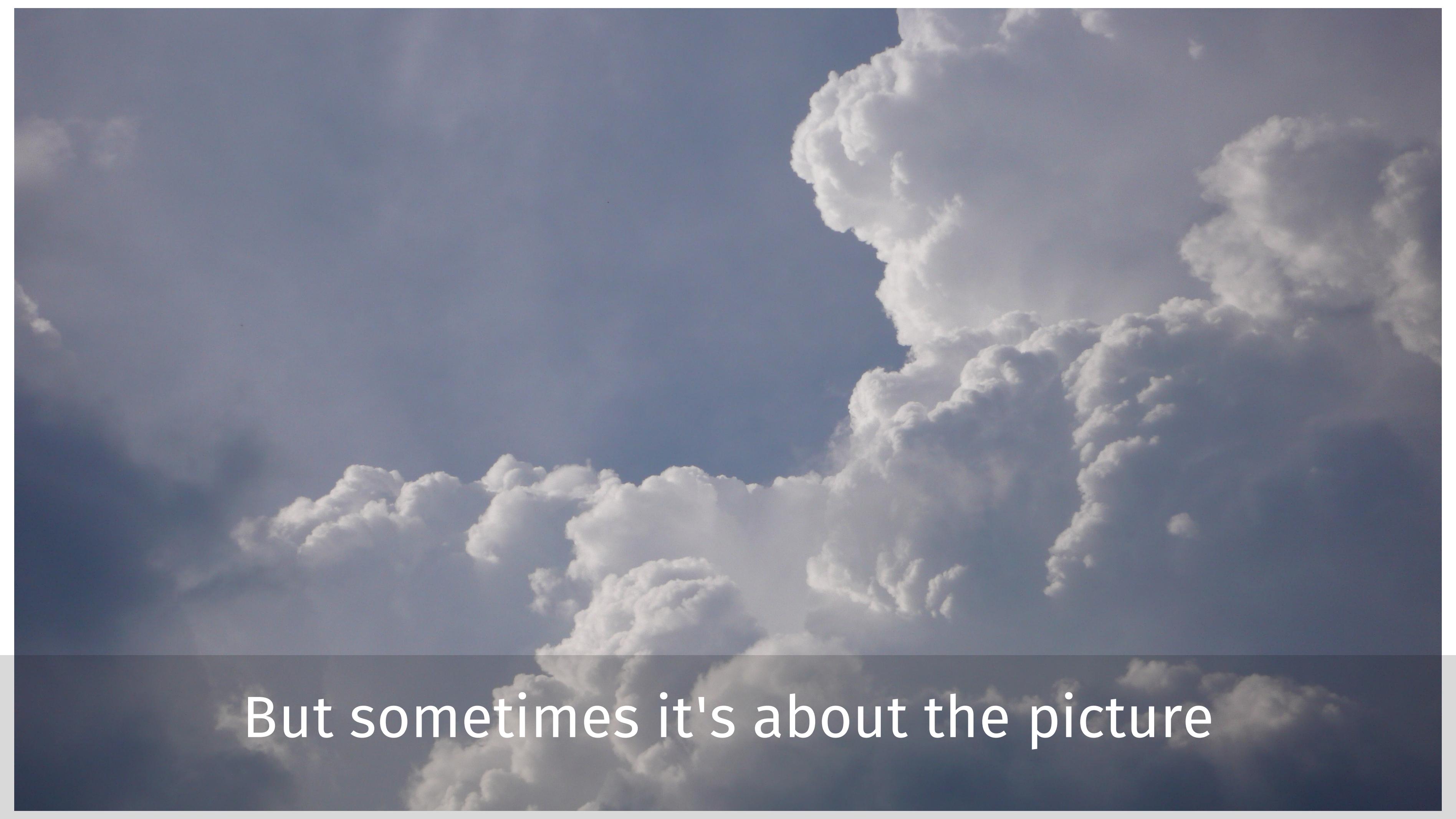


# The other side of Go

## Programming Pictures

# Go is great in the back end





But sometimes it's about the picture

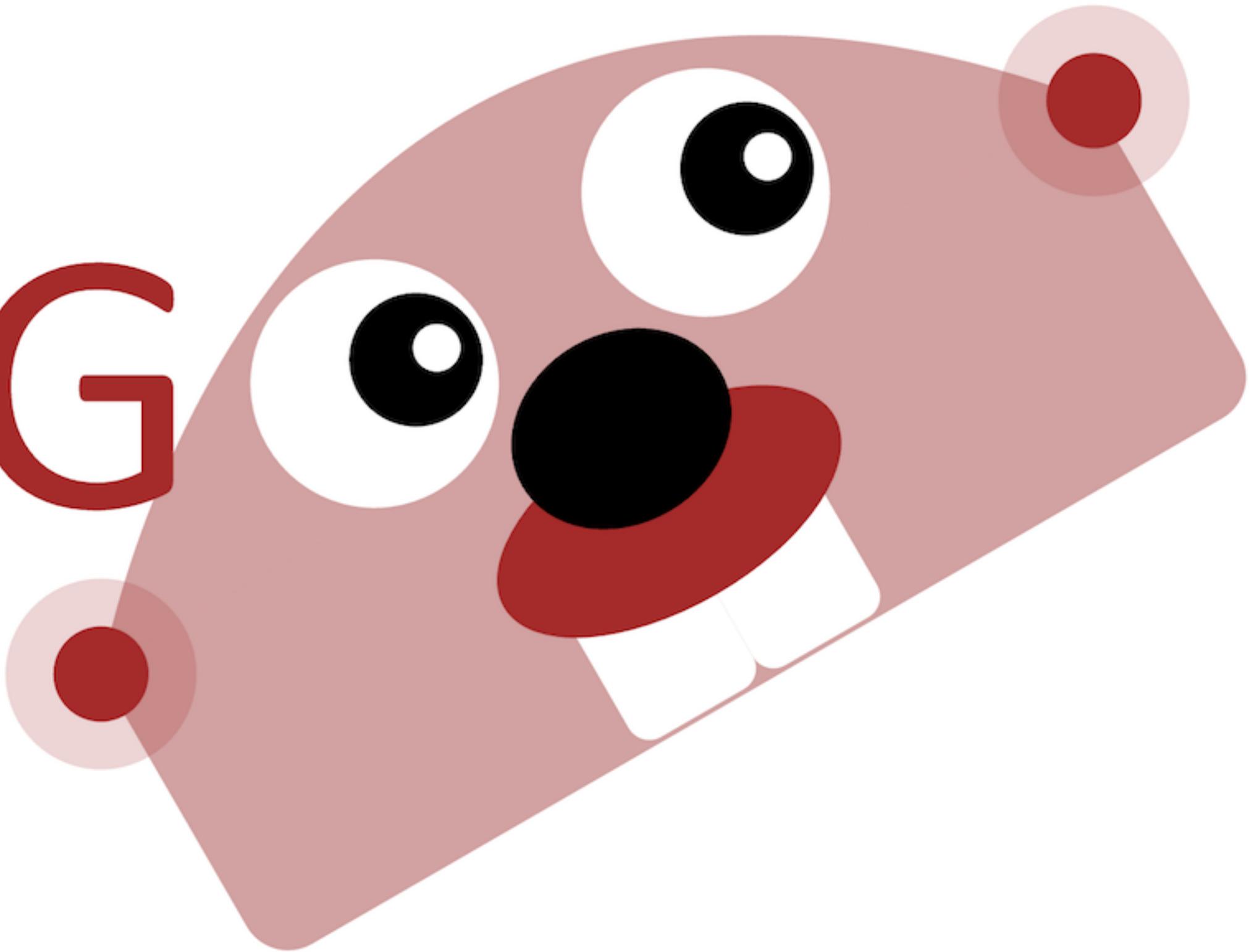
API Design

Client Program Design

Visual Design and Relationships

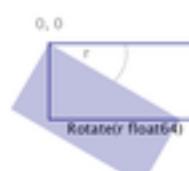
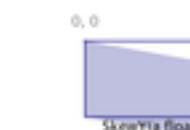
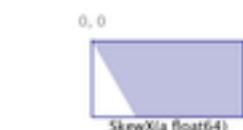
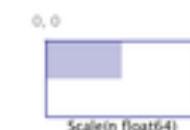
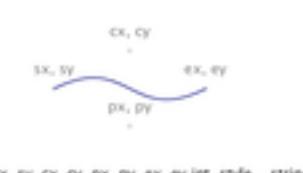
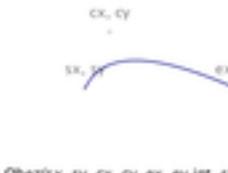
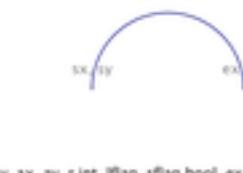
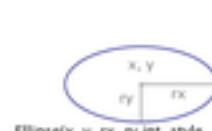
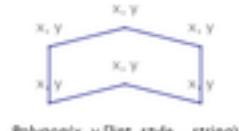
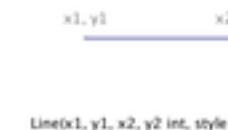
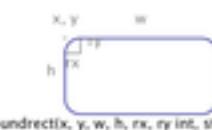
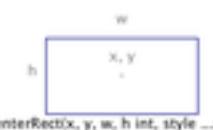
Why Go?

**SVG**



# SVG Go Library

github.com/ajstarks/svggo



hello, this is SVG

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

It's time to "dandy" to draw text paths

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



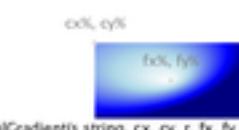
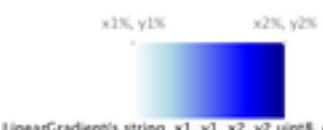
Path(s string, style ...string)



Image(x, y, w, h int, path string, style ...string)



Grid(x, y, w, h int, n int, style ...string)



New in Writer:  
StartW, h int, options ...string)(End)  
StartWd, h, minx, miny, w, vh int  
Groups ...string)(End)  
Styles ...string)(End)  
Transforms ...string)(End)  
Gid(string)(End)  
ClipPath(s ...string)(ClipEnd)  
Defn(DefnEnd)  
Marker(MarkerEnd)  
Pattern(PatternEnd)  
Descs(string)  
Title(string)  
Script(string, data ...string)  
Mask(id string, x,y,w,h int, style ...string)(MaskEnd)  
Link(href string, title string)(LinkEnd)  
Use(x int, y int, link string, style ...string)

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 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

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

Element

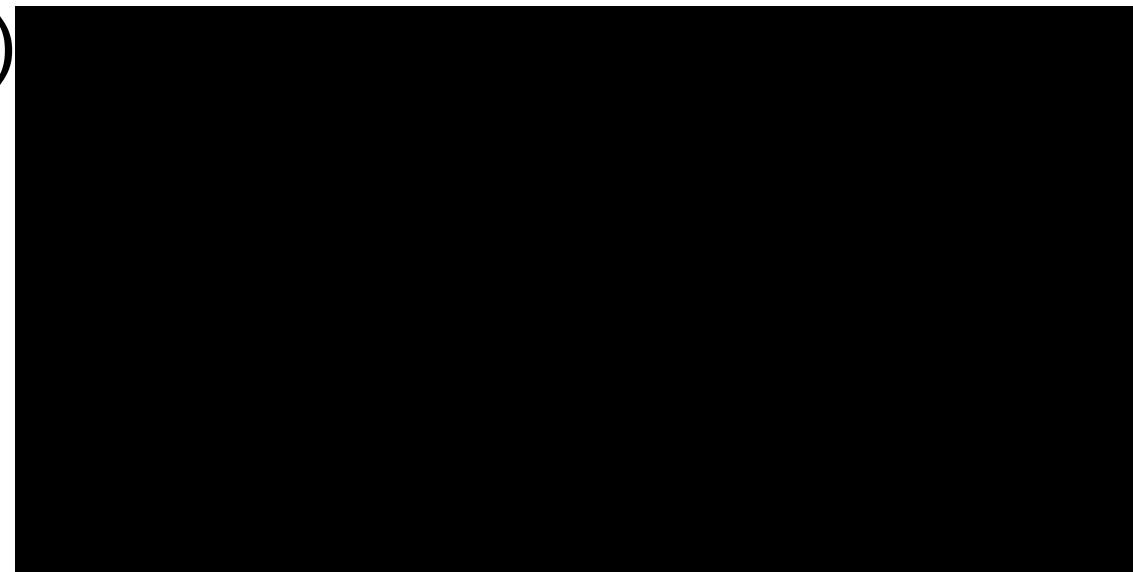
Rect

Arguments

(100,200,250,125)

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

(100, 200)



125

250

Element

Rect

Arguments

(100,200,250,125,

CSS Style

"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



Scale



Roundrect



fill:rgb(164,198,57)

Line

Circle

Arc

Line

Rect

```
package main

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

func main() {
    width := 600
    height := 338
    canvas := svg.New(os.Stdout)
    canvas.Start(width, height)
    canvas.Rect(0, 0, width, height, "fill:black")
    canvas.Circle(width/2, height, width/2, "fill:rgb(44,77,232)")
    canvas.Text(width/2, height/2, "hello, world",
        "fill:white;font-size:60pt;font-family:serif;text-anchor:middle")
    canvas.End()
}
```



```
package main

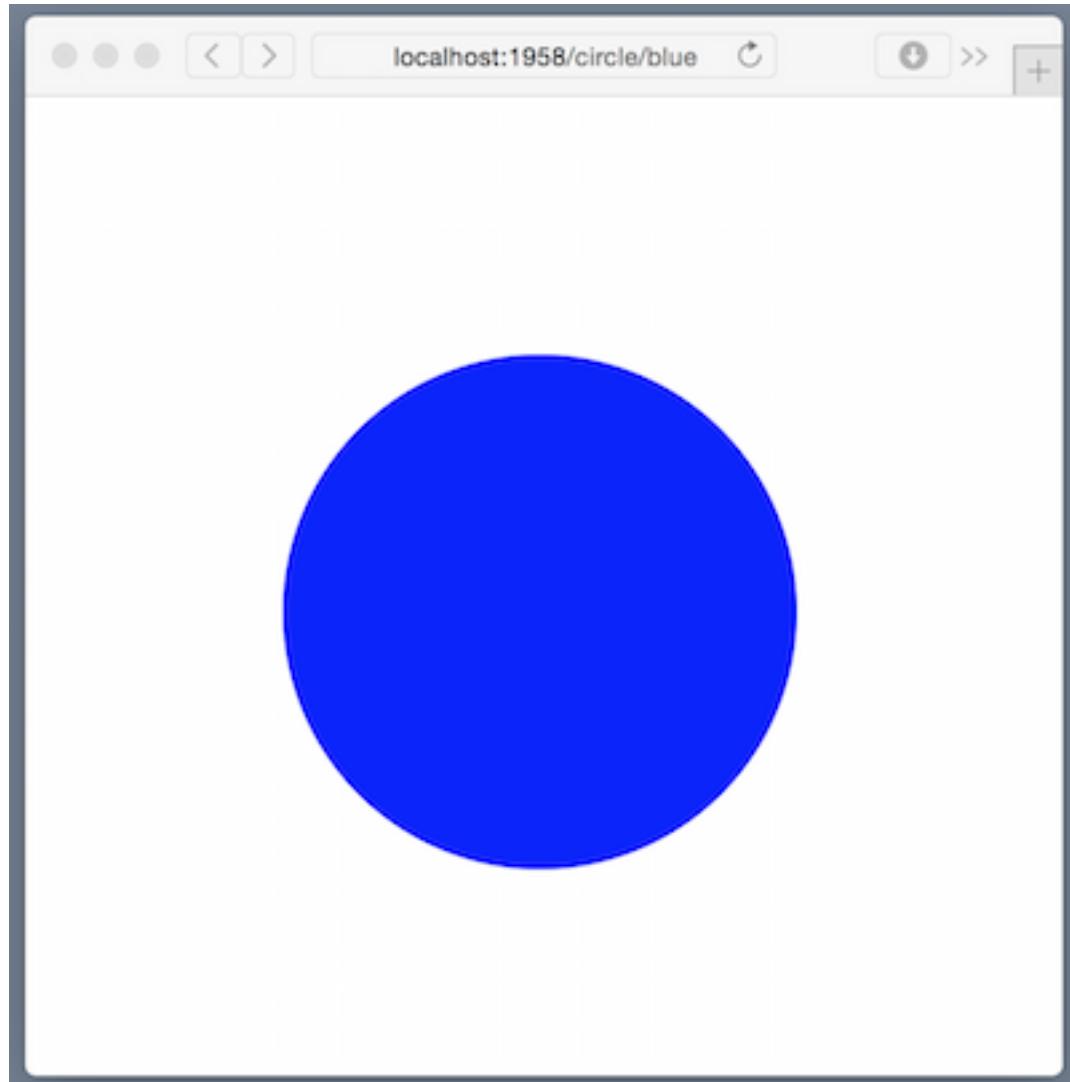
import (
    "github.com/ajstarks/svg"
    "log"
    "net/http"
    "strings"
)

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

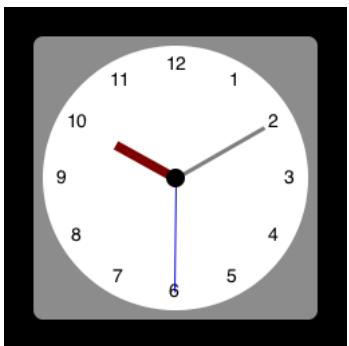
func main() {
    http.Handle("/circle/", http.HandlerFunc(circle))
    err := http.ListenAndServe("localhost:1958", nil)
    if err != nil {
        log.Println("ListenAndServe:", err)
    }
}

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()
}

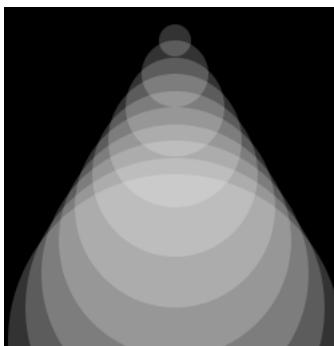
func shapestyle(path string) string {
    i := strings.LastIndex(path, "/") + 1
    if i > 0 && len(path[i:]) > 0 {
        return "fill:" + path[i:]
    }
    return defaultstyle
}
```



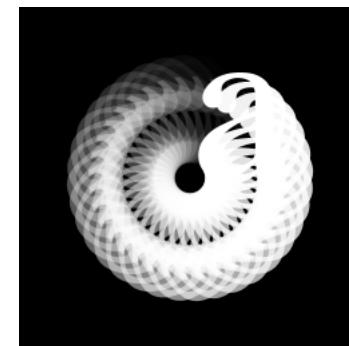
<http://ajstarks.org:1958/{thing}/>



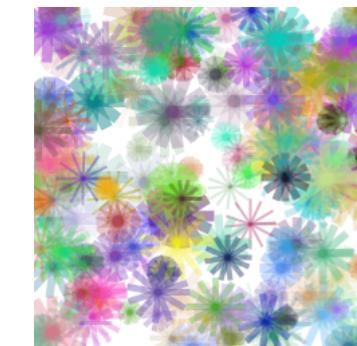
clock



funnel



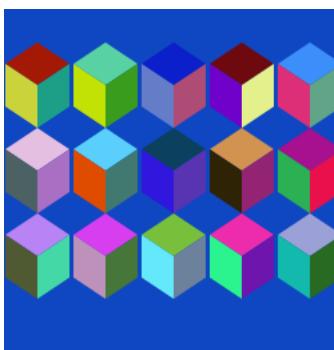
rotext



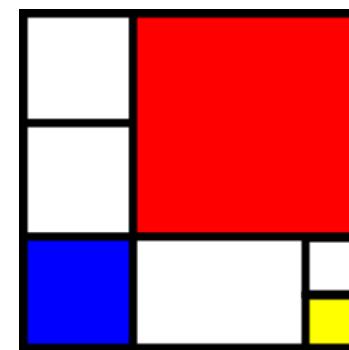
flower



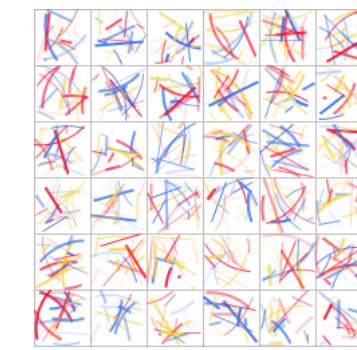
rshape



cube



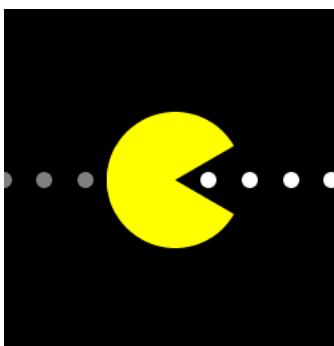
mondrian



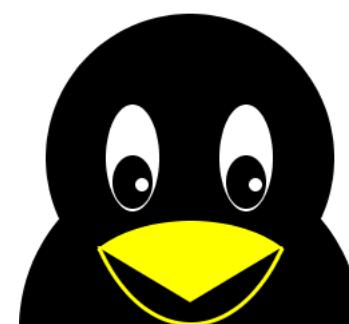
lewitt



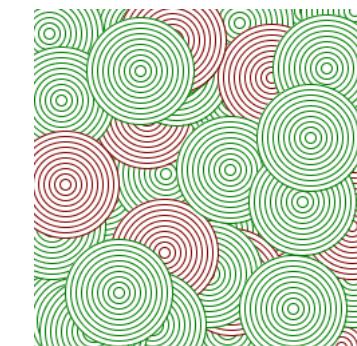
face



pacman

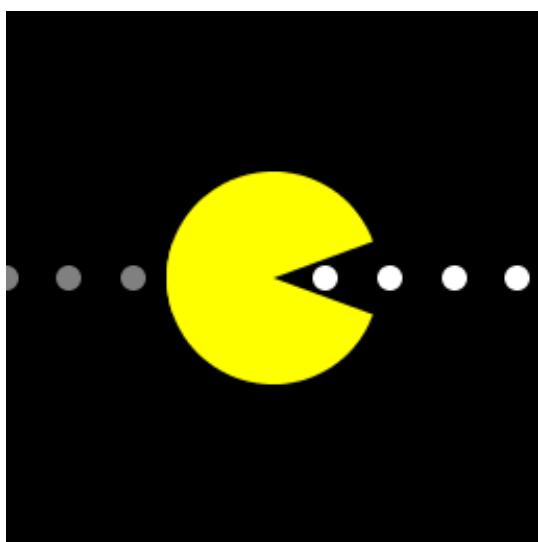


tux

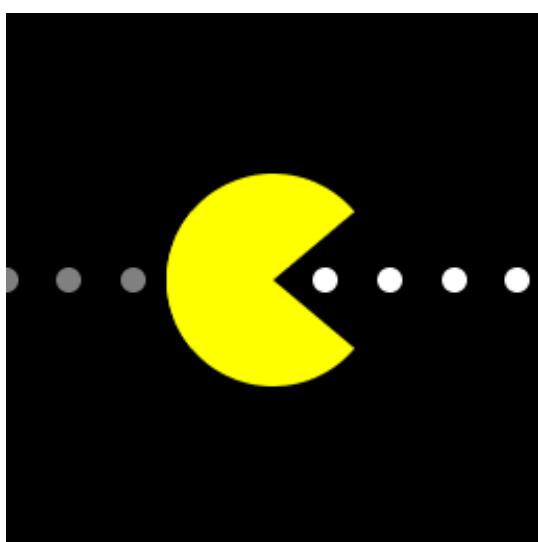


concentric

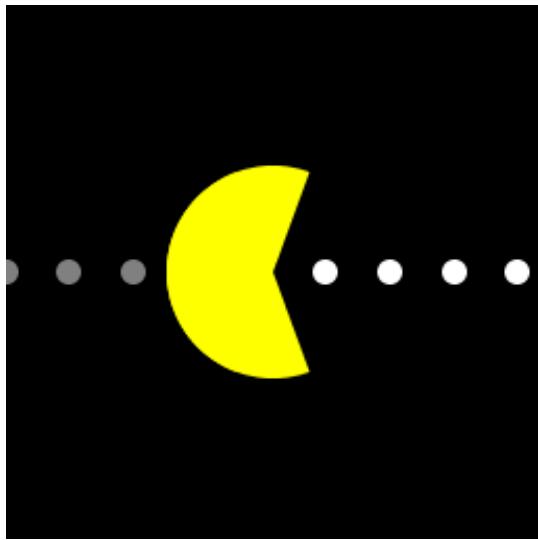
<http://ajstarks.org:1958/pacman/?angle=20>



<http://ajstarks.org:1958/pacman/?angle=40>

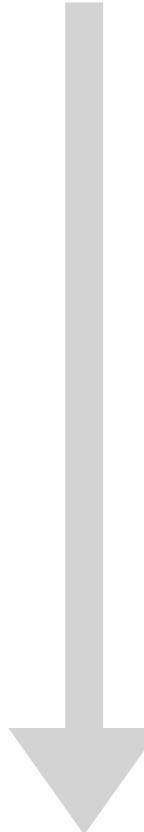


<http://ajstarks.org:1958/pacman/?angle=70>

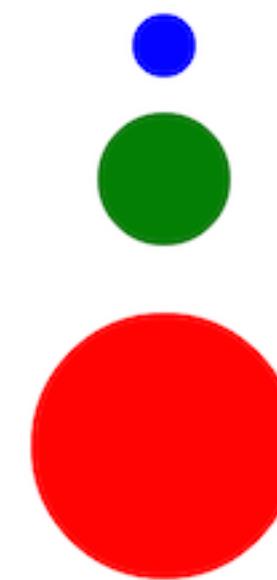


# Read/Parse/Draw Pattern

# Data



# Picture



```
<thing top="100" left="100" sep="100">  
  <item width="50" height="50" name="Little" color="blue">This is small</item>  
  <item width="75" height="100" name="Med"   color="green">This is medium</item>  
  <item width="100" height="200" name="Big"   color="red">This is large</item>  
</thing>
```

Little:This is small/blue

Med:This is medium/green

Big:This is large/red

## [1] Imports

```
package main
import (
    "encoding/xml"
    "flag"
    "fmt"
    "io"
    "os"
    "github.com/ajstarks/svggo"
)
```

## [5] Read the Input

```
func dothing(location string) {
    f, err := os.Open(location)
    if err != nil {
        fmt.Fprintf(os.Stderr, "%v\n", err)
        return
    }
    defer f.Close()
    readthing(f)
}
```

## [2] Data Structures

```
type Thing struct {
    Top int `xml:"top,attr"`
    Left int `xml:"left,attr"`
    Sep int `xml:"sep,attr"`
    Item []item `xml:"item"`
}

type item struct {
    Width int `xml:"width,attr"`
    Height int `xml:"height,attr"`
    Name string `xml:"name,attr"`
    Color string `xml:"color,attr"`
    Text string `xml:",chardata"`
}
```

## [6] Parse and Load

```
func readthing(r io.Reader) {
    var t Thing
    err := xml.NewDecoder(r).Decode(&t)
    if err != nil {
        fmt.Fprintf(os.Stderr, "%v\n", err)
        return
    }
    drawthing(t)
}
```

## [3] Globals and Flags

```
var (
    width = flag.Int("w", 1024, "width")
    height = flag.Int("h", 768, "height")
    canvas = svg.New(os.Stdout)
)
```

## [4] Main

```
func main() {
    flag.Parse()
    for _, f := range flag.Args() {
        canvas.Start(*width, *height)
        dothing(f)
        canvas.End()
    }
}
```

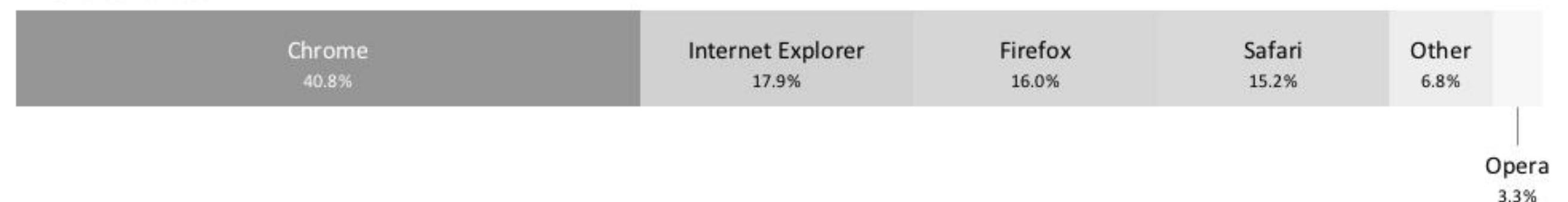
## [7] Draw

```
func drawthing(t Thing) {
    x := t.Left
    y := t.Top
    thingfmt := "font-size:%dpx;fill:%s"
    tfmt := "%s:%s/%s"
    for _, v := range t.Item {
        s := fmt.Sprintf(thingfmt,
                         v.Width/2, v.Color)
        canvas.Circle(x, y, v.Height/4,
                      "fill:"+v.Color)
        canvas.Text(x+t.Sep, y,
                    fmt.Sprintf(tfmt,
                               v.Name, v.Text, v.Color, s))
        y += v.Height
    }
}
```

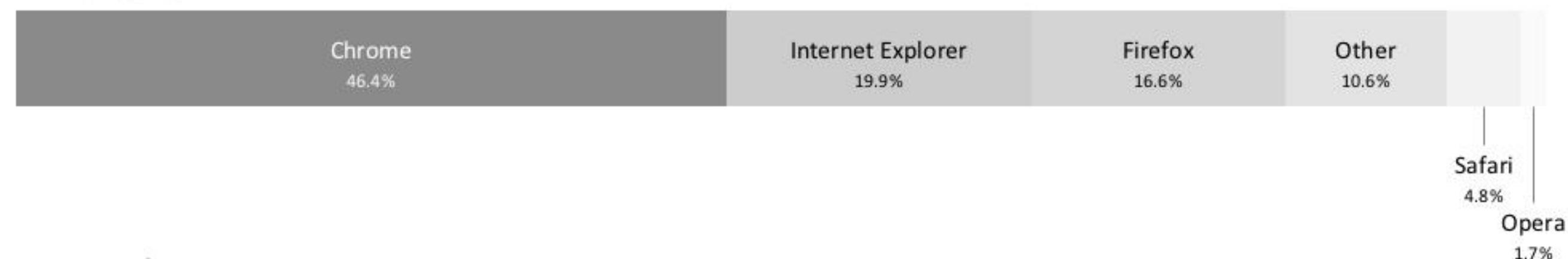
## StatCounter



## W3C Counter



## Wikimedia



## Net Applications



## Browser Market Share

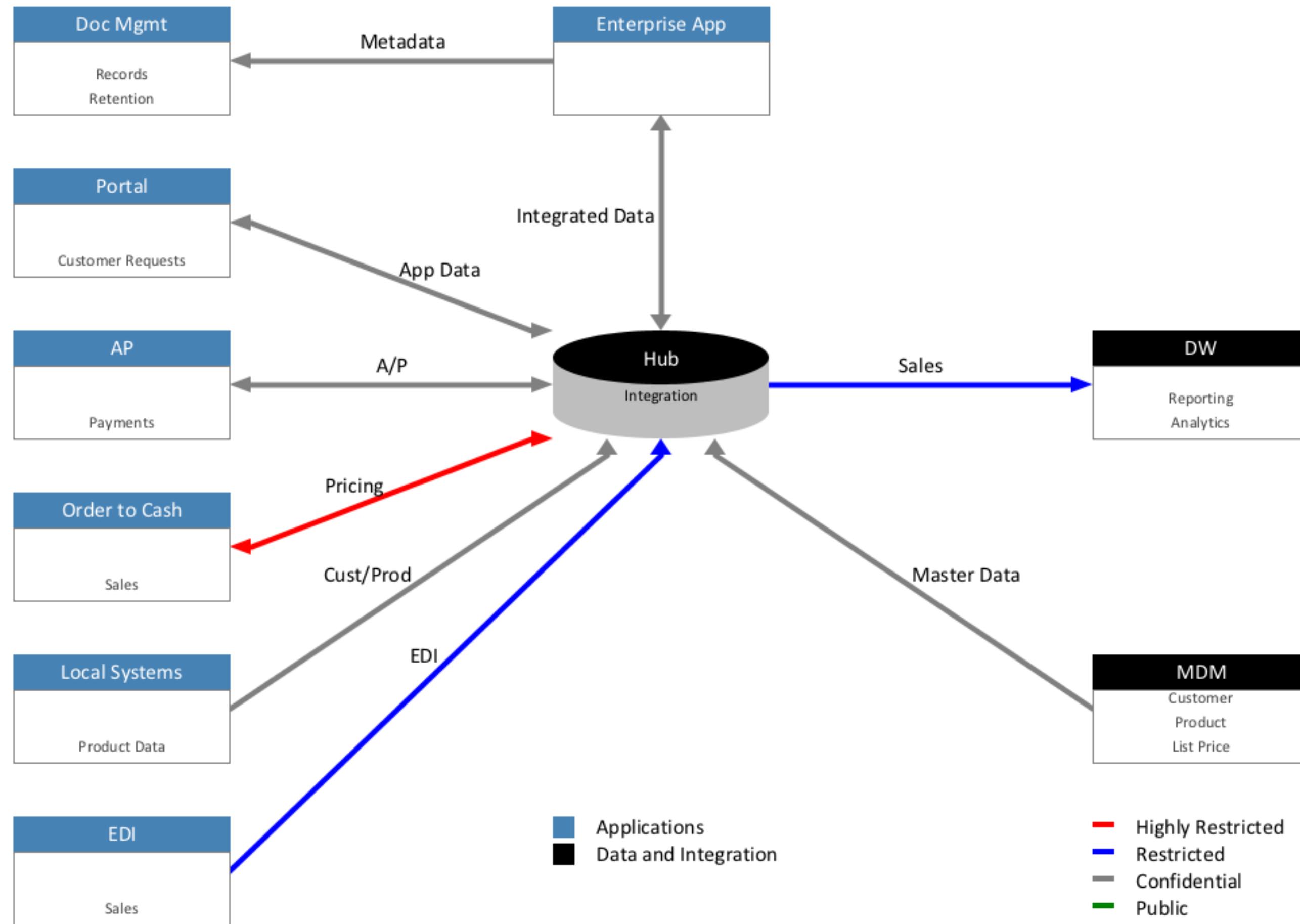
Opera  
0.8%  
Other  
0.4%

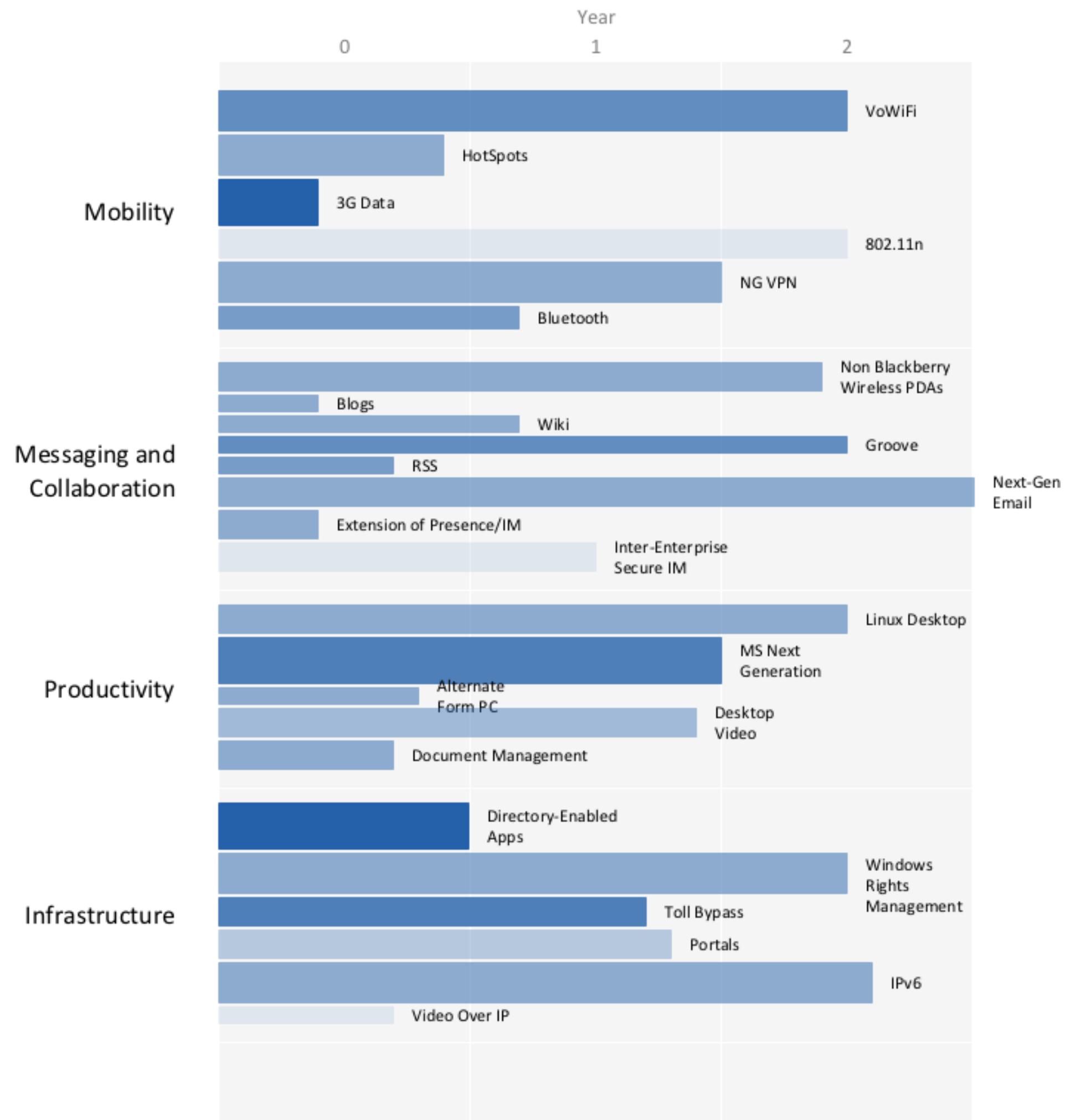
```
pmap -stagger -showtitle -p -t "Browser Market Share" bs.xml
```

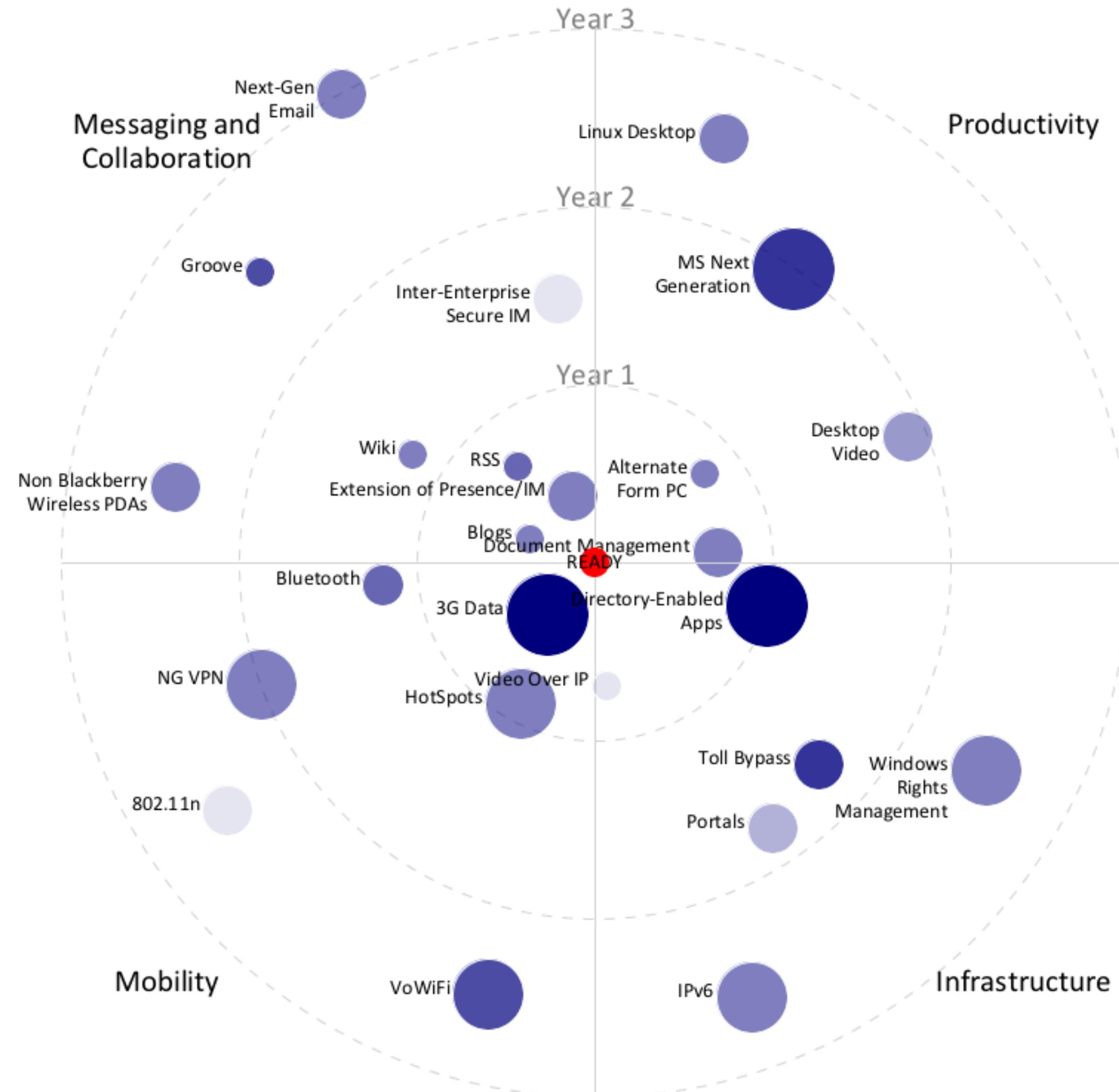
```
<pmap>
  <pdata legend="StatCounter">
    <item value="51.3">Chrome</item>
    <item value="21.3">Internet Explorer</item>
    <item value="18.8">Firefox</item>
    <item value="5.1">Safari</item>
    <item value="2.1">Other</item>
    <item value="1.4">Opera</item>
  </pdata>
  ...
</pmap>
```



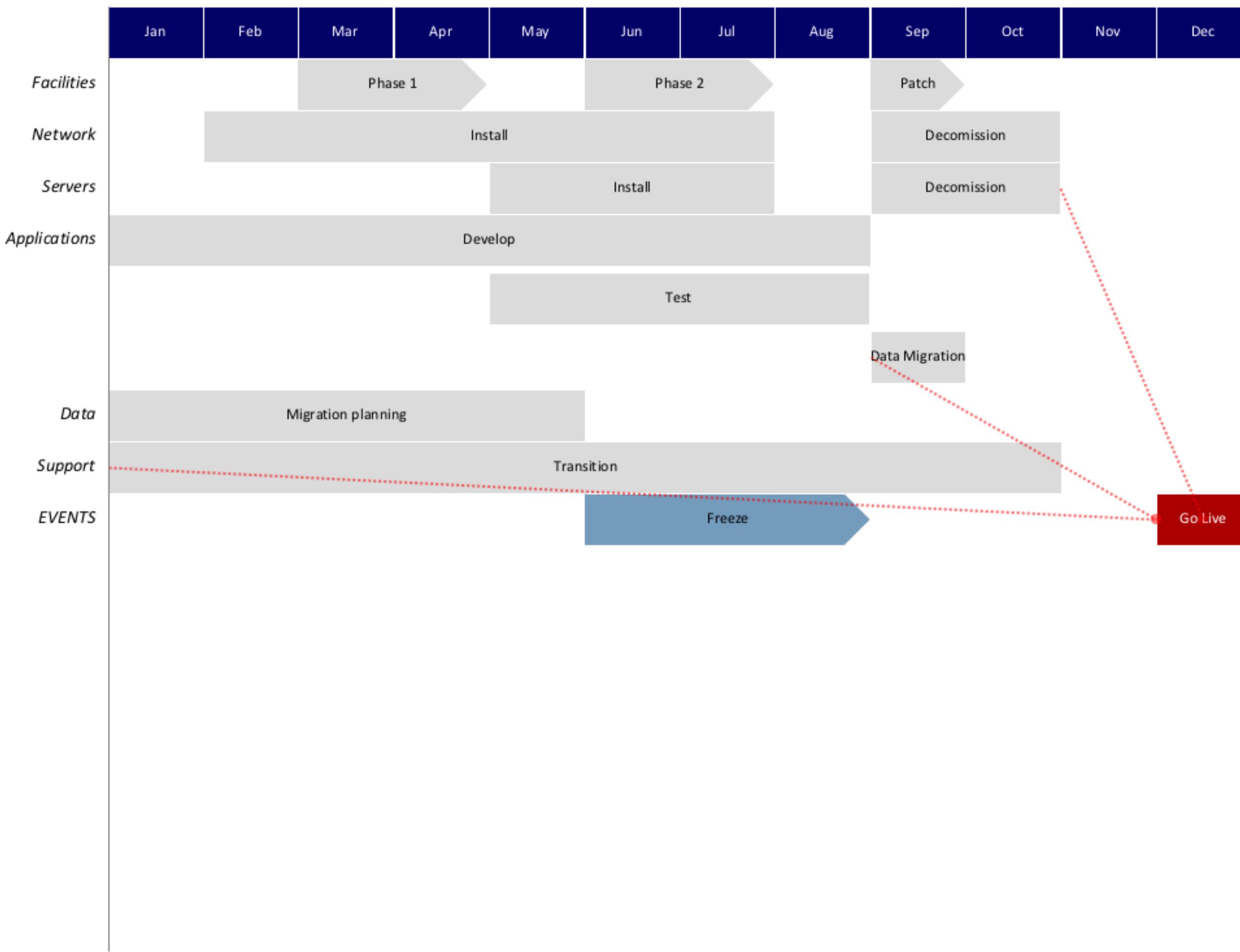
# SVGo Clients







## PLANNING TO PLAN



# Project Timeline

## Meetings

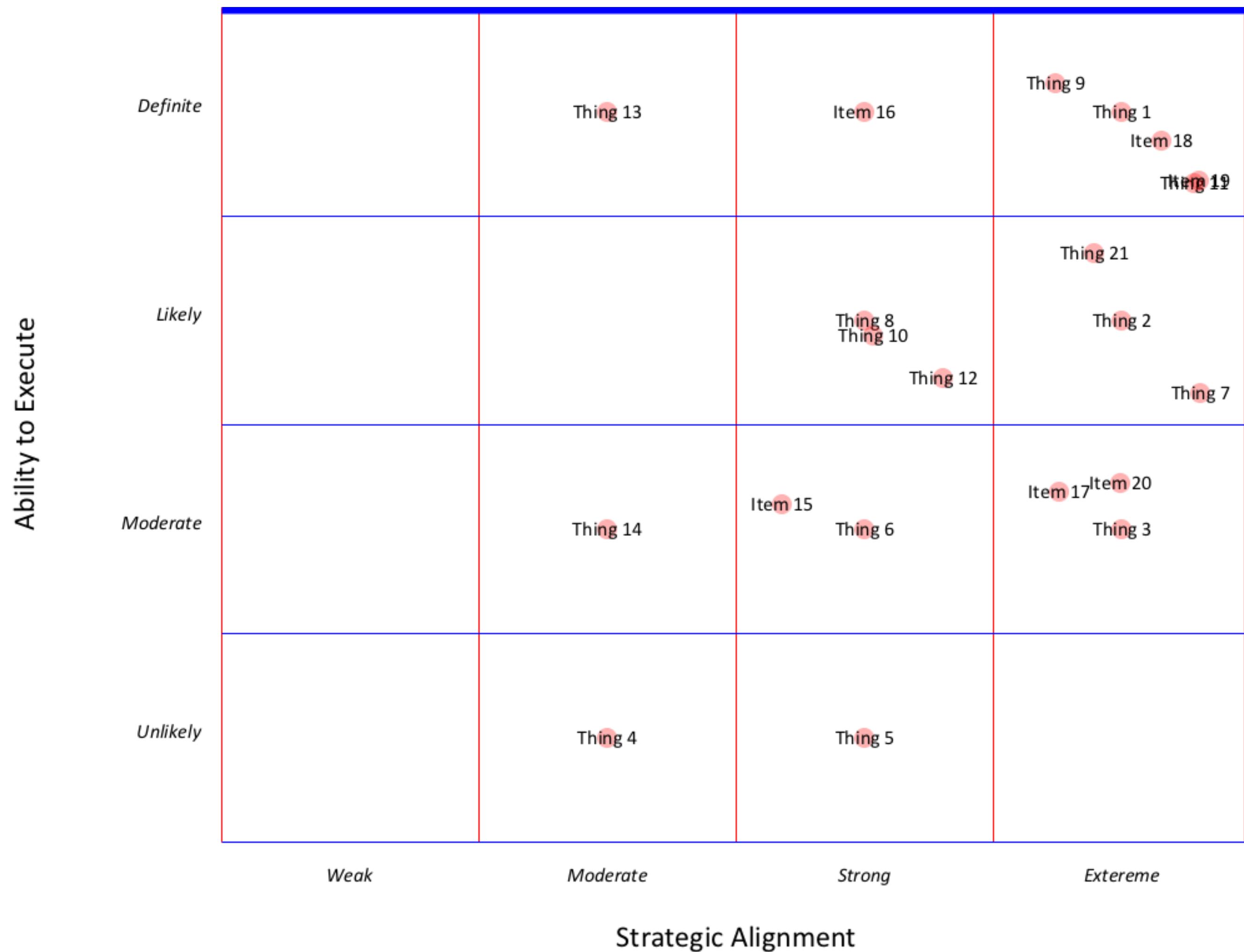


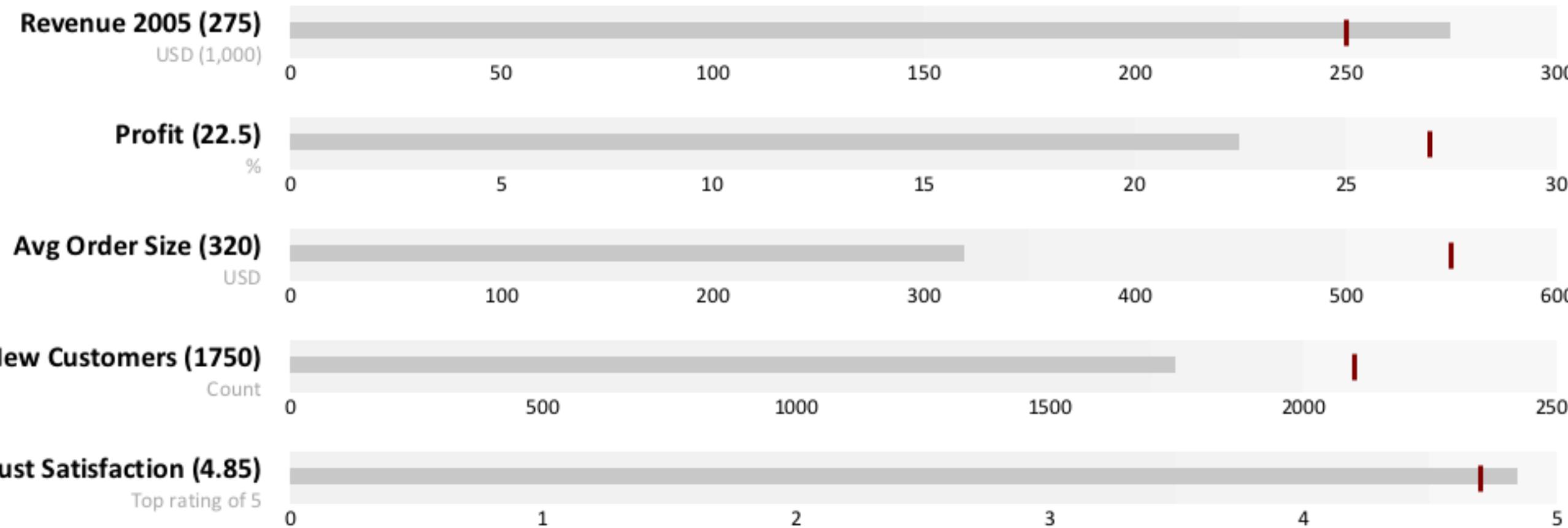
## Process/Policy



## Communication





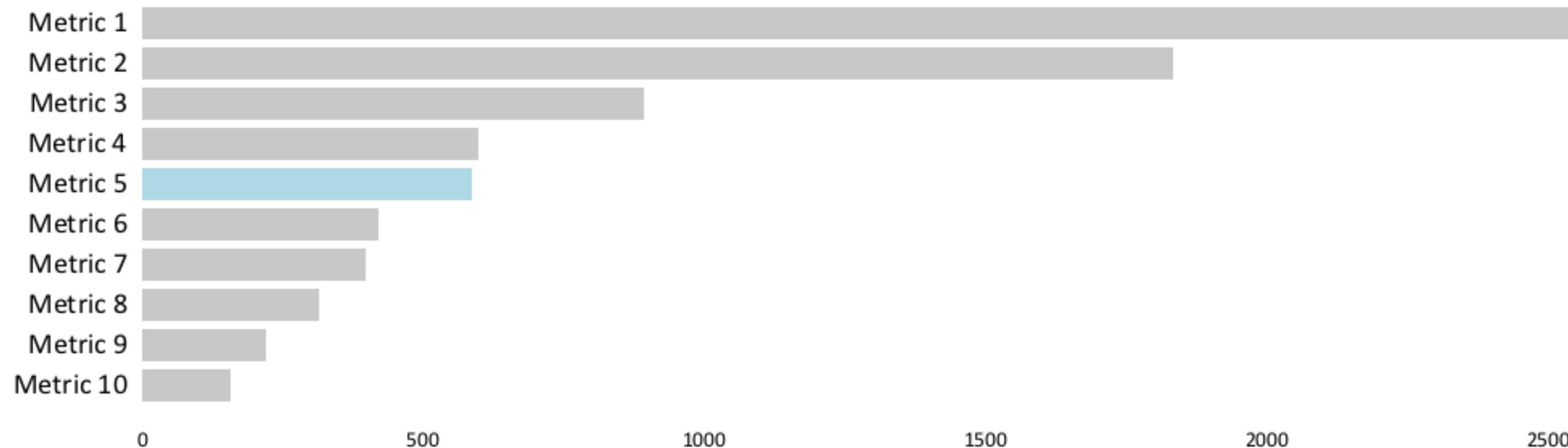


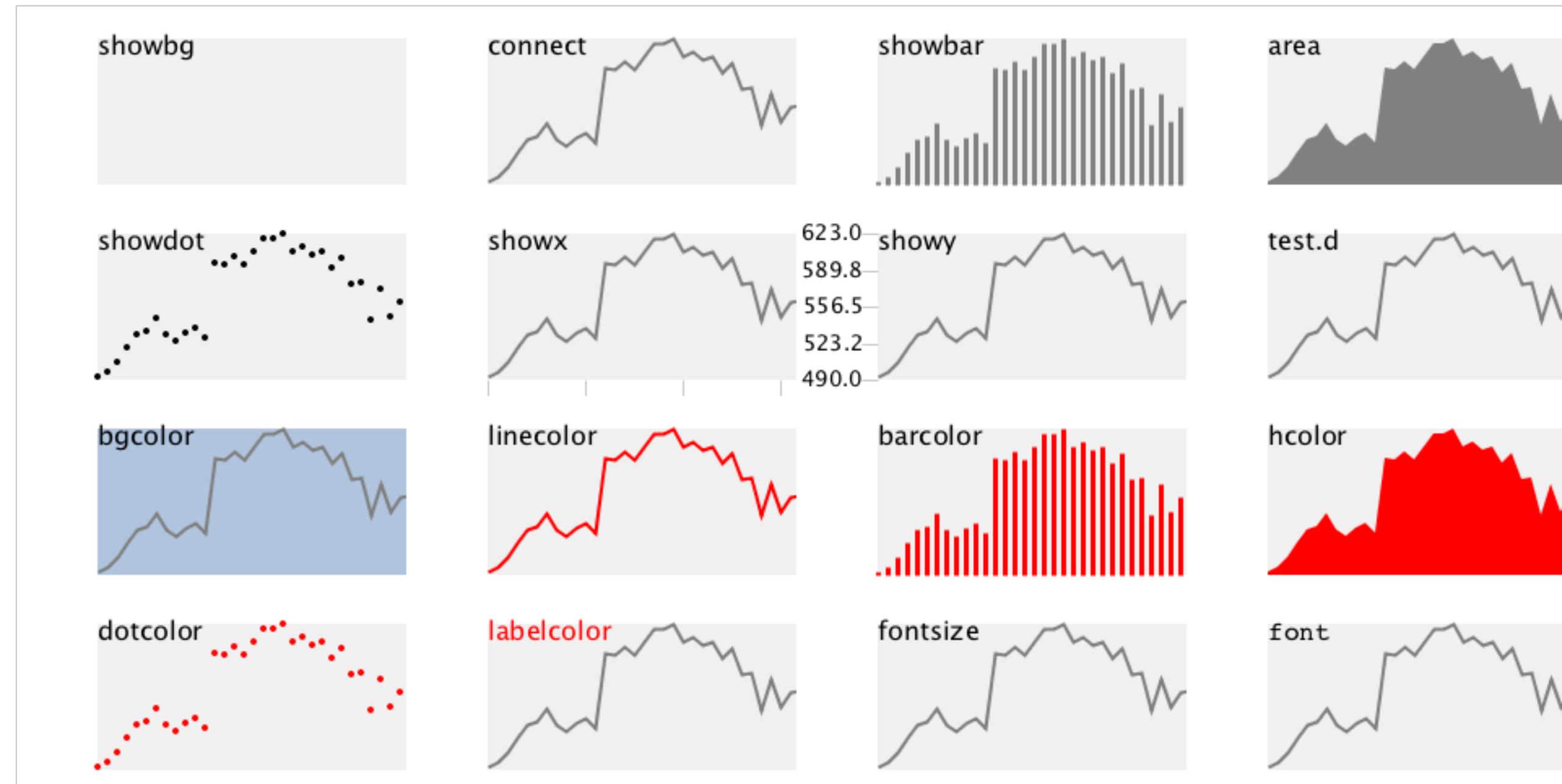
## Sample Bullet Graph

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.

The qualitative ranges are displayed as varying intensities of a single hue to make them discernible by those who are color blind and to restrict the use of colors on the dashboard to a minimum.

## *IS Metrics Usage (Feb-Sep 2011)*





# JONES MONTIEL

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



# ANDERSON DKNG

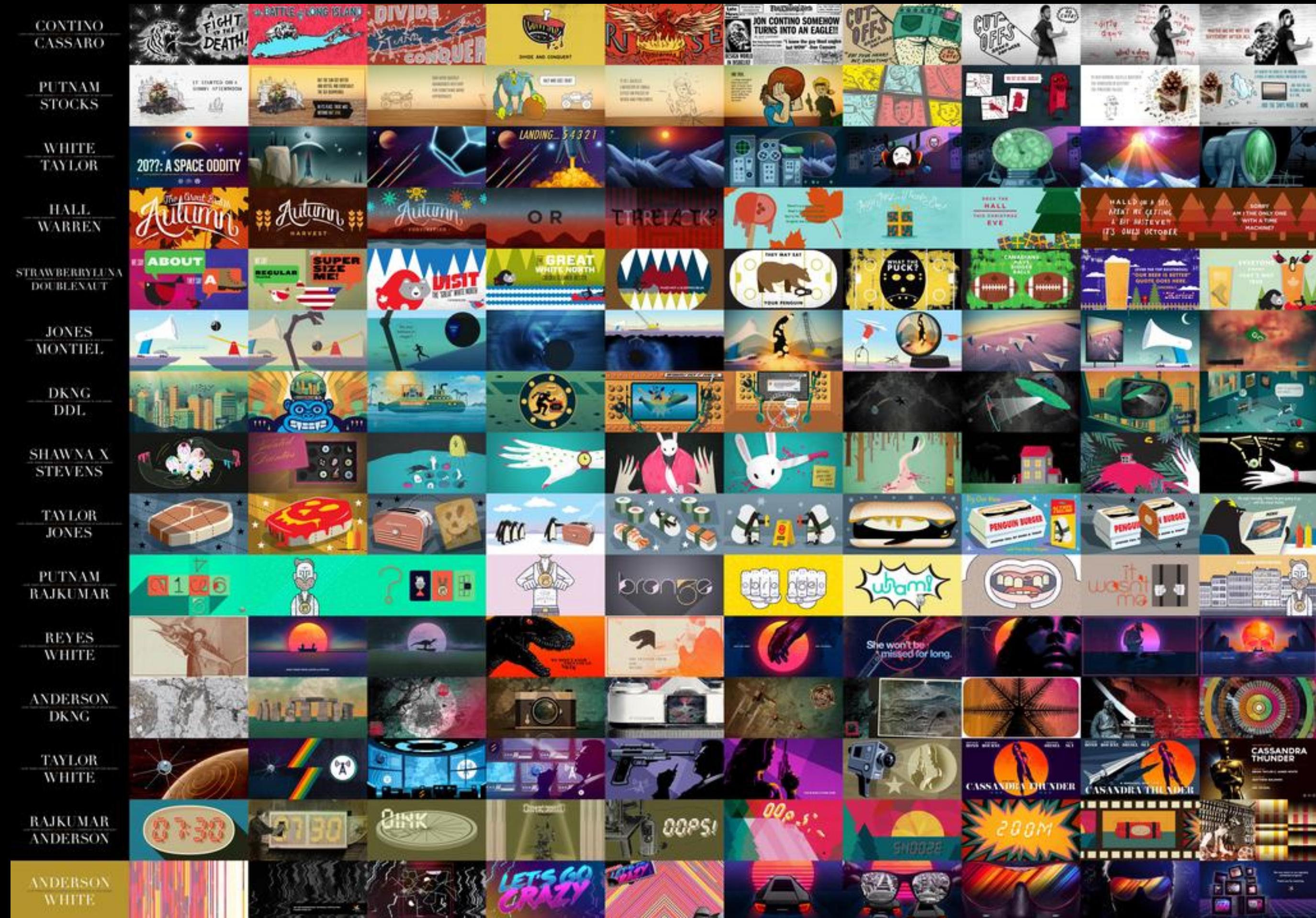
• LAYER TENNIS SEASON 4 PLAYOFF QUARTERFINAL COMMENTARY BY BRYAN BÉDELL •



# DKNG DDL

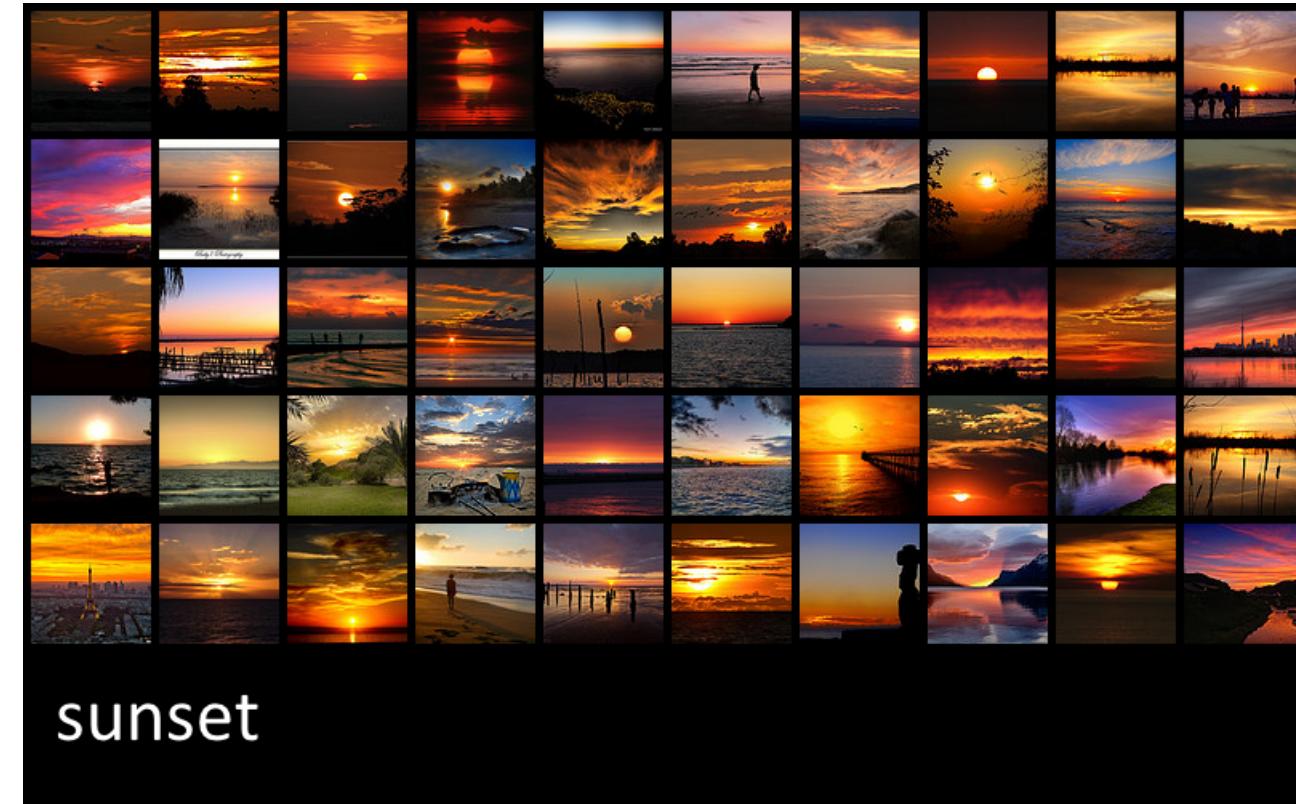
• LAYER TENNIS SEASON 4 WEEK 7 MATCH COMMENTARY BY JOHN GRUBER •





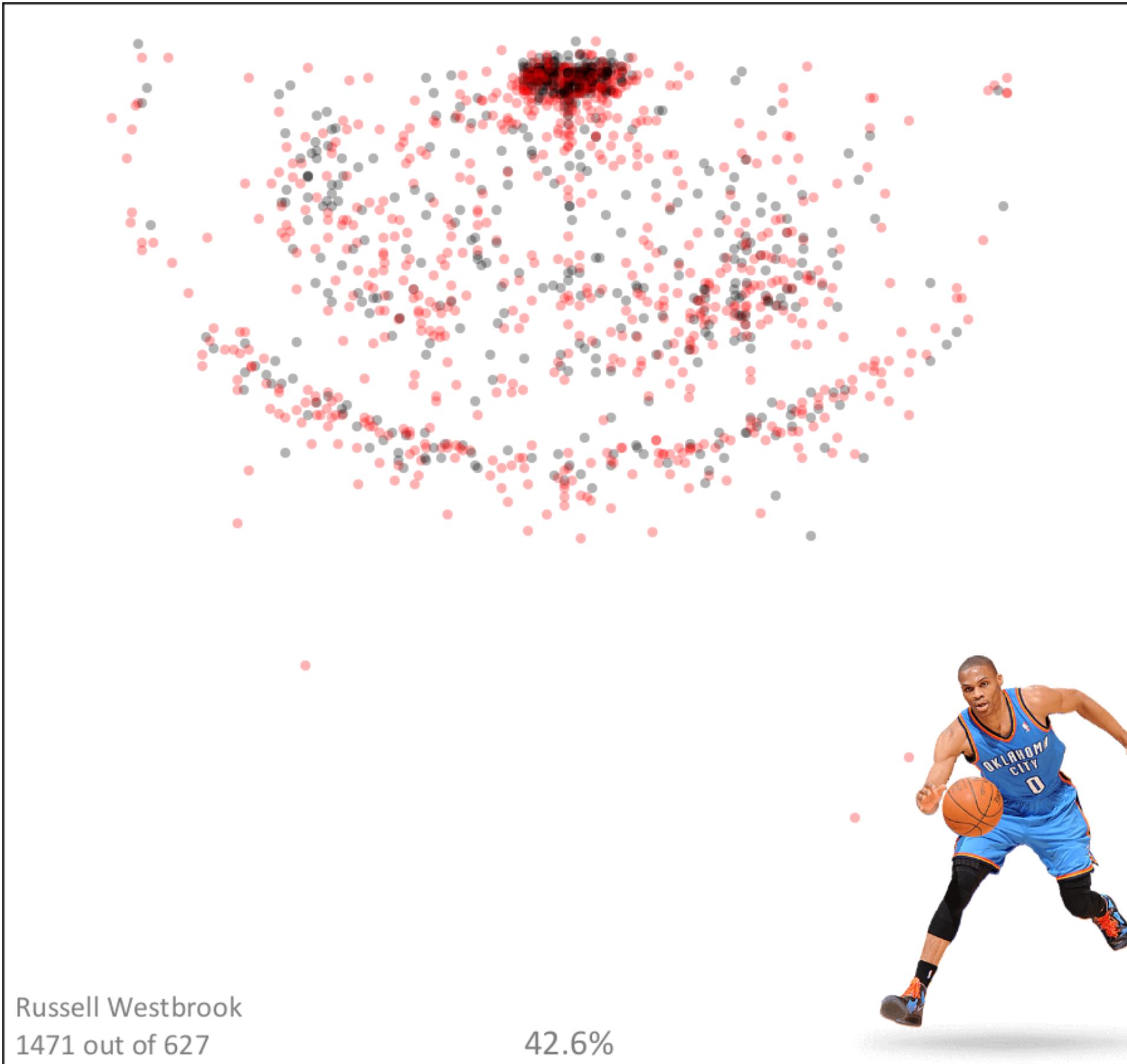
# f50 sunset

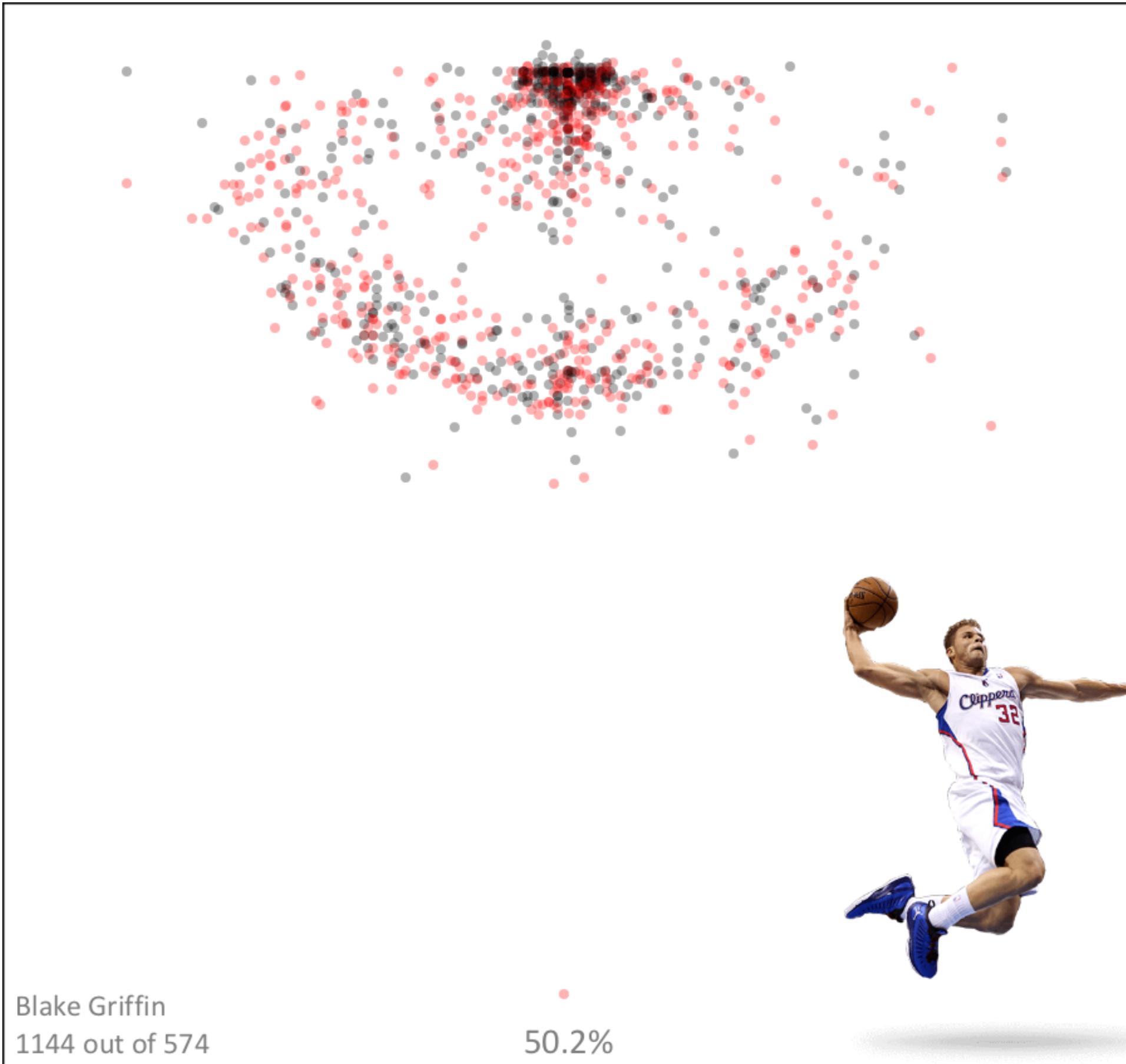
[https://api.flickr.com/services/rest/?method=flickr.photos.search&api\\_key=...&text=sunset&per\\_page=50&sort=interestingness-desc](https://api.flickr.com/services/rest/?method=flickr.photos.search&api_key=...&text=sunset&per_page=50&sort=interestingness-desc)

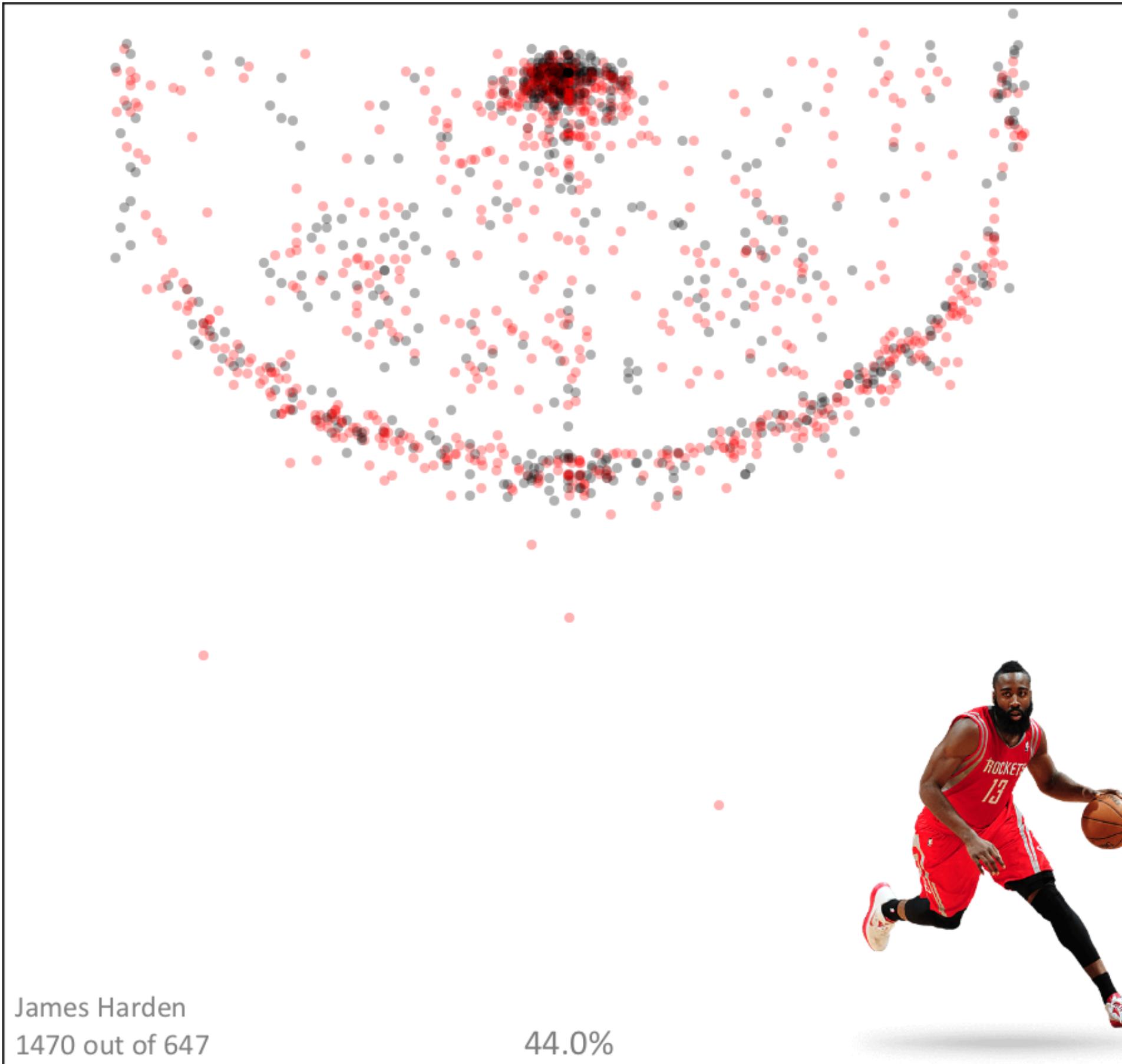


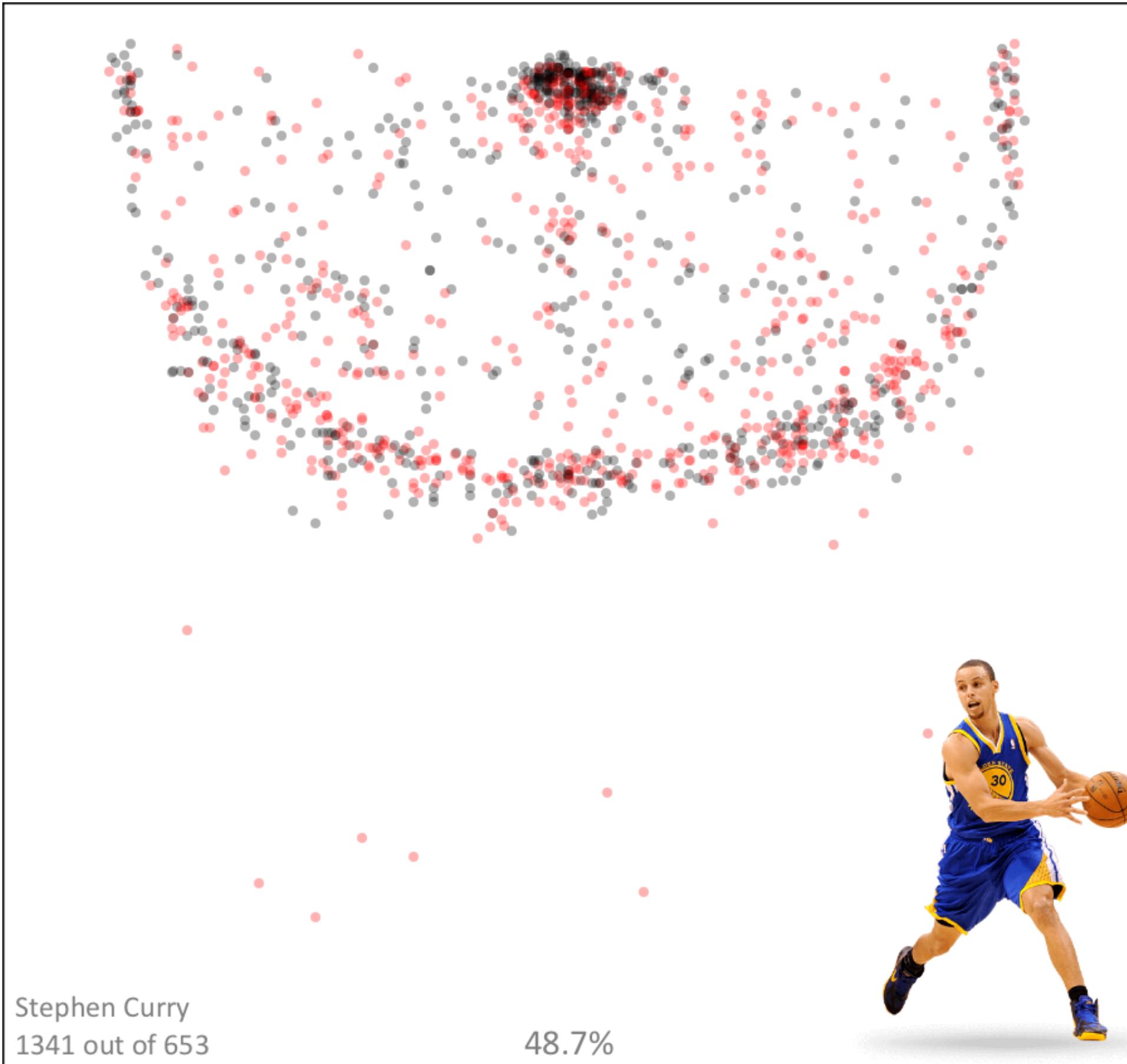
```
<?xml version="1.0" encoding="utf-8" ?>
<rsp stat="ok">
  <photos page="1" pages="105615" perpage="50" total="5280747">
    <photo id="4671838925" ... secret="b070f3363e" server="4068" farm="5" ... />
    <photo id="3590142202" ... secret="c46752e4d8" server="2441" farm="3" .../>
    ...
  </photos>
</rsp>
```

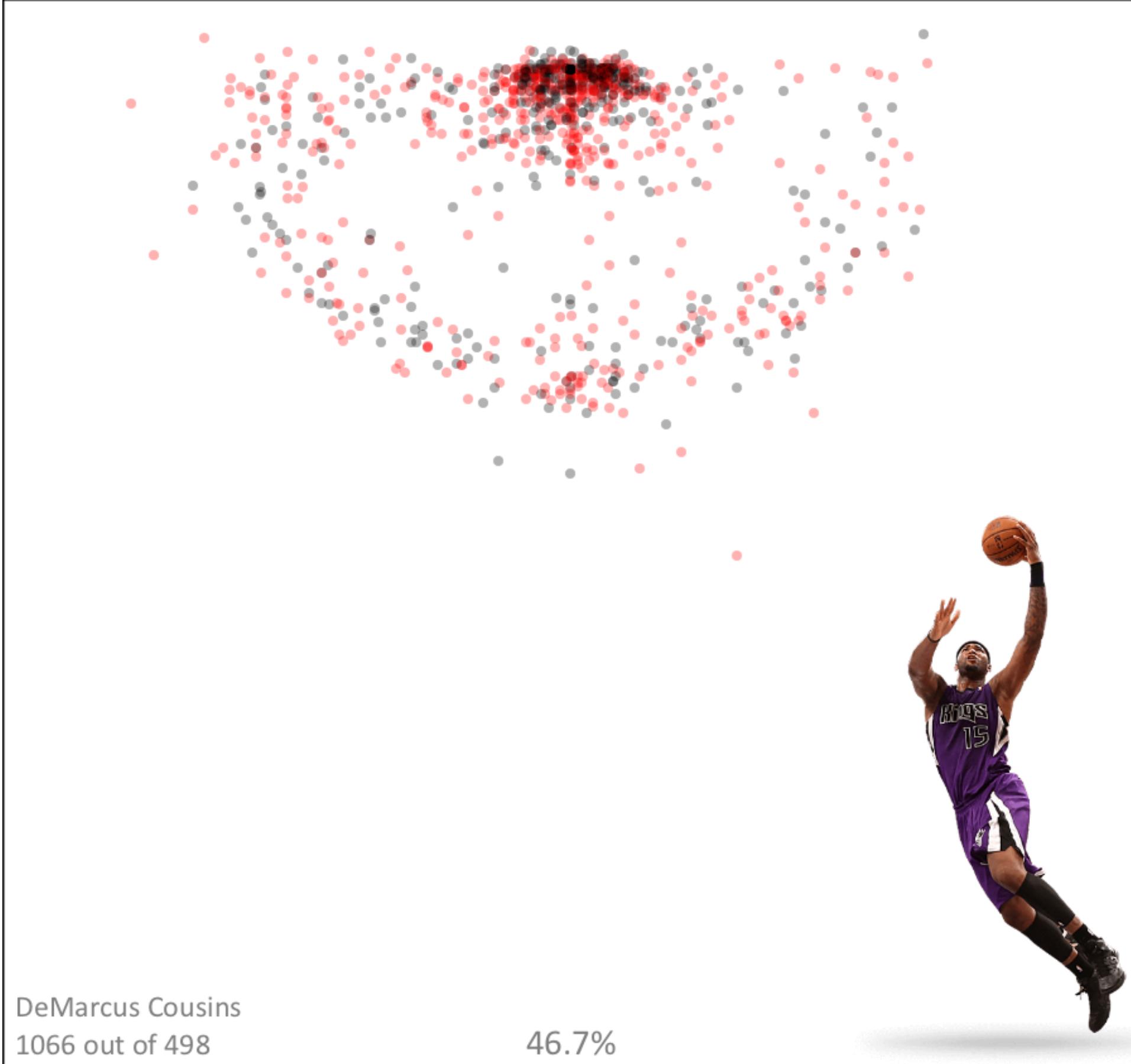
```
for i in $(cat top-ten)
do
    shotchart -net $i > $i.svg
done
```

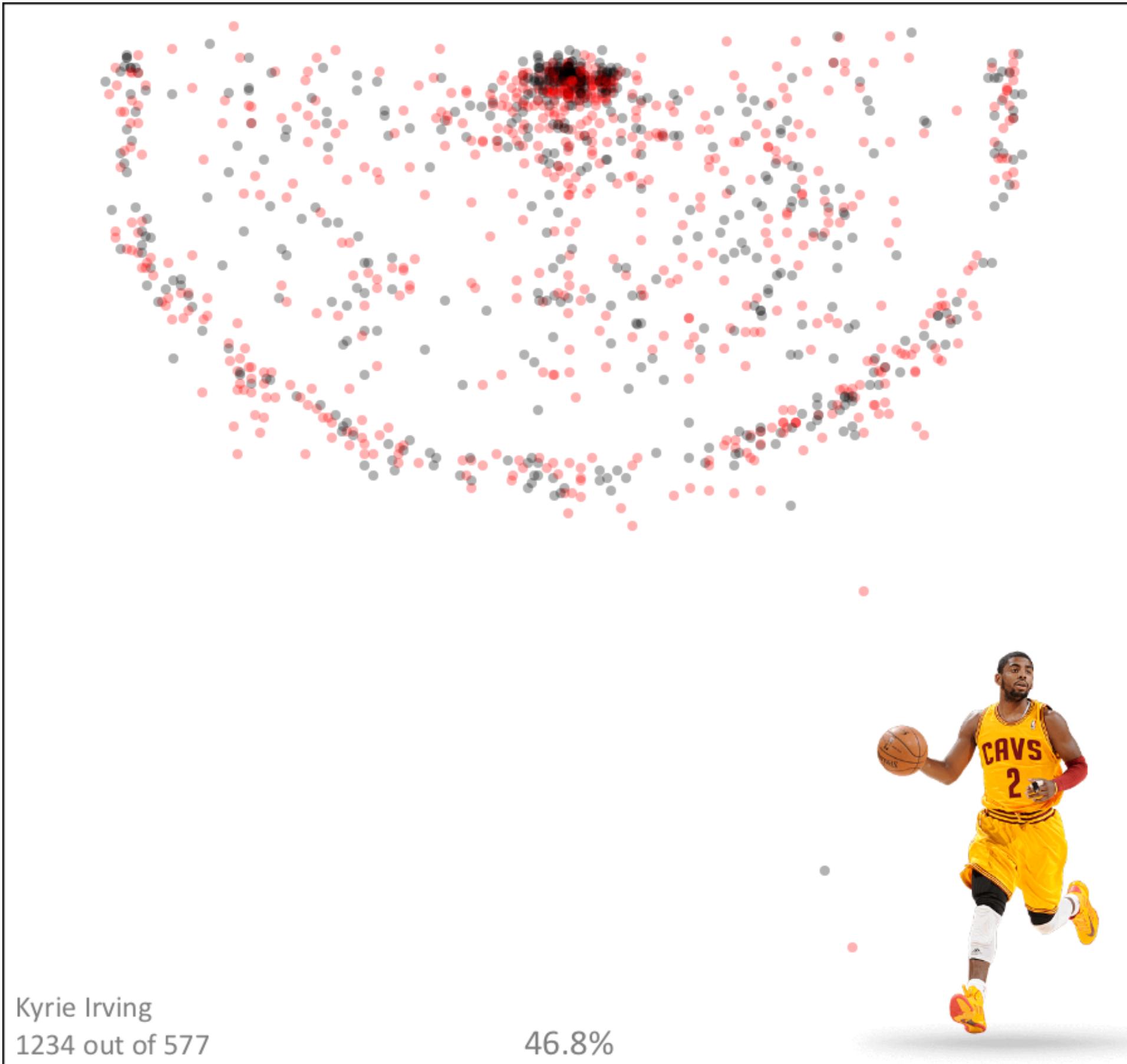


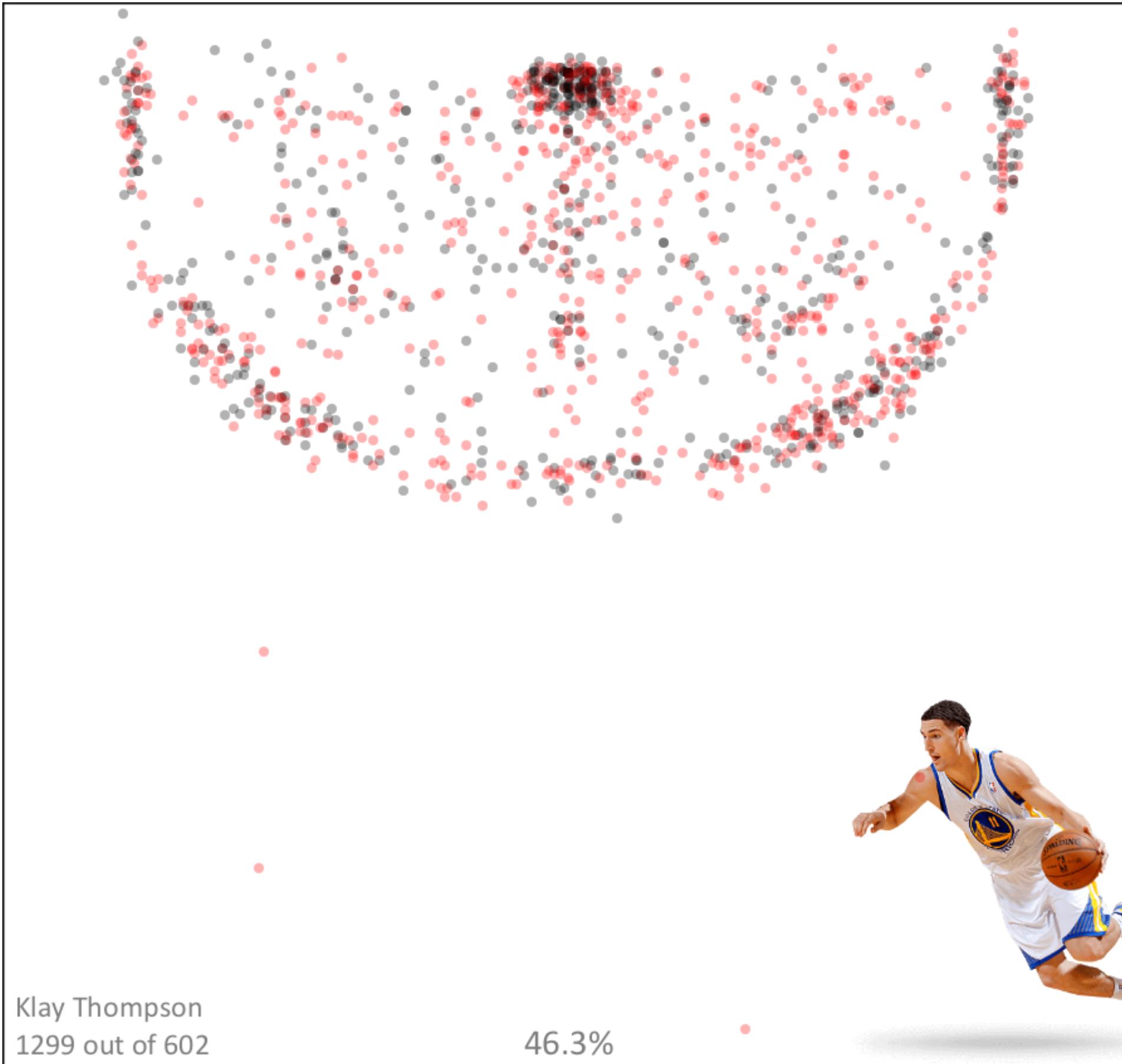


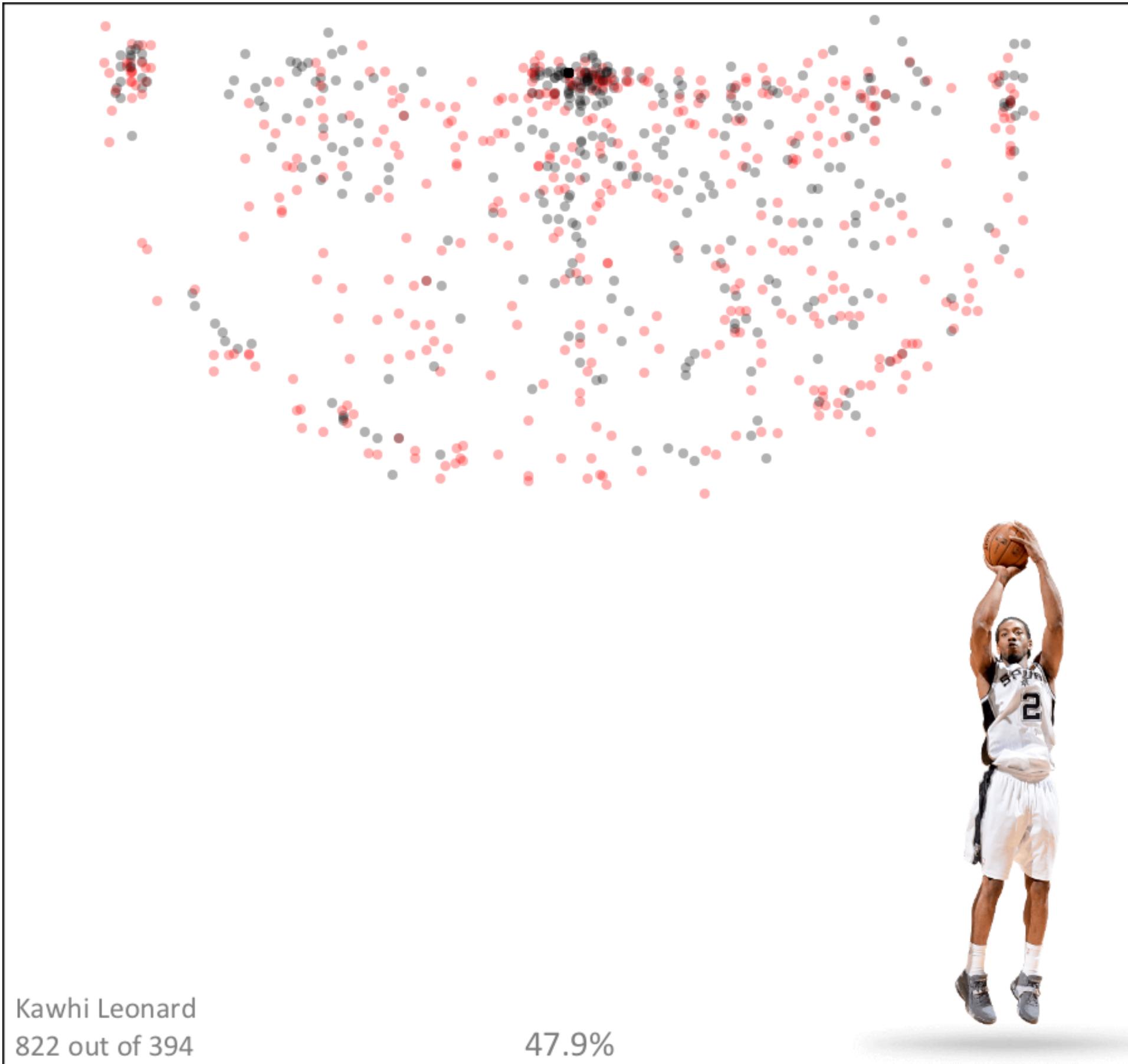


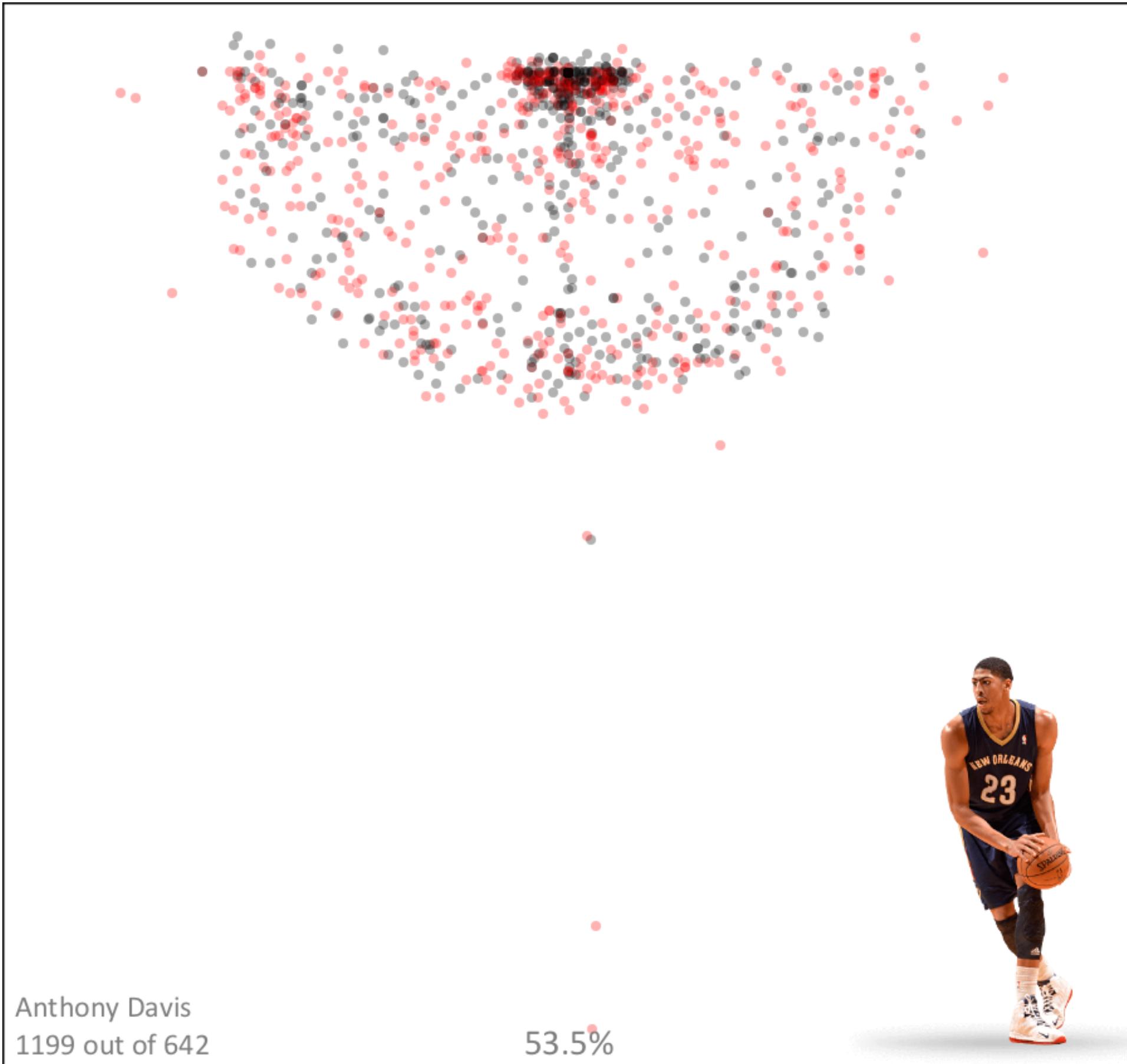


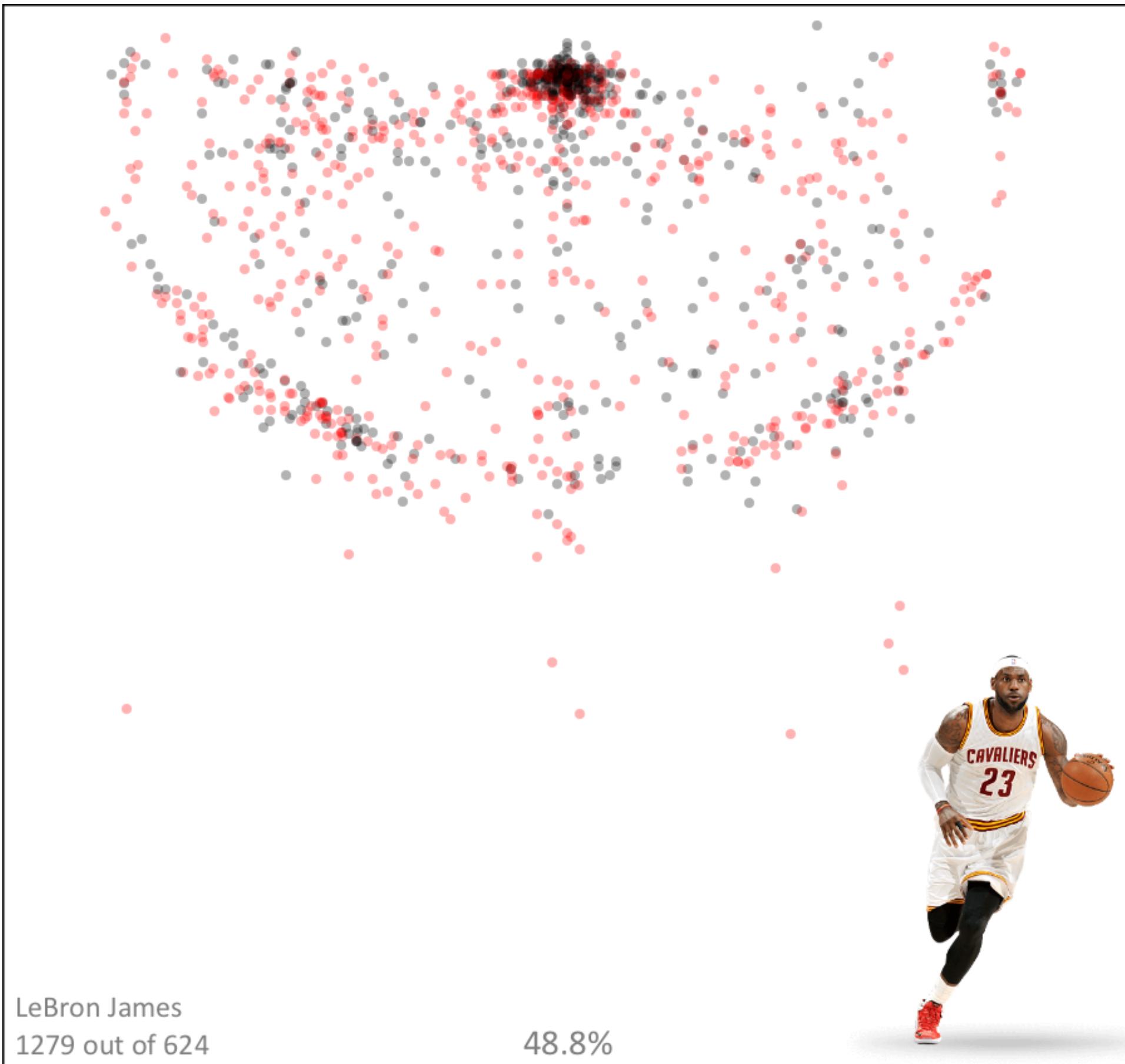


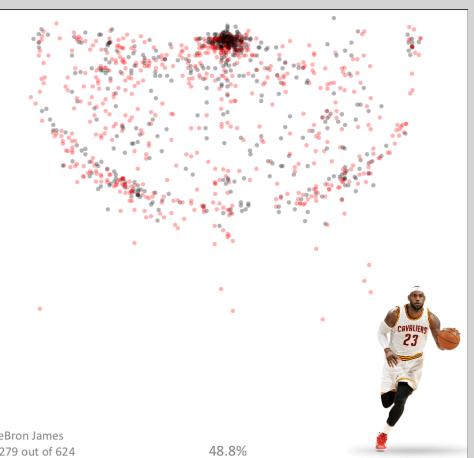
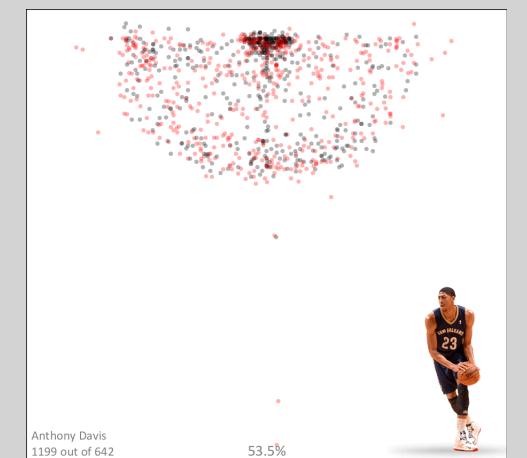
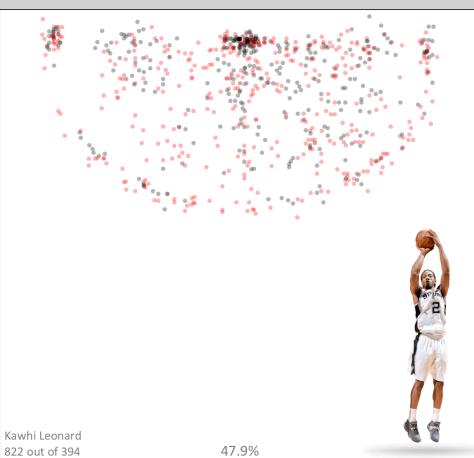
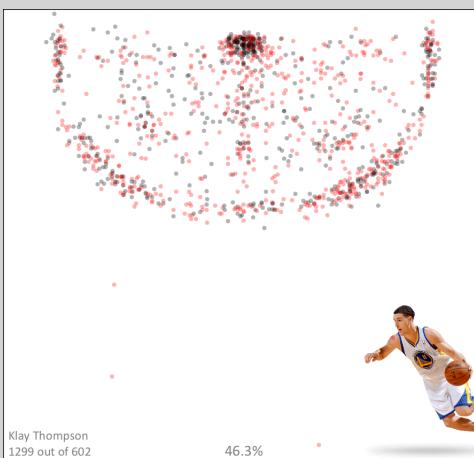
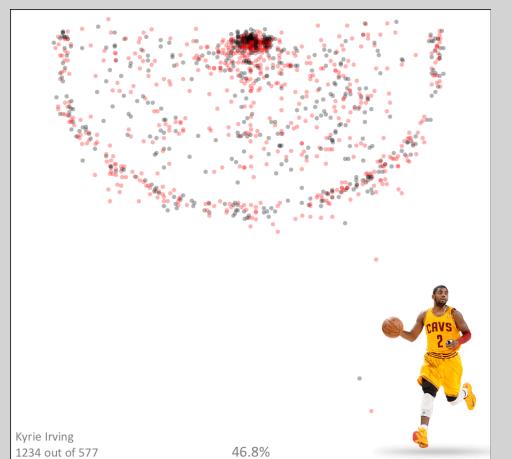
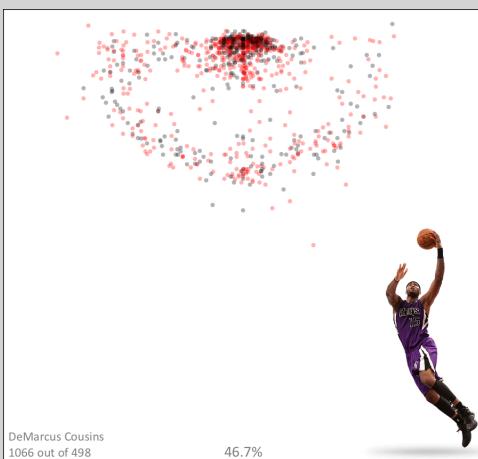
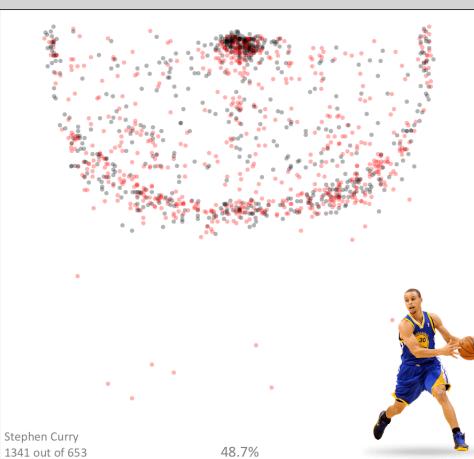
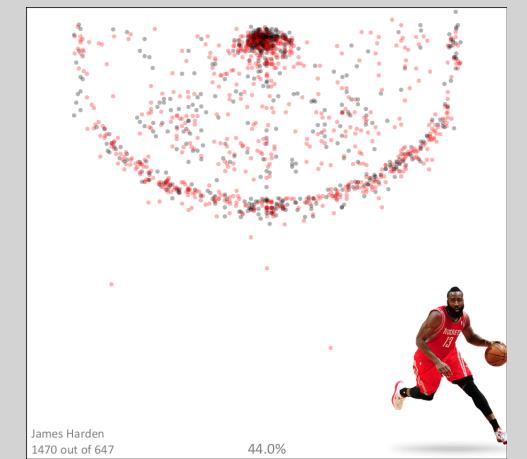
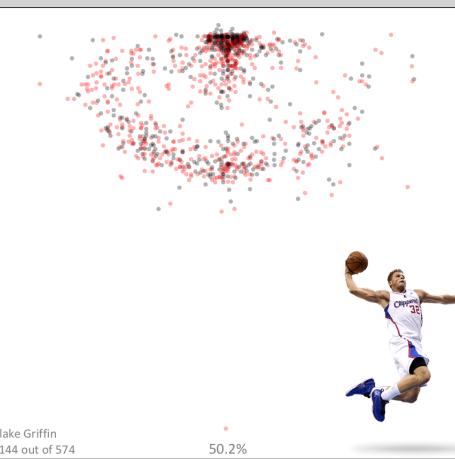
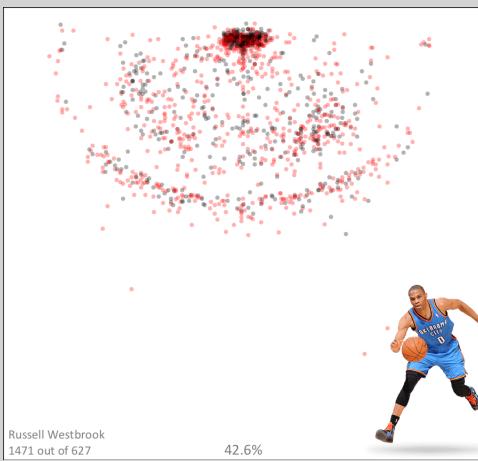


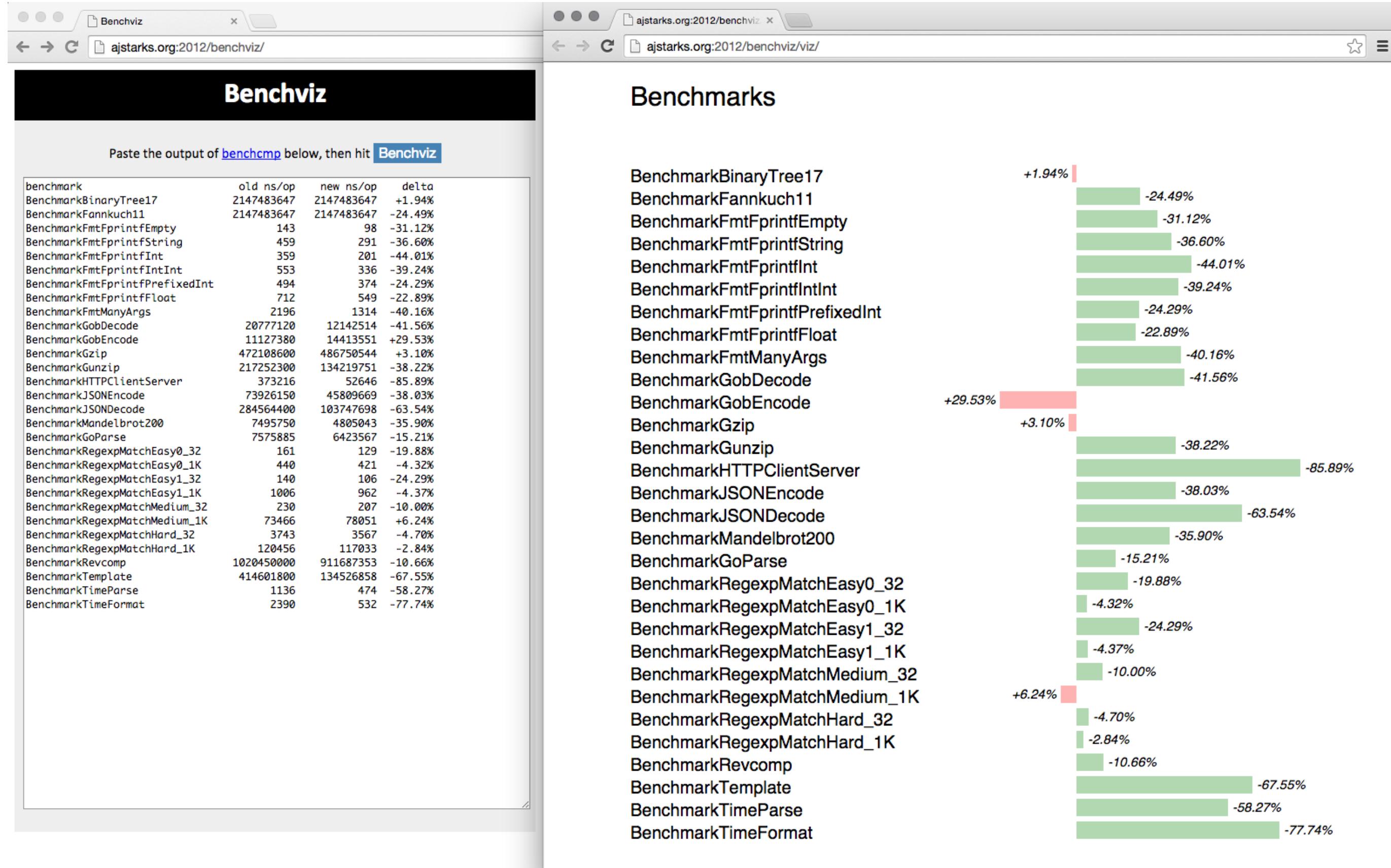












```
package main

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

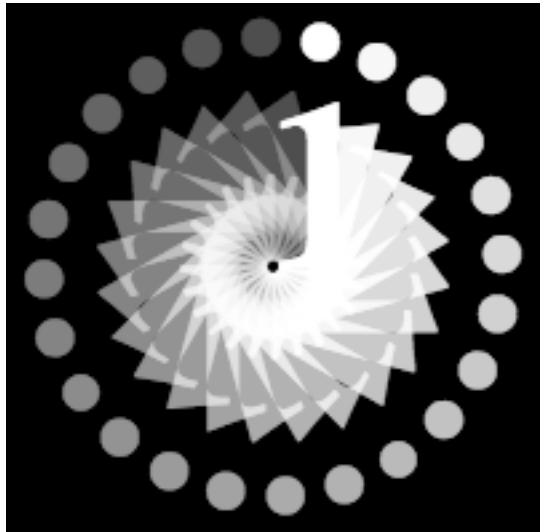
func main() {

    width := 200
    height := 200
    a := 1.0
    ai := 0.03
    ti := 15.0

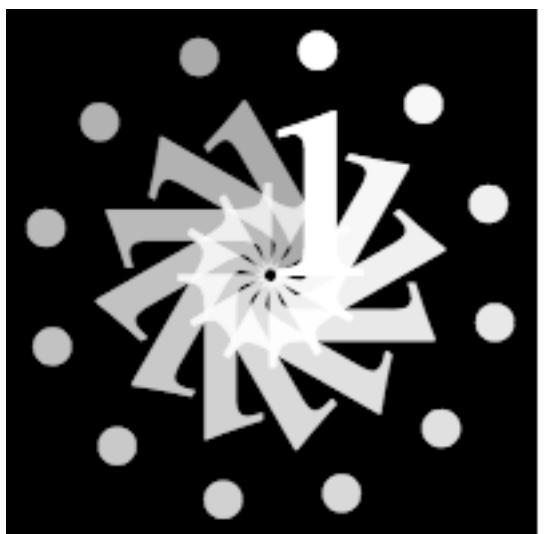
    canvas := svg.New(os.Stdout)
    canvas.Start(width, height)
    canvas.Rect(0, 0, width, height)
    canvas.Gstyle("font-family:serif;font-size:100pt")

    for t := 0.0; t <= 360.0; t += ti {
        canvas.TranslateRotate(width/2, height/2, t)
        canvas.Text(0, 0, "i", canvas.RGBA(255, 255, 255, a))
        canvas.Gend()
        a -= ai
    }
    canvas.Gend()
    canvas.End()
}
```

ti = 15

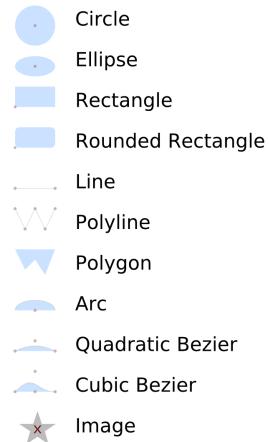


ti = 30

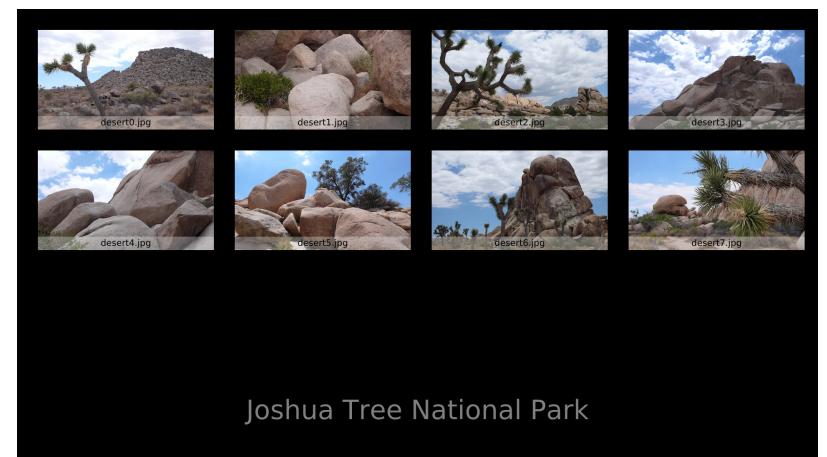
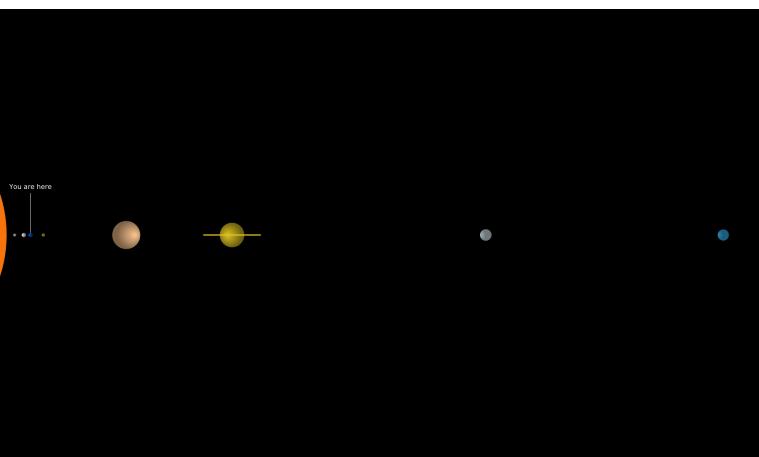
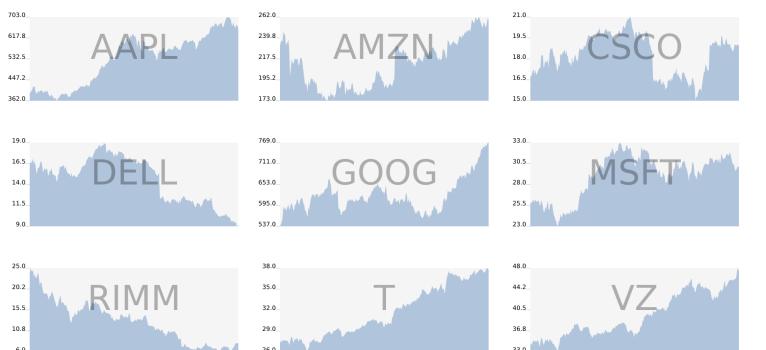
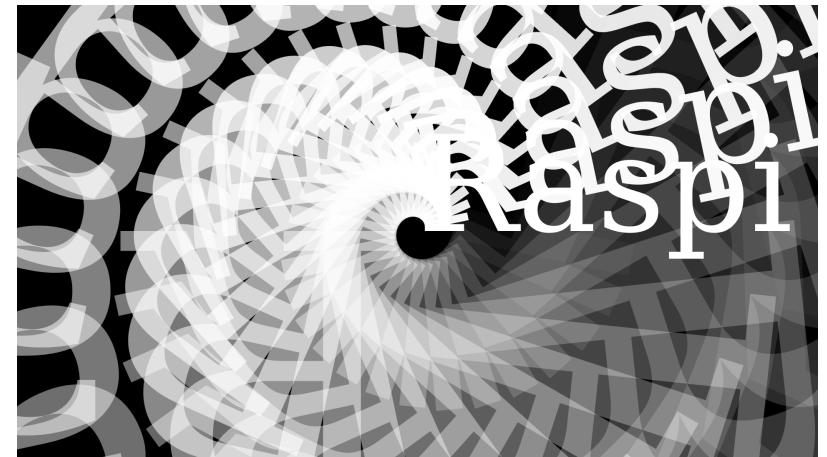
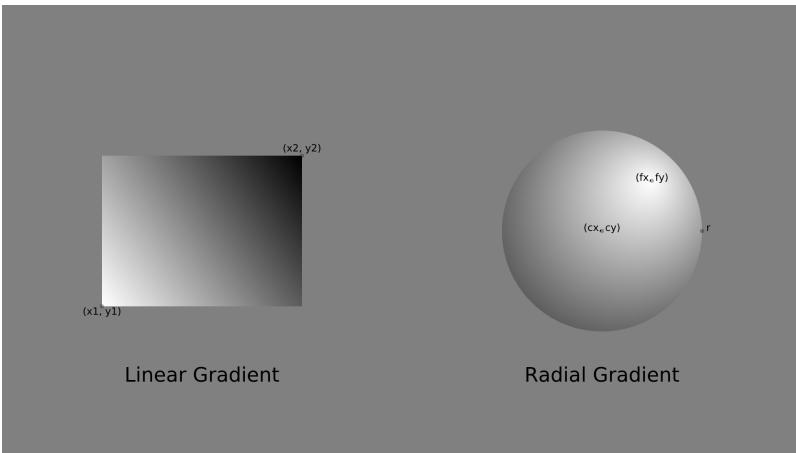


ti = 45





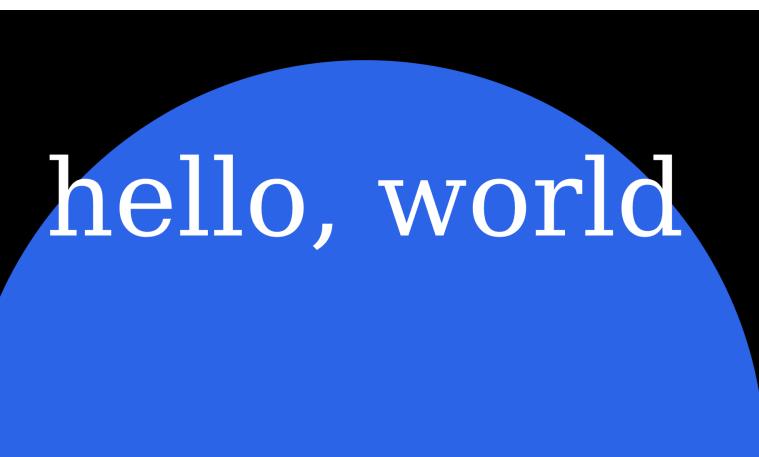
## OpenVG on the Raspberry Pi



## Why I use Go



Anthony Starks  
@ajstarks  
ajstarks@gmail.com



# openvg

```
package main
import "fmt"

func main() {
    fmt.Println("hello, world")
}
```

This is the traditional hello, world program.  
It's six lines long, and imports the fmt package,  
leading some to be surprised at the size of the resulting binary.

```
package main

import (
    "bufio"
    "github.com/ajstarks/openvg"
    "os"
)

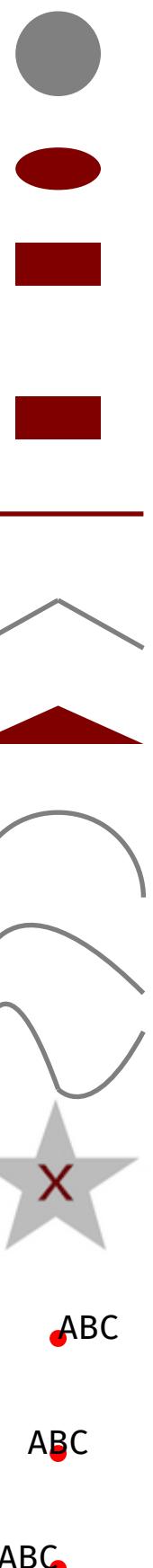
func main() {
    width, height := openvg.Init()

    w2 := openvg.VGfloat(width / 2)
    h2 := openvg.VGfloat(height / 2)
    w := openvg.VGfloat(width)

    openvg.Start(width, height)                      // Start the picture
    openvg.BackgroundColor("black")                   // Black background
    openvg.FillRGB(44, 100, 232, 1)                 // Big blue marble
    openvg.Circle(w2, 0, w)                         // The "world"
    openvg.FillColor("white")                       // White text
    openvg.TextMid(w2, h2, "hello, world", "serif", width/10) // Greetings
    openvg.End()                                    // End the picture
    bufio.NewReader(os.Stdin).ReadBytes('\n') // Pause until [RETURN]
    openvg.Finish()                                // Graphics cleanup
}
```



# Openvg Functions



Circle	(x, y, r VGfloat)
Ellipse	(x, y, w, h VGfloat)
Rect	(x, y, w, h VGfloat)
Roundrect	(x, y, w, h, rw, rh VGfloat)
Line	(x1, y1, x2, y2 VGfloat)
Polyline	(x, y [])VGfloat)
Polygon	(x, y [])VGfloat)
Arc	(x, y, w, h, sa, aext VGfloat)
Qbezier	(sx, sy, cx, cy, ex, ey VGfloat)
Cbezier	(sx, sy, cx, cy, px, py, ex, ey VGfloat)
Image	(x, y VGfloat, w, h int, s string)
Text	(x, y VGfloat, s string, font string, size int)
TextMid	(x, y VGfloat, s string, font string, size int)
TextEnd	(x, y VGfloat, s string, font string, size int)

# Deck



a Go package for presentations

Start the deck

```
<deck>
```

Set the canvas size

```
<canvas width="1024" height="768" />
```

Begin a slide

```
<slide bg="white" fg="black">
```

Place an image

```
<image xp="70" yp="60" width="256" height="179" name="work.png" caption="Desk"/>
```

Draw some text

```
<text xp="20" yp="80" sp="3" link="http://goo.gl/Wm05Ex">Deck elements</text>
```

Make a bullet list

```
<list xp="20" yp="70" sp="2" type="bullet">
```

```
  <li>text, list, image</li>
```

```
  <li>line, rect, ellipse</li>
```

```
  <li>arc, curve, polygon</li>
```

```
</list>
```

End the list

Draw a line

```
<line xp1="20" yp1="10" xp2="30" yp2="10"/>
```

Draw a rectangle

```
<rect xp="35" yp="10" wp="4" hr="75" color="rgb(127,0,0)"/>
```

Draw an ellipse

```
<ellipse xp="45" yp="10" wp="4" hr="75" color="rgb(0,127,0)"/>
```

Draw an arc

```
<arc xp="55" yp="10" wp="4" hp="3" a1="0" a2="180" color="rgb(0,0,127)"/>
```

Draw a quadratic bezier

```
<curve xp1="60" yp1="10" xp2="75" yp2="20" xp3="70" yp3="10" />
```

Draw a polygon

```
<polygon xc=75 75 80" yc="8 12 10" color="rgb(0,0,127)"/>
```

End the slide

```
</slide>
```

End of the deck

```
</deck>
```

# Anatomy of a Deck

# Deck elements

- text, list, image
- line, rect, ellipse
- arc, curve, polygon



Desk



**Percent Grid**

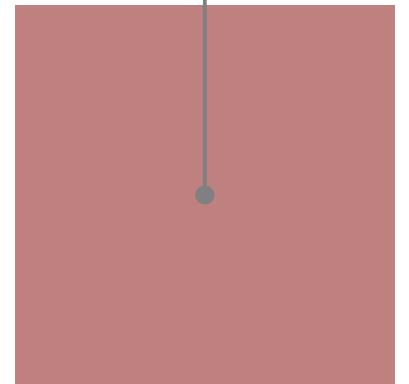
10%, 50%

Hello

50%, 50%



90%, 50%

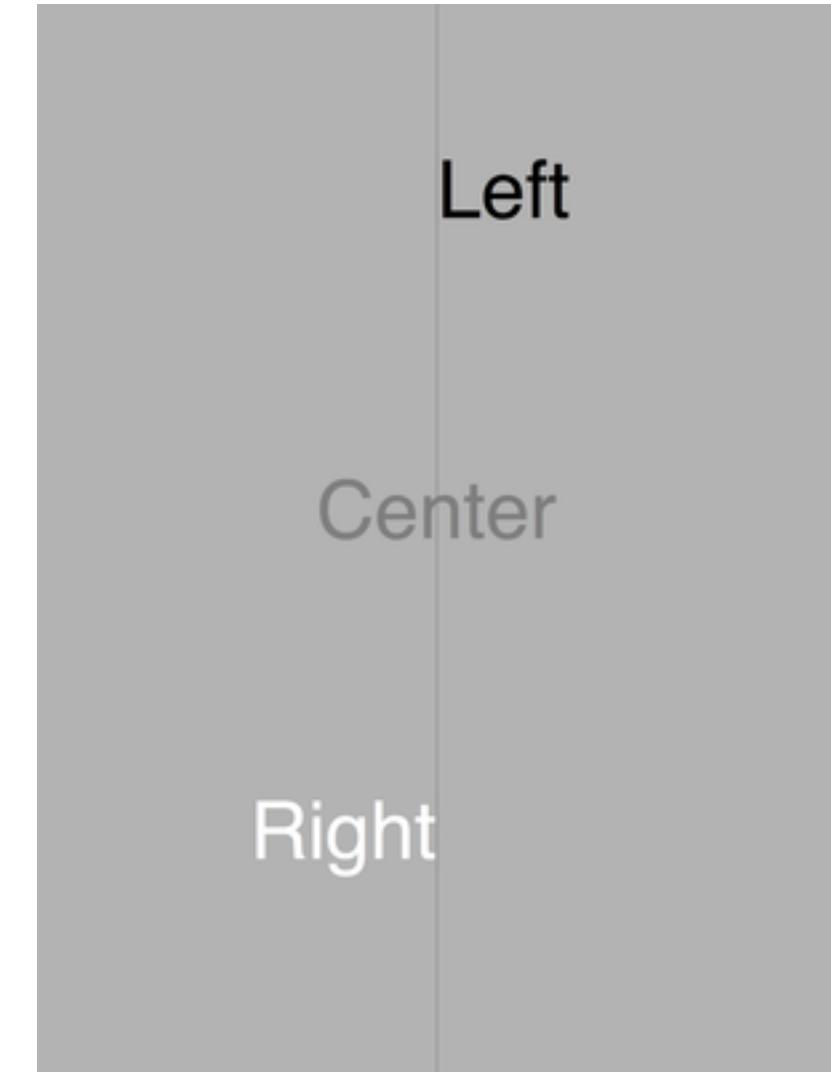


Percentage-based layout

# Scaling the canvas

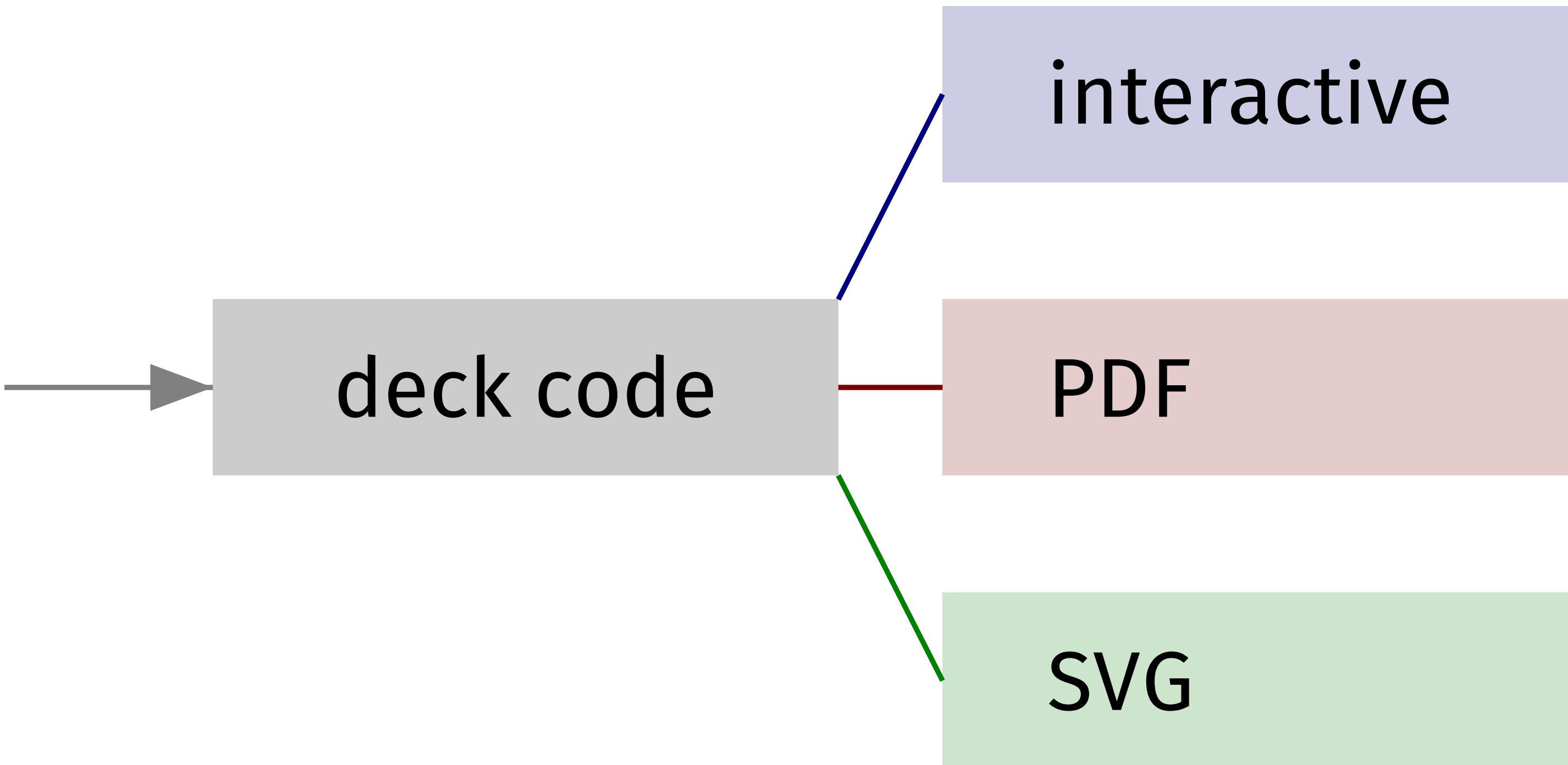


Landscape



Portrait

Process



**NewSlides** (where io.Writer, w, h int)

**StartDeck() / EndDeck()**

**StartSlide** (colors ...string) **EndSlide()**

**Arc** (x, y, w, h, size, a1, a2 float64, color string, opacity ...float64)

**Circle** (x, y, w float64, color string, opacity ...float64)

**Code** (x, y float64, s string, size, margin float64, color string, opacity ...float64)

**Curve** (x1, y1, x2, y2, x3, y3, size float64, color string, opacity ...float64)

**Ellipse** (x, y, w, h float64, color string, opacity ...float64)

**Image** (x, y float64, w, h int, name string)

**Line** (x1, y1, x2, y2, size float64, color string, opacity ...float64)

**List** (x, y, size float64, items []string, ltype, font, color string)

**Polygon** (x, y []float64, color string, opacity ...float64)

**Rect** (x, y, w, h float64, color string, opacity ...float64)

**Square** (x, y, w float64, color string, opacity ...float64)

**Text** (x, y float64, s, font string, size float64, color string, opacity ...float64)

**TextBlock** (x, y float64, s, font string, size, margin float64, color string, opacity ...float64)

**TextEnd** (x, y float64, s, font string, size float64, color string, opacity ...float64)

**TextMid** (x, y float64, s, font string, size float64, color string, opacity ...float64)

```

package main

import (
    "github.com/ajstarks/deck/generate"
    "os"
)

func main() {
    deck := generate.NewSlides(os.Stdout, 1600, 900) // 16x9 deck to standard output
    deck.StartDeck()                                // start the deck

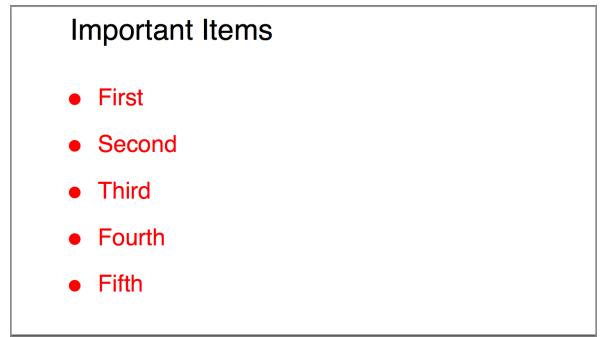
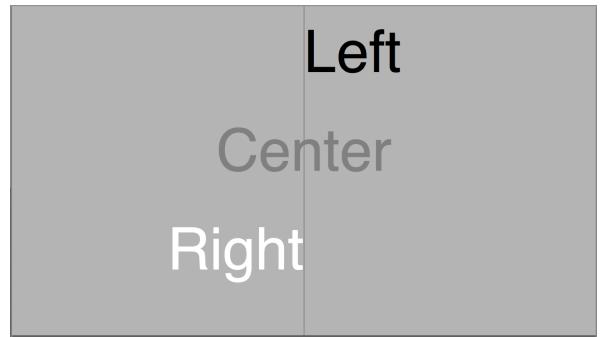
    // Text alignment
    deck.StartSlide("rgb(180,180,180)")
    deck.Text(50, 80, "Left", "sans", 10, "black")
    deck.TextMid(50, 50, "Center", "sans", 10, "gray")
    deck.TextEnd(50, 20, "Right", "sans", 10, "white")
    deck.Line(50, 100, 50, 0, 0.2, "black", 20)
    deck.EndSlide()

    // List
    items := []string{"First", "Second",
                      "Third", "Fourth", "Fifth"}
    deck.StartSlide()
    deck.Text(10, 90, "Important Items", "sans", 5, "")
    deck.List(10, 70, 4, items, "bullet", "sans", "red")
    deck.EndSlide()

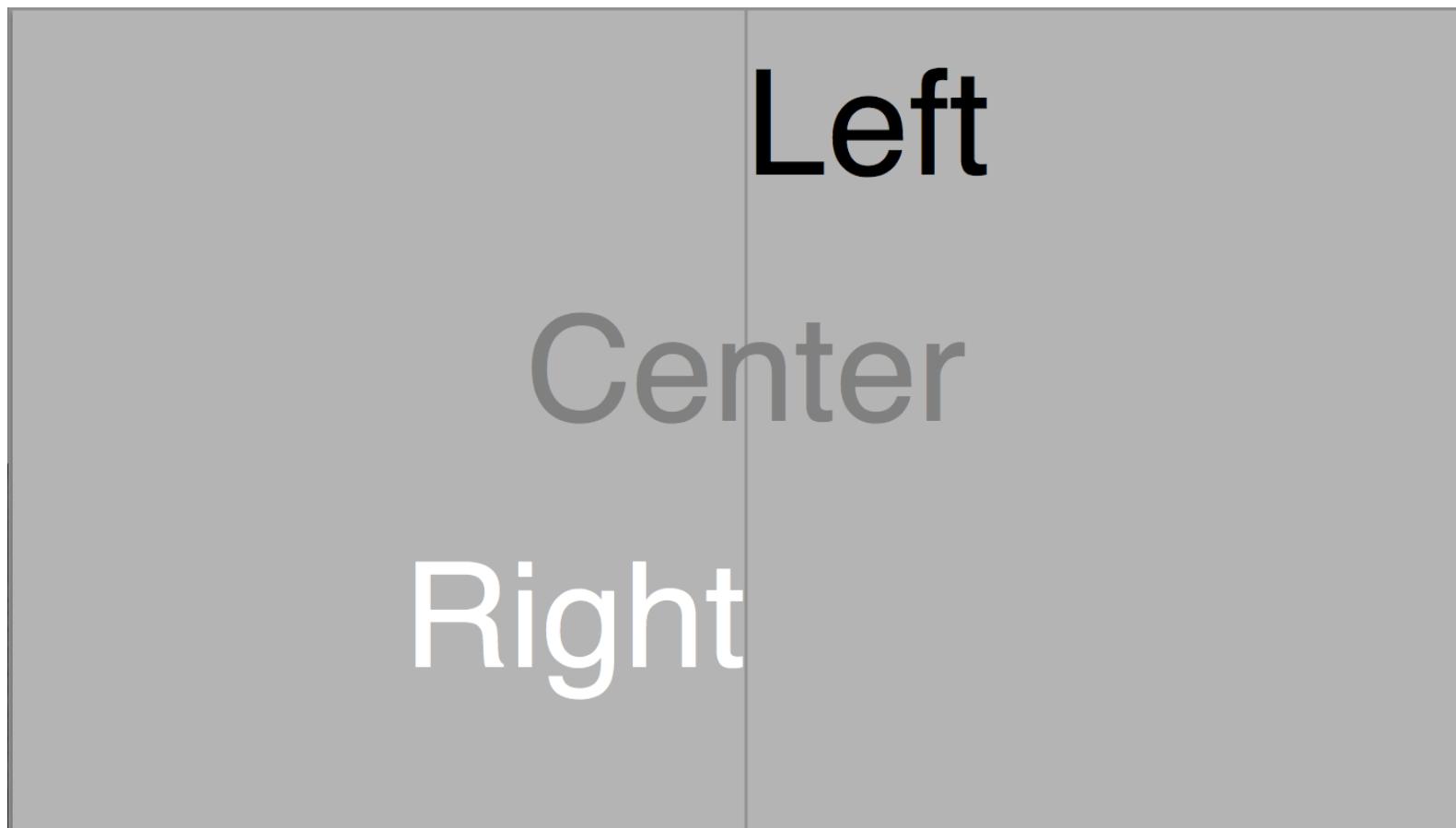
    // Picture with text annotation
    quote := "Yours is some tepid, off-brand, generic 'cola'. " +
        "What I'm making is \"Classic Coke\""
    person := "Heisenberg"
    deck.StartSlide("black", "white")
    deck.Image(50, 50, 1440, 900, "classic-coke.png")
    deck.TextBlock(10, 80, quote, "sans", 2.5, 30, "")
    deck.Text(65, 15, person, "sans", 1.2, "")
    deck.EndSlide()

    deck.EndDeck() // end the deck
}

```



```
// Text alignment
deck.StartSlide("rgb(180,180,180)")
deck.Text(50, 80, "Left", "sans", 10, "black")
deck.TextMid(50, 50, "Center", "sans", 10, "gray")
deck.TextEnd(50, 20, "Right", "sans", 10, "white")
deck.Line(50, 100, 50, 0, 0.2, "black", 20)
deck.EndSlide()
```



```
// List
items := []string{"First", "Second", "Third",
                    "Fourth", "Fifth"}
deck.StartSlide()
deck.Text(10, 90, "Important Items", "sans", 5, "")
deck.List(10, 70, 4, items, "bullet", "sans", "red")
deck.EndSlide()
```

## Important Items

- First
- Second
- Third
- Fourth
- Fifth

```
// Picture with text annotation
quote := "Yours is some tepid, off-brand, generic 'cola'. " +
        "What I'm making is \"Classic Coke\""
person := "Heisenberg"
deck.StartSlide("black", "white")
deck.Image(50, 50, 1440, 900, "classic-coke.png")
deck.TextBlock(10, 80, quote, "sans", 2.5, 30, "")
deck.Text(65, 15, person, "sans", 1.2, "")
deck.EndSlide()
```



## A View of User Experience: Designing for People

Anthony Starks / ajstarks@gmail.com / @ajstarks

Design



What works good is better than what looks good, because what works good lasts.

Ray Eames

## # Designing for People

title A View of User Experience: Designing for People Anthony Starks / ajstarks@gmail.com / @ajstarks

section Design gray white

caption eames.png Ray Eames What works good is better than what looks good, because what works good lasts.

capgen slides.txt | pdfdeck ... > slides.pdf

# Design Examples

Top

Left

Right

Bottom

10%

30%

70%

10%

# Header (top 10%)

Summary  
(30%)

Detail  
(70%)

Footer (bottom 10%)

# My Story

## Section

One

Two

Three

Four

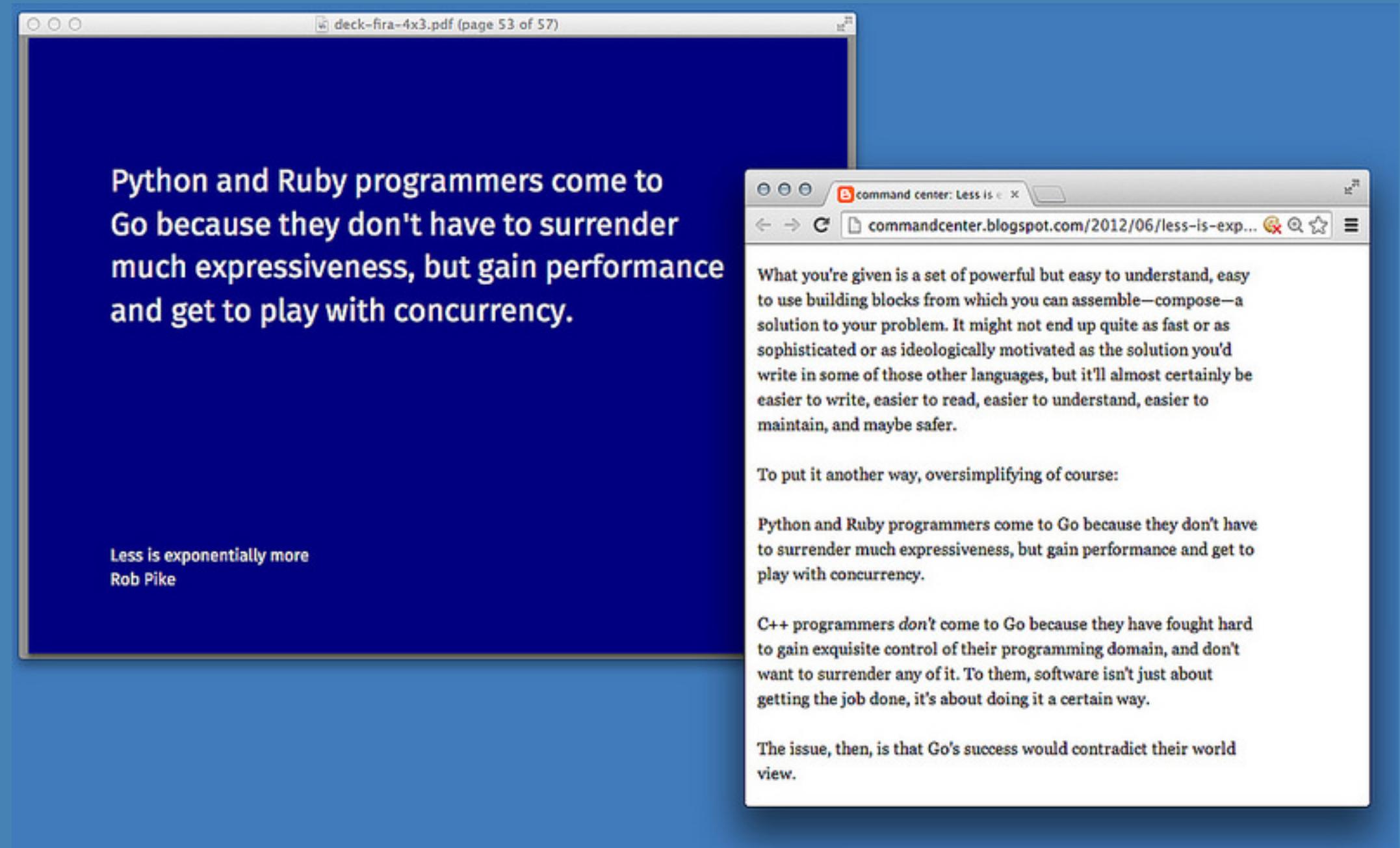
Five

Six

# Document Links

Add web and mailto links with the link attribute of the text element.

Once rendered as a PDF, clicking on the link opens the default browser or email client.



BOS



SFO

Virgin America 351

Gate B38

8:35am

On Time

JFK



IND

US Airways 1207

Gate C31C

5:35pm

Delayed

AAPL 110.22 +0.97 (0.89%)

AMZN 294.74 +3.33 (1.14%)

FB 76.45 -0.27 (0.35%)

GOOG 496.18 +3.63 (0.74%)

MSFT 46.35 -0.24 (0.53%)

Closing Price, 2015-01-13

# Two Columns

One

Two

Three

Four



Tree and Sky

Five

Six

Seven

Eight



Rocks

# go

---

build	compile packages and dependencies
clean	remove object files
env	print Go environment information
fix	run go tool fix on packages
fmt	run gofmt on package sources
generate	generate Go files by processing source
get	download and install packages and dependencies
install	compile and install packages and dependencies
list	list packages
run	compile and run Go program
test	test packages
tool	run specified go tool
version	print Go version
vet	run go tool vet on packages

---

This is not a index card

Rich

Can't buy me love

Bliss

Worse

Better

Misery

We have each other

Poor

So, the next time you're  
about to make a subclass,  
think hard and ask yourself  
**what would Go do**

Andrew Mackenzie-Ross



**FOR, LO,**

the winter is past,  
the rain is over and gone;  
The flowers appear on the earth;  
the time for the singing of birds is come,  
and the voice of the turtle is heard in our land.

Song of Solomon 2:11-12

# Good Design

is innovative

makes a product useful

is aesthetic

makes a product understandable

is unobtrusive

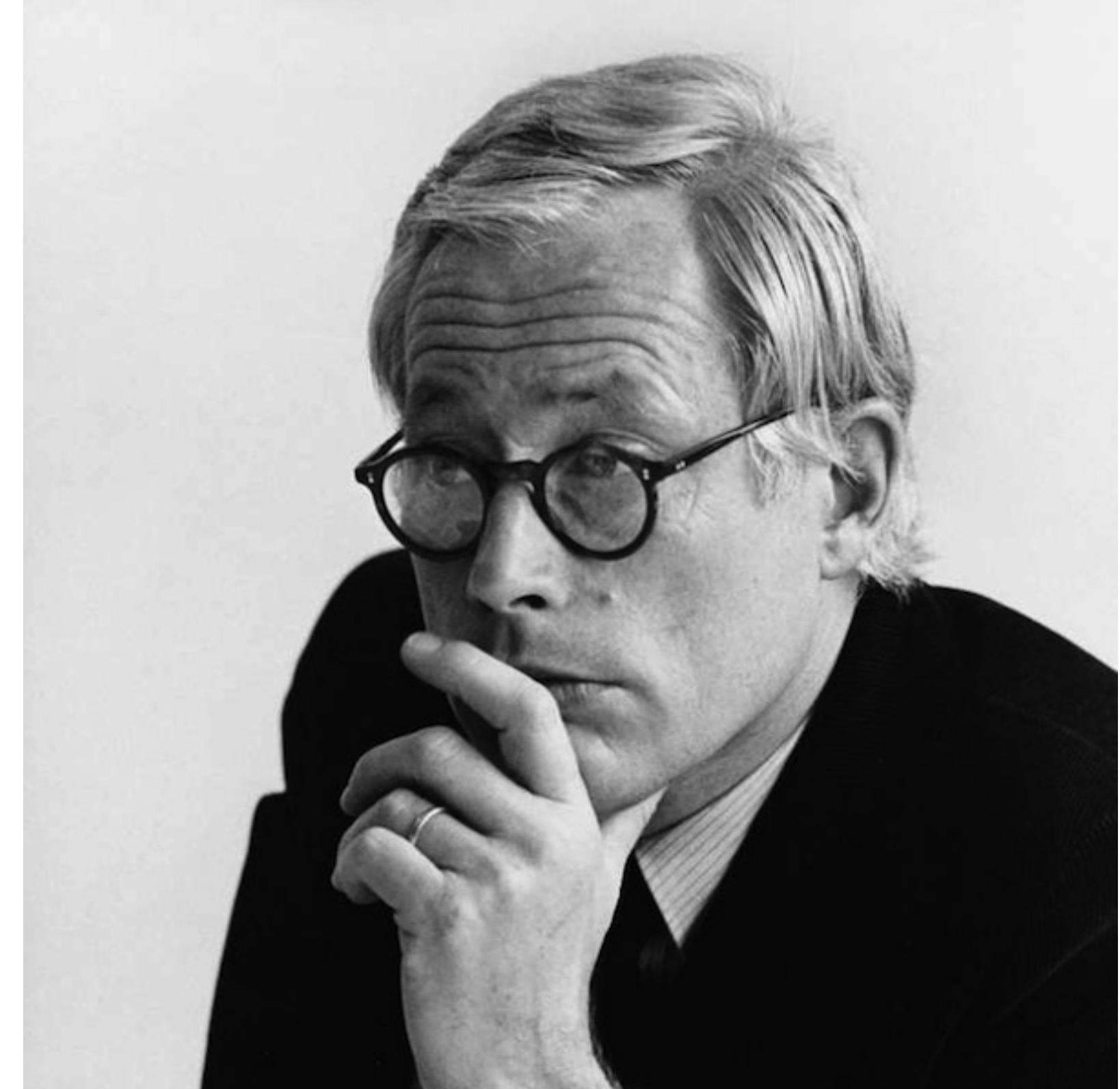
is honest

is long-lasting

is thorough down to the last detail

is environmentally-friendly

is as little design as possible



Dieter Rams

# What is it about Go?

Go is not the product of a Whiggish development process. We were just trying to get something that worked for us.

Rob Pike

# Making Tools

# Fun

fmt

func

Writer  
Reader

net/http

encoding/xml  
encoding/json

cgo

# The Community

## Re: [go-nuts] Visualizing Random Number Generators: /dev/urandom vs. Go rand package

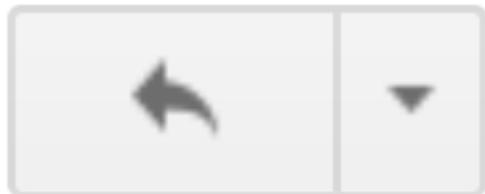


Inbox x



Russ Cox rsc@golang.org via google.com

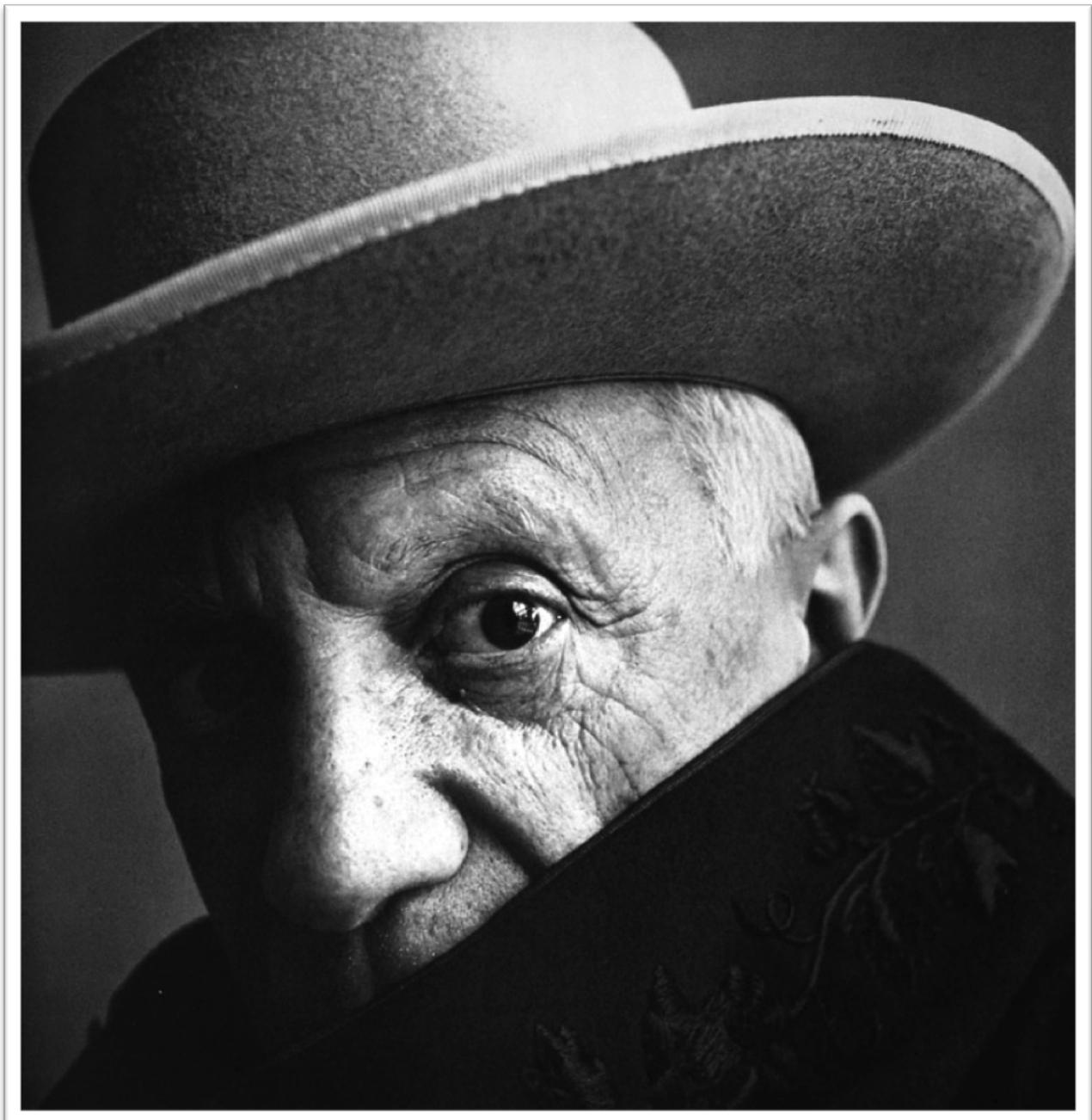
3/5/10



to me ▼

are you going to share the library or just  
tease us with pictures? ;-)

Reducing the distance from  
the idea to the picture





Picasso



Turing

# Thank you



[github.com/ajstarks](https://github.com/ajstarks)



[@ajstarks](https://twitter.com/ajstarks)



[ajstarks@gmail.com](mailto:ajstarks@gmail.com)



[flickr.com/photos/ajstarks](https://flickr.com/photos/ajstarks)



[speakerdeck.com/ajstarks](https://speakerdeck.com/ajstarks)



[mindchunk.blogspot.com](http://mindchunk.blogspot.com)