, b int)

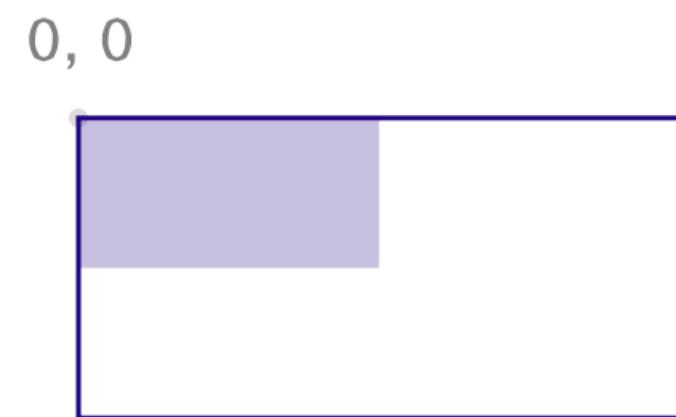


RadialGradient(id string, cx, cy, r, fx, fy uint8, sc []Offcolor)

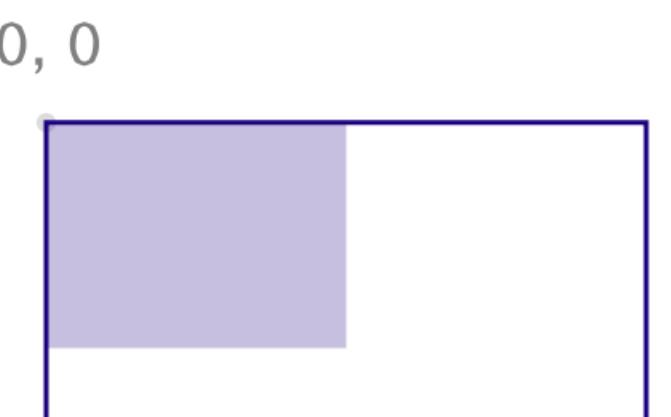


RGBA(r, g, b int, a float64)

Transforms



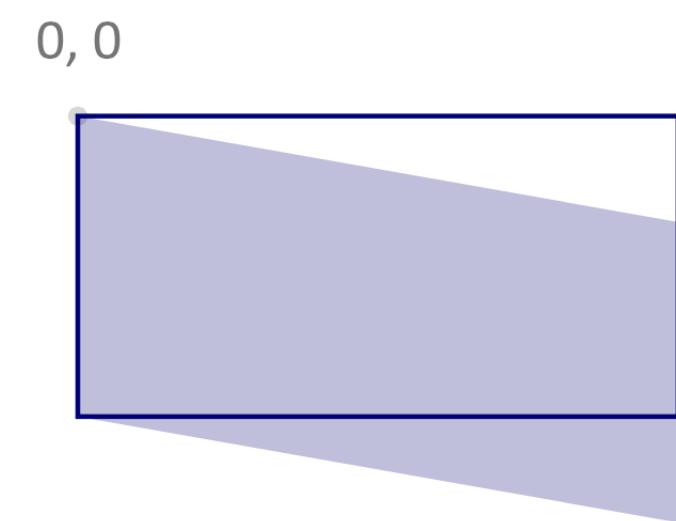
Scale(n float64)



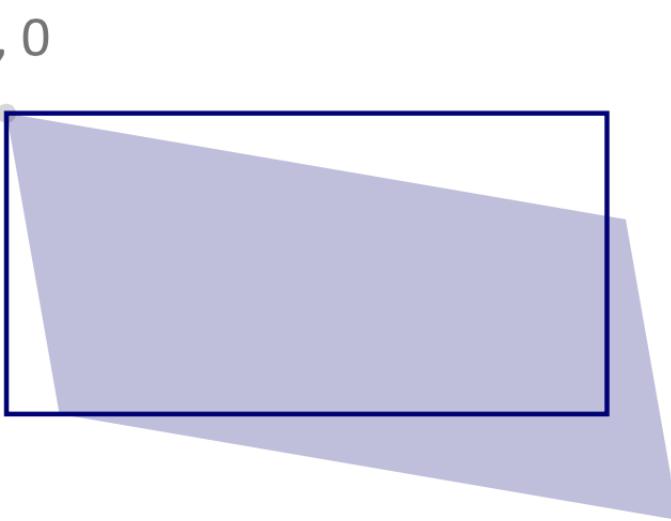
ScaleXY(dx, dy float64)



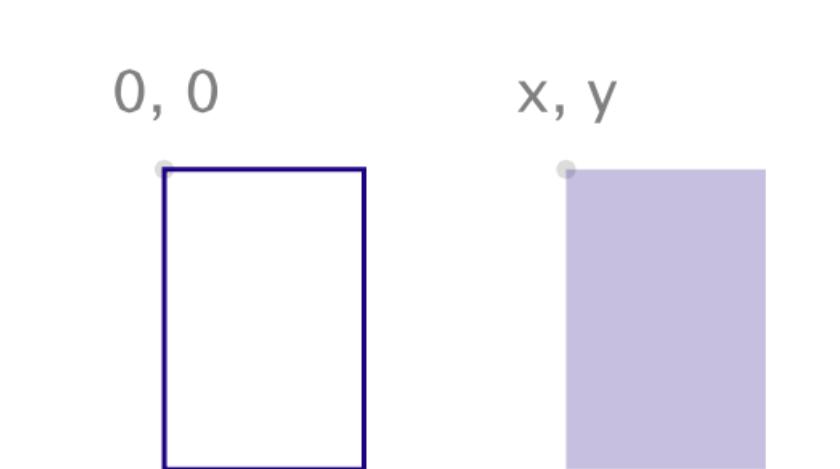
SkewX(a float64)



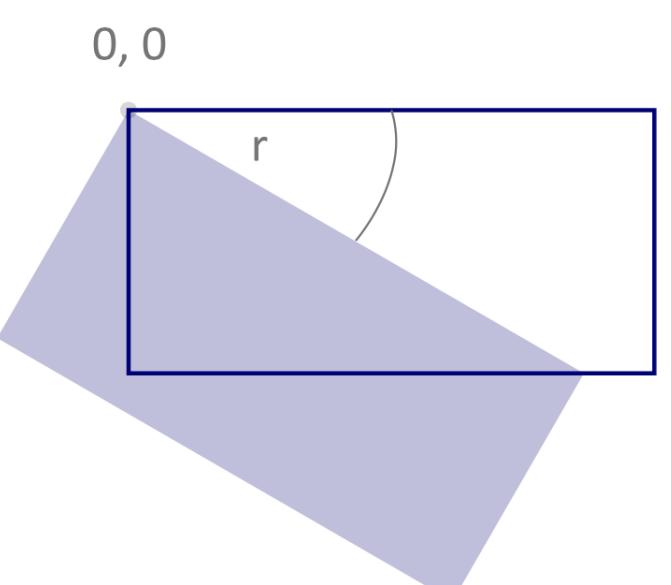
SkewY(a float64)



SkewXY(ax, ay float64)



Translate(x, y int)



Rotate(a float64)

Text and Images

hello, this is SVG
x, y

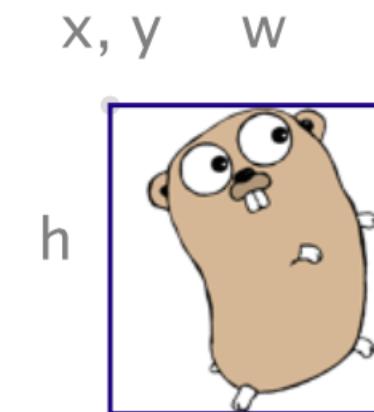
Text(x, y int, s string, s ...string)

It's "fine" & "dandy" to draw text along

Textpath(t string, pathid string, s ...string)

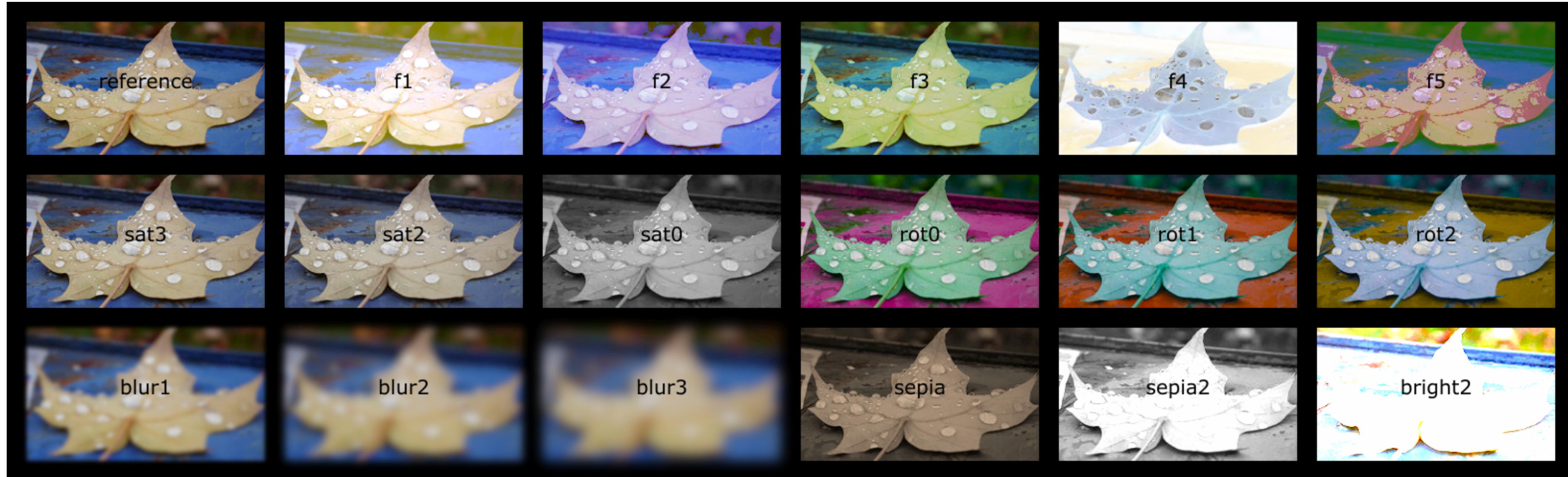
```
New(w io.Writer)  
Start(w, h int, options ...string)/End()  
Startview(w, h, minx, miny, vw, vh int)  
Group(s ...string)/Gend()  
Gstyle(s string)/Gend()
```

Textlines(x, y int, s []string, size, spacing int, fill, align string)



Image(x, y, w, h int, link string, s ...string)

Filter Effects



Sketching with code

```
package main

import (
    "os"
    "github.com/ajstarks/svg"
)

func main() {
    width := 960
    height := 540
    style := "fill:white;font-size:60pt;text-anchor:middle"
    canvas := svg.New(os.Stdout)
    canvas.Start(width, height)
    canvas.Rect(0, 0, width, height)
    canvas.Circle(width/2, height, width/2, "fill:rgb(44,77,232)")
    canvas.Text(width/2, height/2, "hello, world", style)
    canvas.End()
}
```



(Shift-Enter to compile and run.)

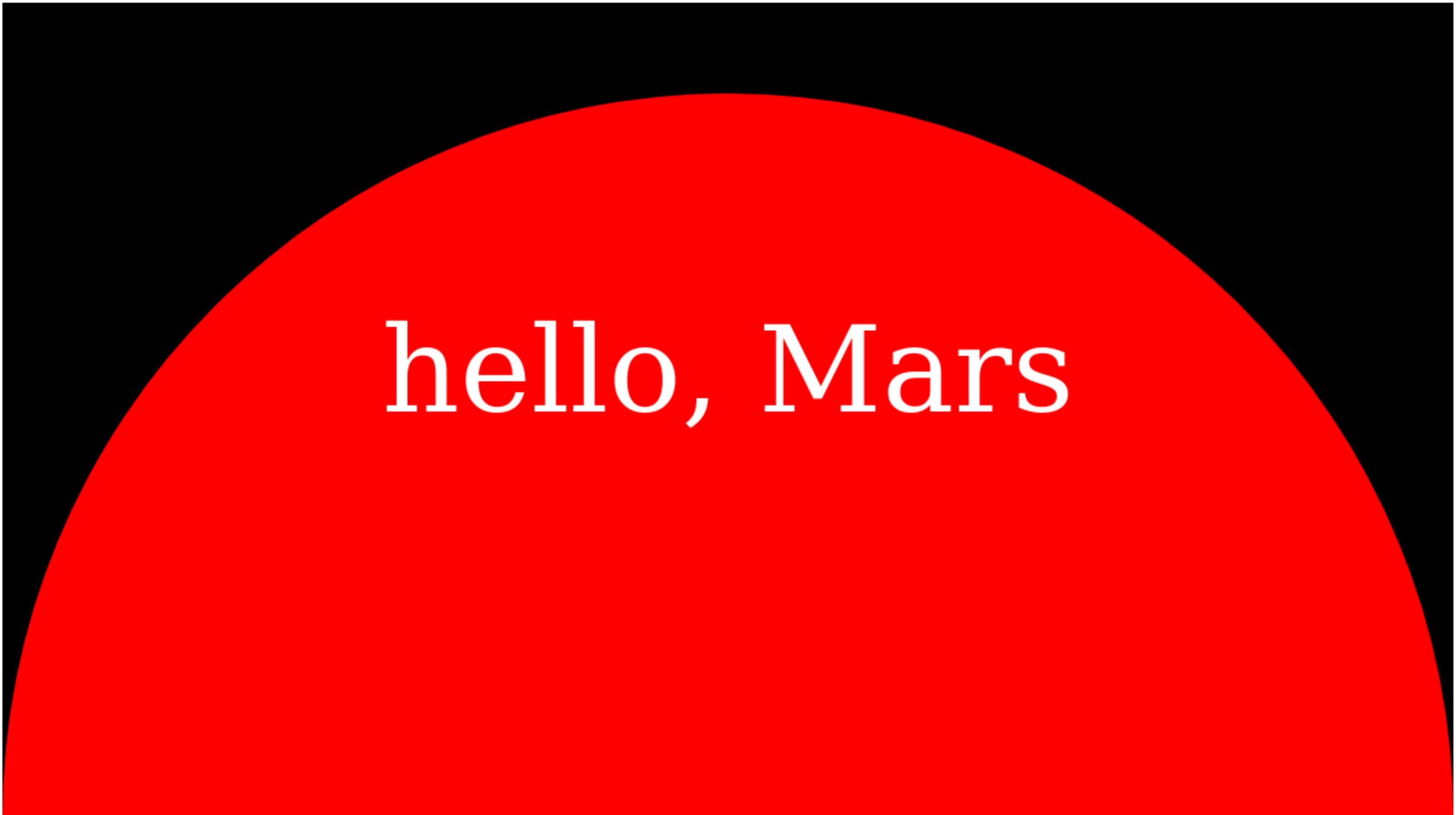


Compile and run after each keystroke

```
package main

import (
    "os"
    "github.com/ajstarks/svg"
)

func main() {
    width := 960
    height := 540
    style := "fill:white;font-size:60pt;text-anchor:middle"
    canvas := svg.New(os.Stdout)
    canvas.Start(width, height)
    canvas.Rect(0, 0, width, height)
    canvas.Circle(width/2, height, width/2, "fill:red")
    canvas.Text(width/2, height/2, "hello, Mars", style)
    canvas.End()
}
```



(Shift-Enter to compile and run.)



Compile and run after each keystroke

svgplay: SVGo sketching × +

localhost:1999

Apps PROTOTYPE -events | Data... Other bookmarks

```
package main

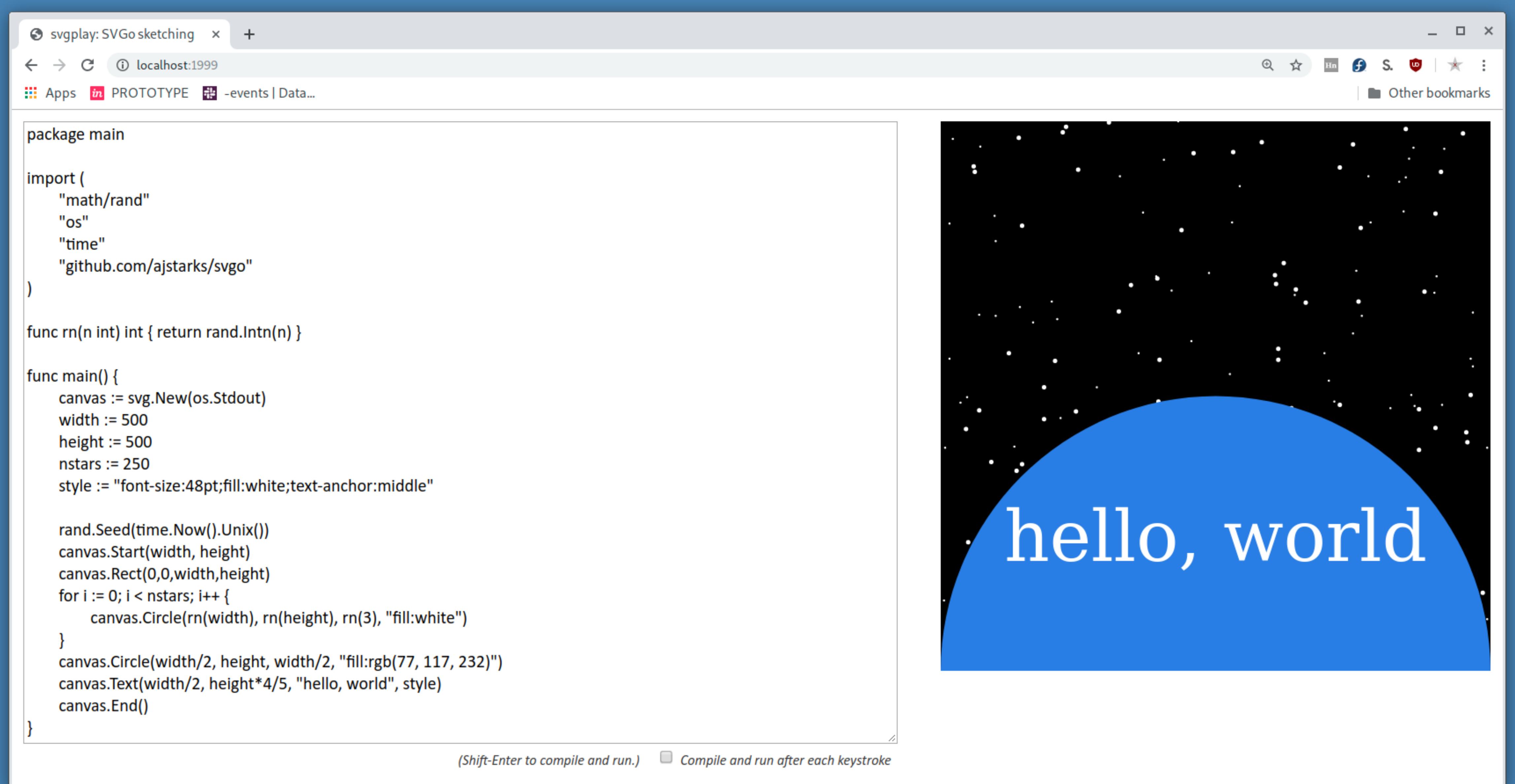
import (
    "math/rand"
    "os"
    "time"
    "github.com/ajstarks/svg"
)

func rn(n int) int { return rand.Intn(n) }

func main() {
    canvas := svg.New(os.Stdout)
    width := 500
    height := 500
    nstars := 250
    style := "font-size:48pt;fill:white;text-anchor:middle"

    rand.Seed(time.Now().Unix())
    canvas.Start(width, height)
    canvas.Rect(0,0,width,height)
    for i := 0; i < nstars; i++ {
        canvas.Circle(rn(width), rn(height), rn(3), "fill:white")
    }
    canvas.Circle(width/2, height, width/2, "fill:rgb(77, 117, 232)")
    canvas.Text(width/2, height*4/5, "hello, world", style)
    canvas.End()
}

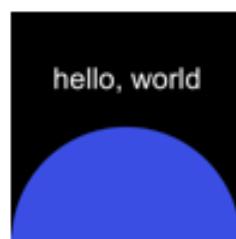
(Shift-Enter to compile and run.)  Compile and run after each keystroke
```



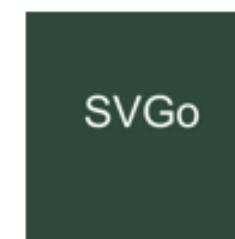
ajstarks@slab:~

```
$ svgplay
2019/06/18 19:19:44 ⚠️⚠️⚠️ Warning: this server allows a client connecting to 127.0.0.1:1999 to execute code on this computer ⚠️⚠️⚠️
```

SVGo Examples



hello.go



SVGo



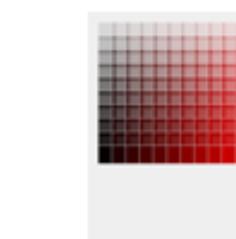
rl.go



concentric.go



concentric2.go



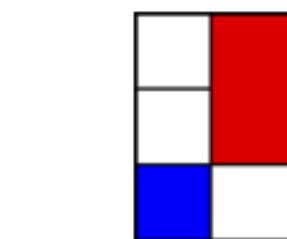
cgrid.go



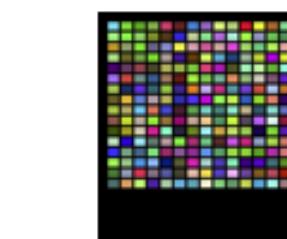
diag.go



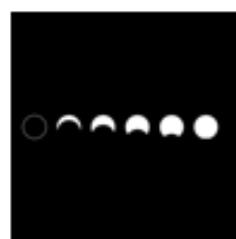
shining.go



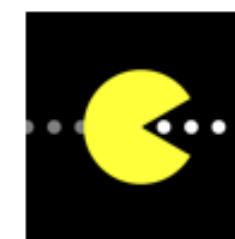
mondrian.go



richter.go



eclipse.go



pacman.go



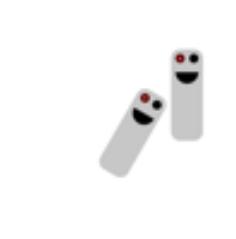
pyramid.go



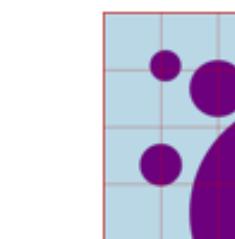
cloud.go



color-clouds.go



creepy.go



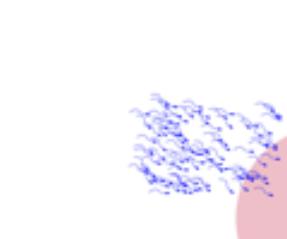
d4h.go



sunearth.go



conception.go



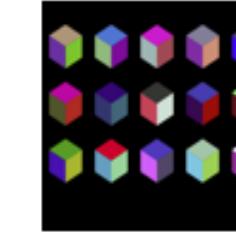
conception2.go



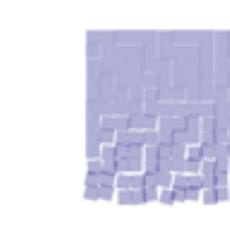
randbox.go



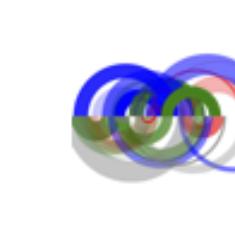
randspot.go



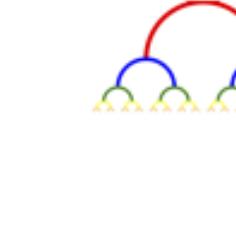
cube.go



schotter.go



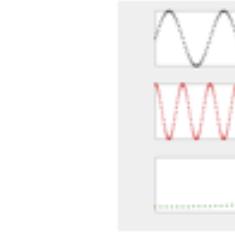
randarc.go



reurse.go



clock.go



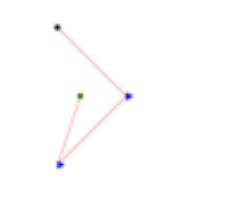
plotfunc.go



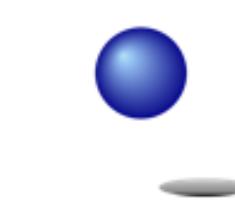
therm.go



pattern.go



marker.go



gradient.go



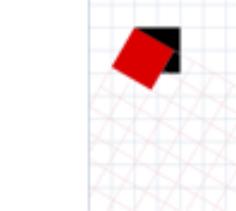
fontrange.go



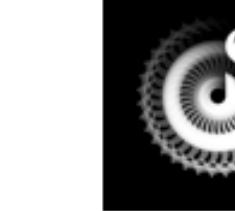
uni.go



lorem.go



rotate.go



rottext.go



skewabc.go



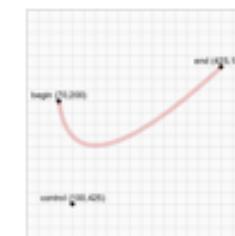
gear.go



star.go



starx.go



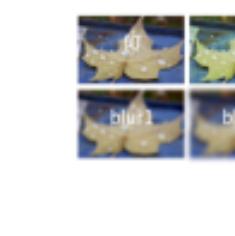
swoosh.go



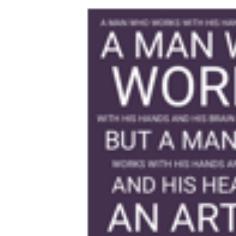
textpath.go



imfade.go



fe.go



artist.go



go.go

codepicdeck

Read/Parse/Draw Pattern

Read

<https://api.nytimes.com/svc/topstories/v2/world.json?api-key=...>

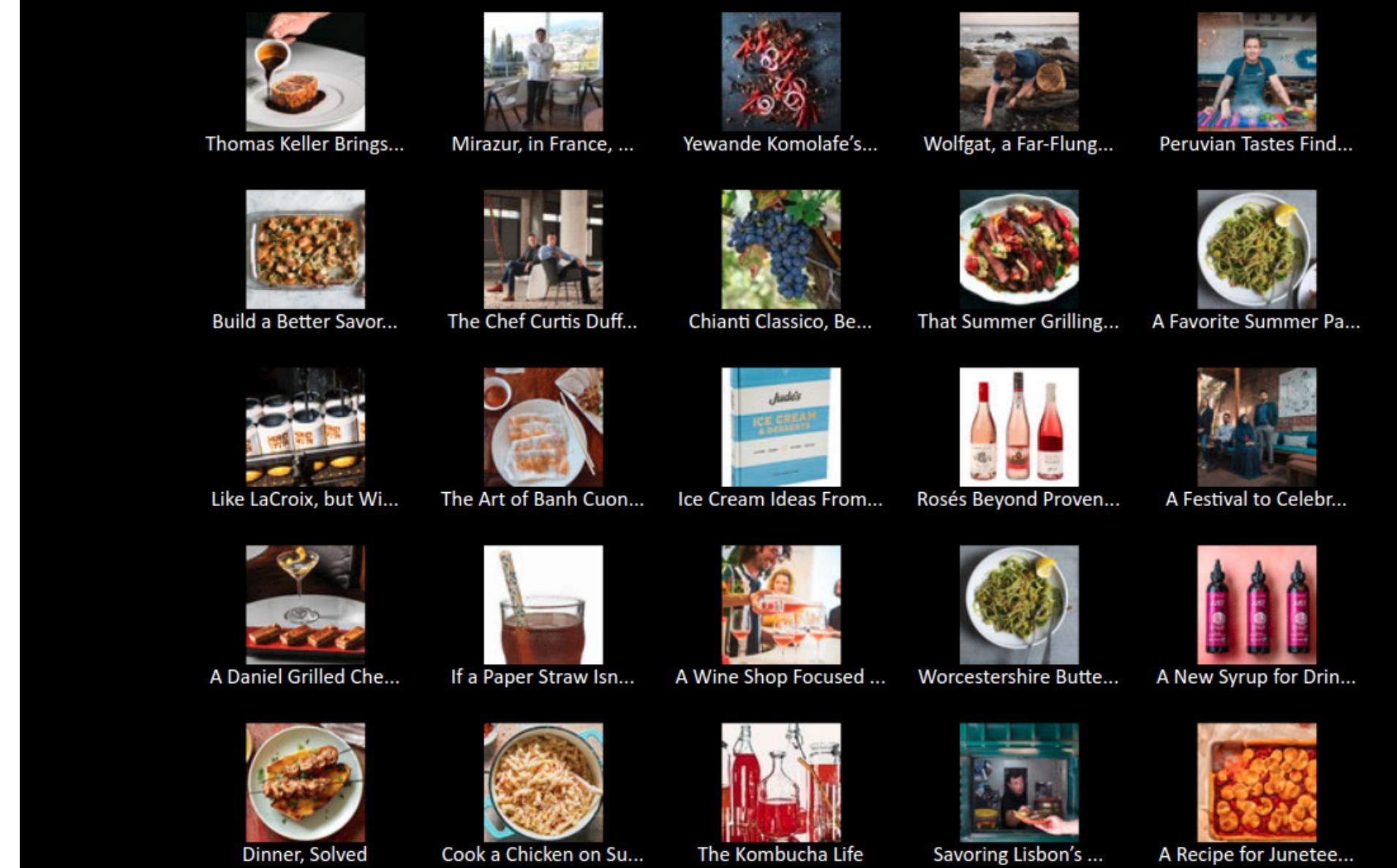
```
{  
  "status": "OK",  
  "copyright": "Copyright (c) 2019 The New York Times Company. All Rights Reserved.",  
  "section": "world",  
  "last_updated": "2019-06-21T21:47:21-04:00",  
  "num_results": 40,  
  "results": [  
    {  
      "section": "World",  
      "subsection": "Middle East",  
      "title": "U.S.-Iran Crisis Updates: Trump Says Military Was Ready to Strike",  
      "abstract": "After the downing of an American drone, leaders around the globe asked the United States and Iran to step back from the brink",  
      "url": "https://www.nytimes.com/2019/06/21/world/middleeast/trump-iran.html",  
      "byline": "",  
      "item_type": "Article",  
      "updated_date": "2019-06-21T17:57:38-04:00",  
      "created_date": "2019-06-21T06:46:09-04:00",  
      "published_date": "2019-06-21T06:46:09-04:00",  
      "material_type_facet": "",  
      "kicker": "",  
      "des_facet": [  
        "United States International Relations",  
        "Defense and Military Forces",  
        "Politics and Government",  
        "Drones (Pilotless Planes)",  
        "Airlines and Airplanes"  
      ],  
      "org_facet": [],  
      "per_facet": [],  
      "geo_facet": [  
        "Iran",  
        "United States",  
        "Strait of Hormuz"  
      ],  
      "multimedia": [  
        {  
          "url": "https://static01.nyt.com/images/2019/06/21/world/21iran-briefing1/21iran-briefing1-thumbStandard.jpg",  
          "format": "Standard Thumbnail",  
          "height": 75,  
          "width": 75,  
          "type": "image",  
          "subtype": "photo",  
          "caption": "An Air Force photograph of an RQ-4 Global Hawk surveillance drone, the kind of aircraft that was shot down this week.",  
          "copyright": "Agence France-Presse – Getty Images"  
        },  
        {  
          "url": "https://static01.nyt.com/images/2019/06/21/world/21iran-briefing1/21iran-briefing1-thumbLarge.jpg",  
          "format": "Large Thumbnail",  
          "height": 150,  
          "width": 150,  
          "type": "image",  
          "subtype": "photo",  
          "caption": "An Air Force photograph of an RQ-4 Global Hawk surveillance drone, the kind of aircraft that was shot down this week.",  
          "copyright": "Agence France-Presse – Getty Images"  
        }  
      ]  
    }  
  ]  
}
```



Parse

Draw

New York Times Top Stories Wednesday Jun 26, 2019



```
package main

import (
    "encoding/json"
    "flag"
    "fmt"
    "io"
    "net/http"
    "os"
    "time"

    "github.com/ajstarks/svg"
)
```

Imports

```
// API Info and formats
const (
    NYTAPIkey = "HxTV50RYD7LyGzHxUy7XCThV3kQ3HYvk"
    NYTfmt    = "https://api.nytimes.com/svc/topstories/v2/%s.json?api-key=%s"
    style     = "font-size:20pt;font-family:sans-serif;fill:white"
    errfmt    = "unable to get network data for %s (%s)"
    datefmt   = "Monday Jan 2, 2006"
    usage     = `section choices:
arts, automobiles, books, business, fashion,
food, health, home, insider, magazine, movies,
national, nyregion, obituaries, opinion, politics,
realestate, science, sports, sundayreview, technology,
theater, tmagazine, travel, upshot, world`  
)
```

Constants

```
// NYTStories is the headline info from the New York Times
type NYTStories struct {
    StoryCount int      `json:"num_results"`
    Results     []result `json:"results"`
}

type result struct {
    Title      string   `json:"title"`
    URL        string   `json:"url"`
    Multimedia []multimedia `json:"multimedia"`
}

type multimedia struct {
    URL      string `json:"url"`
    Width    int    `json:"width"`
    Height   int    `json:"height"`
    Format   string `json:"format"`
}
```

Data Structures

```
func main() {
    var section = flag.String("s", "home", usage)
    var nstories = flag.Int("n", 25, "number of stories")
    flag.Parse()

    width, height := 1000, (*nstories/5)*150
    canvas := svg.New(os.Stdout)
    canvas.Start(width, height)
    canvas.Rect(0, 0, width, height)
    nytStories(canvas, width, *section, *nstories)
    canvas.End()
}
```

Main

```
// netread dereferences a URL, returning the Reader, with an error
func netread(url string) (io.ReadCloser, error) {
    client := &http.Client{Timeout: 30 * time.Second}
    resp, err := client.Get(url)
    if err != nil {
        return nil, err
    }
    if resp.StatusCode != http.StatusOK {
        return nil, fmt.Errorf(errfmt, url, resp.Status)
    }
    return resp.Body, nil
}
```

Network

```
// nytStories retrieves Top Stories data
// from the New York Times API, decodes and displays it.
func nytStories(canvas *svg.SVG, width int, section string, n int) {
    r, err := netread(fmt.Sprintf(NYTfmt, section, NYTAPIkey))
    if err != nil {
        fmt.Fprintf(os.Stderr, "headline read error: %v\n", err)
        return
    }
    defer r.Close()
    var data NYTStories
    if err = json.NewDecoder(r).Decode(&data); err != nil {
        fmt.Fprintf(os.Stderr, "decode: %v\n", err)
        return
    }
    drawStories(canvas, width, data, n)
}
```

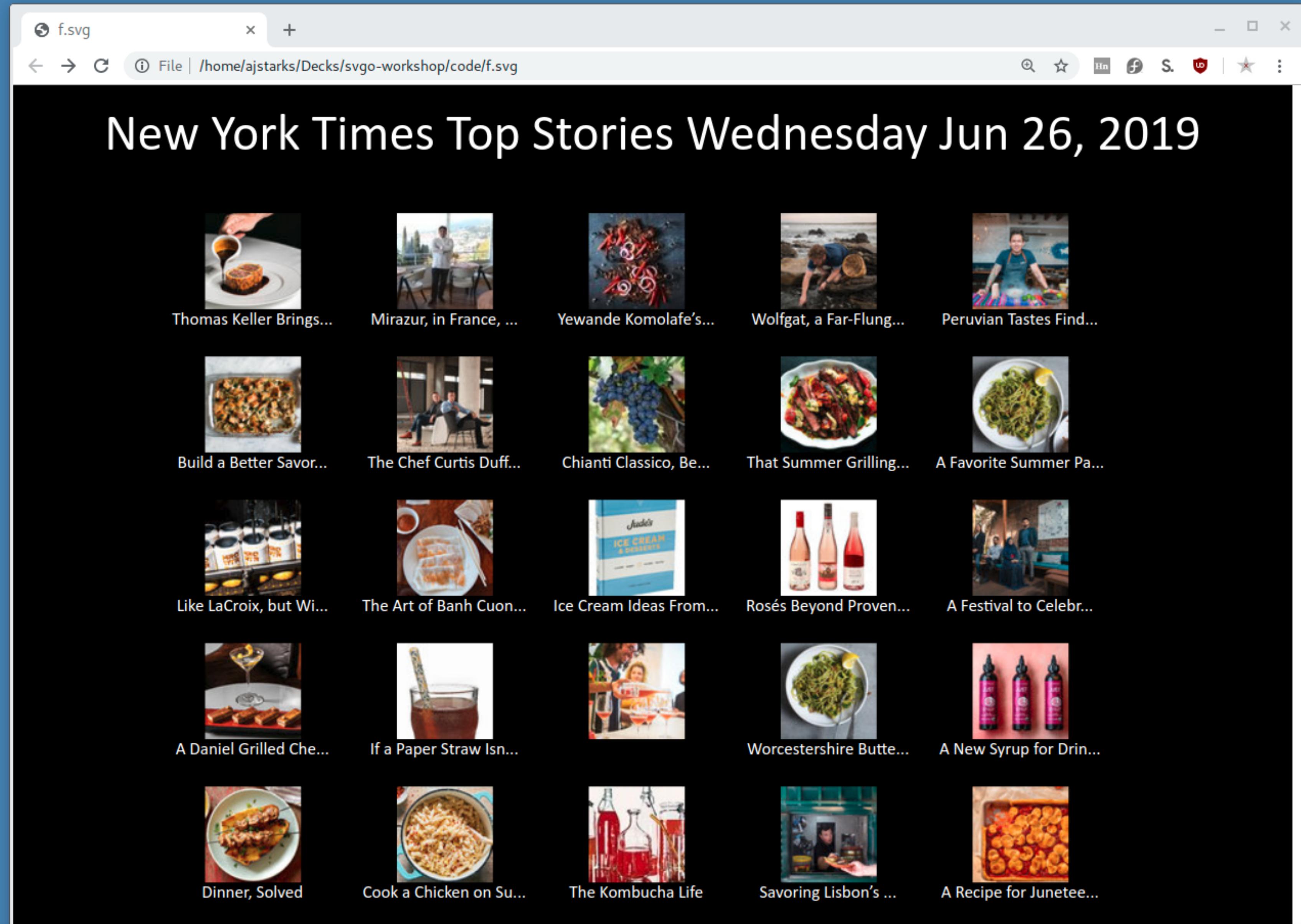
Read and Decode

```
// drawStories walks the result structure, displaying title and thumbnail
func drawStories(canvas *svg.SVG, data NYTStories, n int) {
    top, left := 200, 150
    imx, titley := left-100, top-100
    x, y, th, tw := left, top, 75, 75
    ts := fmt.Sprintf("New York Times for %s", time.Now().Format(datefmt))
    imagelink := ""
    if n > data.StoryCount {
        n = data.StoryCount
    }
}
```

Drawing (setup)

```
canvas.Gstyle(style)
canvas.Text(width/2, titley, ts, "font-size:300%")
for i := 0; i < n; i++ {
    d := data.Results[i]
    tw, th, imagelink := imageinfo(d)
    if i > 0 && i%5 == 0 {
        x = left
        y += th + (th / 2)
    }
    canvas.Link(d.URL, d.Title)
    canvas.Image(x, y, tw, th, imagelink)
    canvas.Text(x+tw/2, y+th+12, struncate(d.Title, 20))
    canvas.LinkEnd()
    x += tw * 2
}
canvas.Gend()
```

Drawing



🔍

ajstarks@slab:~/Decks/svgo-workshop/code

```
$ go run nytsvg.go -s food > f.svg
```