Cognos Visualization Workshop

Agenda

8:45 – Introductions
9:00 – Discussion on Visualization
9:30 – Cognos Hands-On Lab 1
10:15 – Break
10:25 – Cognos Hands-On Lab 2 and 3
11:50 – Wrap-Up & Dismissal

Introductions

Name

Company

Interaction with Cognos and Visualization background

What is Visualization?

- The ability to create a visual display of structured and unstructured data
- Visualization creates encoding of data into visual channels that people can view and understand

Why use Visualization? Science.

- The human brain's short term memory is capable of processing 3-7 items in place simultaneously

- "The human visual system is by far the richest, most immediate, highest bandwidth pipeline into the human mind. The amount of brain capacity that is devoted to processing visual input far exceeds that of the other human senses."

  – Alan Keahey

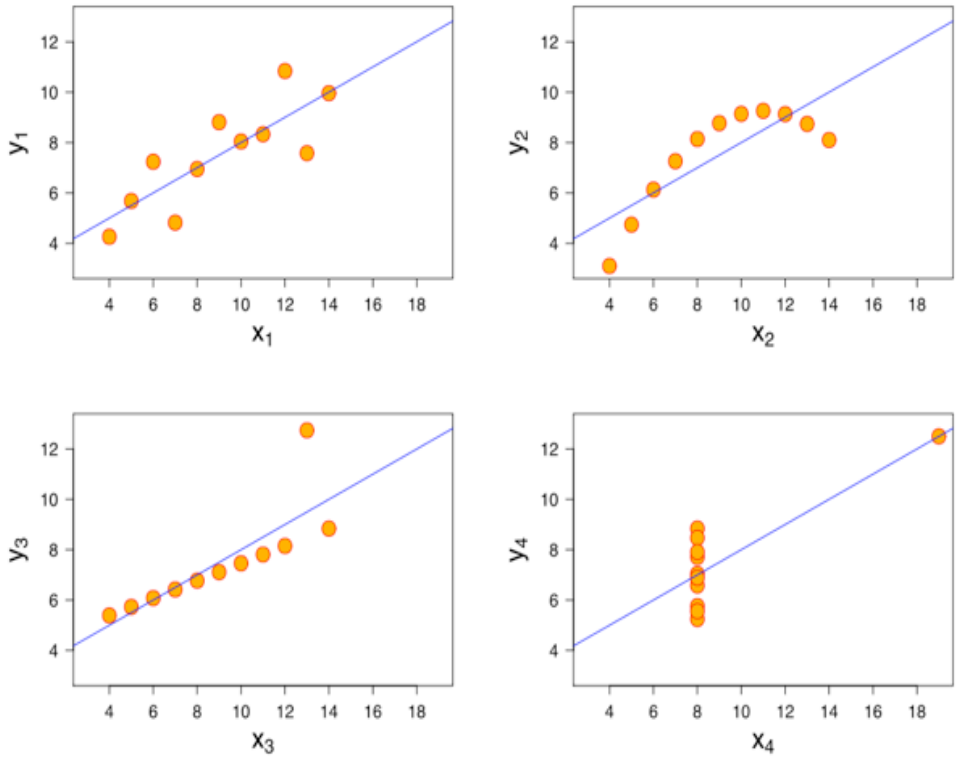
What does all this mean?

A Picture
is worth
a Thousand Words

Why do you use Visualization?

Anscombe's Quartet

I		II		III		IV	
x	y	x	y	x	y	x	y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

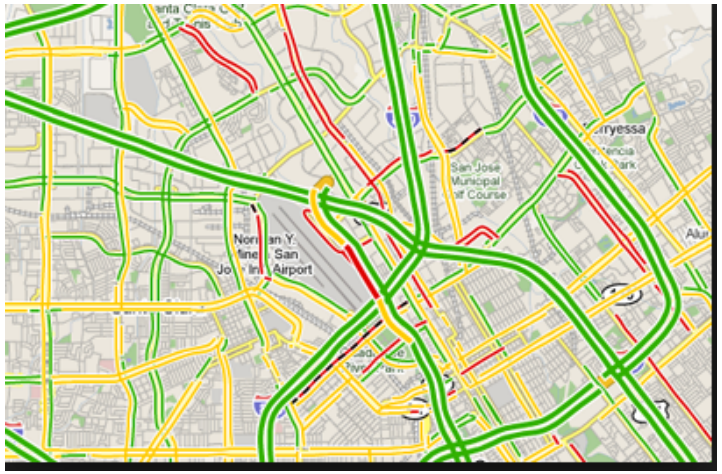


In each case:

Mean of x	9
Sample variance of x	11
Mean of y	7.50
Sample variance of y	4.122
Correlation between x and y	0.816
Linear regression line	y = 3.00 + 0.500x

When & Where do you use Visualization?

- Depends on your audience and business needs
- Visualizations are commonly used in reports, and dashboards
- Where else are visualizations used?



2 volunteers for an in-class study

30 seconds or less to answer the question:

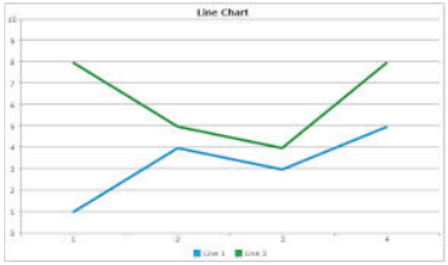
- What are the revenue trends for the four territories, and which territory has the highest revenue in the 4th quarter?

- Volunteer #1 – graph
- Volunteer #2 – 1,000 words

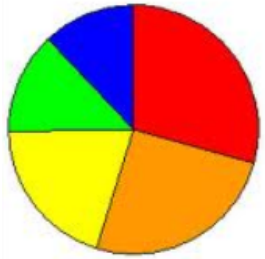
What if you aren't presented with a specific question?

- Visualization plays a vital role in gaining an understanding of large data sets
- Many organizations using visualizations to perform "data discovery" or "data mining" of their Big Data

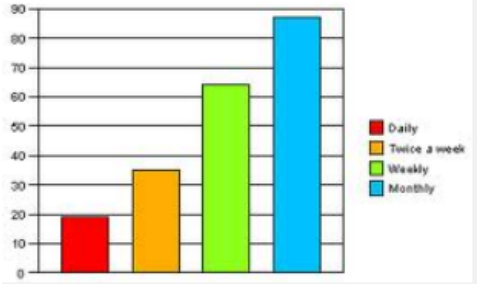
Structure is key to effective visualizations



Line Chart?



Pie Chart?



Bar Chart?

Missing two necessary pre-steps before selecting structure

Steps to effective visualizations (in order)

1. Purpose – why am I creating this?
   - Who is it for, what am I trying to convey, and what decisions will be made based on the results?
2. Data Selection – how much of what data do I need?
   - Choose the appropriate subset of data.
   - Extra data is just noise to end-user.
3. Structure – what layout will I use to frame my data?
   - This defines the landscape of your data and is arguably the most important step.

Foundational papers: Cleveland & McGill, 1984, 1985

Graphical Perception: Theory Experimentation, and Application to the Development of Graphical Methods

Determined relative accuracy of perception & interpretation of various visual encodings.

1. Aligned, nonaligned Position 
2. (nonaligned) Length 
3. Angle / Slope 
4. Area 
5. Volume / Saturation 
6. Hue 

http://www.jstor.org/stable/2288400

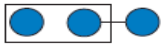
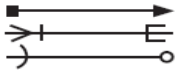
Actual selection of a structure

If you have a well defined purpose, then tools like the visualization options list can help you with selection.

This chart is from IBM's Many Eyes website which allows users the ability to "test drive" visualizations.

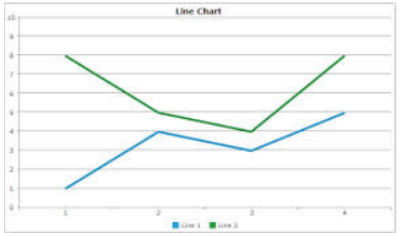
Need	Option
See relationships between data points	Scatterplot Matrix chart Network diagram
Compare a set of values	Bar chart Block histogram Bubble chart
Track rises and falls over time	Line graph Stack graph Stack graph for categories
See the parts of a whole	Pie chart Tree map Tree map for comparisons
Analyze text	Word tree Tag cloud Phrase net Word cloud generator

Actual selection of a structure (cont.)

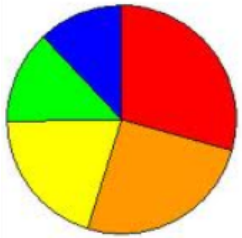
Example	Encoding	Ordered	Useful Values	Quantitative	Ordinal	Categorical	Relational
	Position, Placement	Yes	Infinite	Good	Good	Good	Good
1, 2, 3; A, B, C	Text Labels	Optional (alphabetic/ numbered)	Infinite	Good	Good	Good	Good
	Length	Yes	Many	Good	Good		
	Size, Area	Yes	Many	Good	Good		
	Angle	Yes	Medium/ Few	Good	Good		
	Pattern Density	Yes	Few	Good	Good		
	Weight, Boldness	Yes	Few		Good		
	Saturation, Brightness	Yes	Few		Good		
	Color	No	Few (<20)			Good	
	Shape, Icon	No	Medium			Good	
	Pattern, Texture	No	Medium			Good	
	Enclosure, Connection	No	Infinite			Good	Good
	Line Pattern	No	Few				Good
	Line Endings	No	Few				Good
	Line Weight	Yes	Few		Good		

Time for a quiz…

If I am looking for changing values over time…



If I am looking for how my budget is divided up…



If I want to compare sales figures for products…

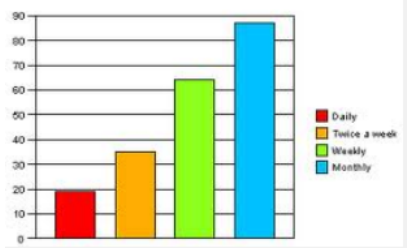


Chart Basics – Bar Graphs

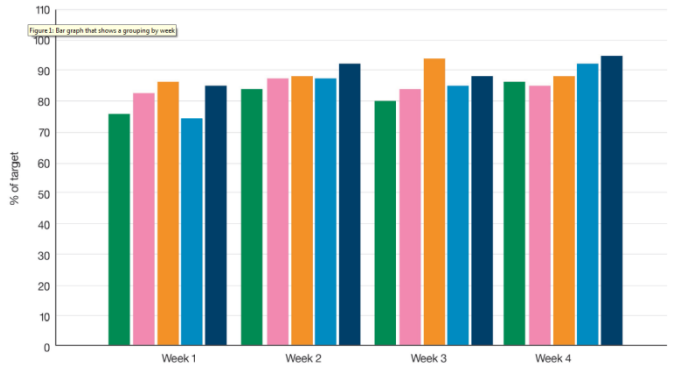
*Vertical bars = column graph

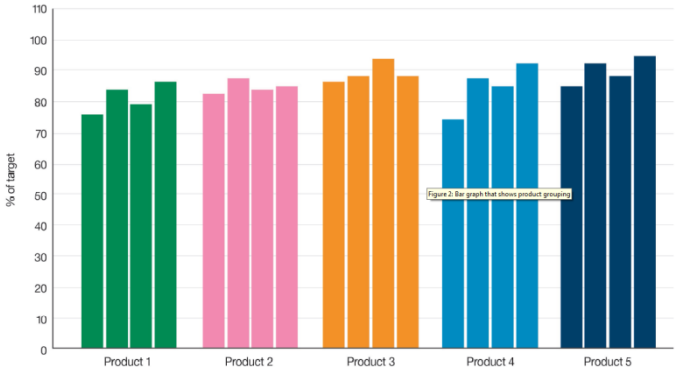
*Horizontal bars = bar chart

*Represent & compare values

*Position & grouping has significant meaning

*Advanced – bullet graphs





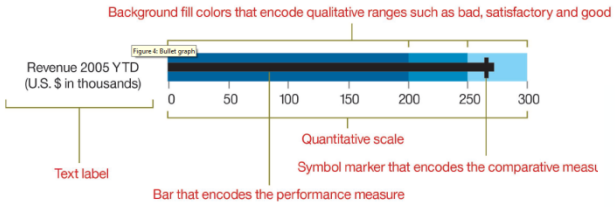


Chart Basics – Line Graphs

*Continuous relationship, typically changing over time

*Can get messy with large numbers of lines

*Advanced – data plot graphs

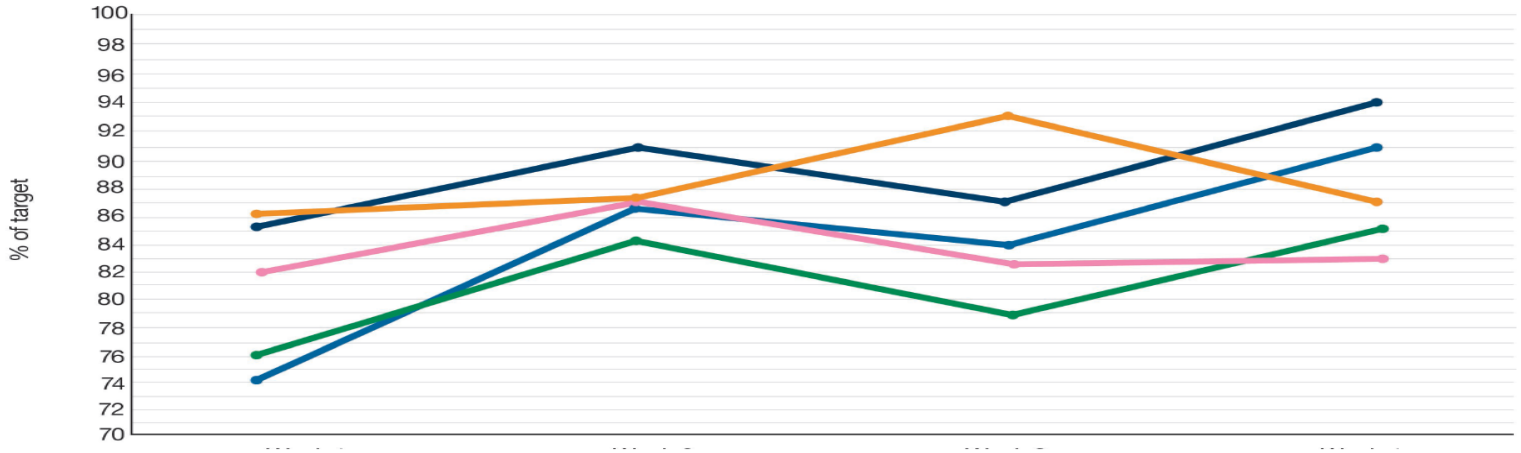


Chart Basics – Pie Graphs

Composition graphs

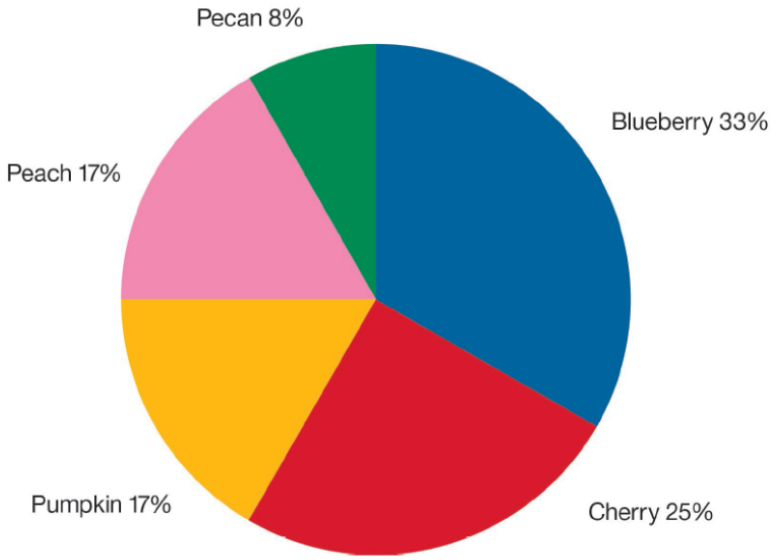
Shows how the parts make up the whole

Order slices form smallest to largest

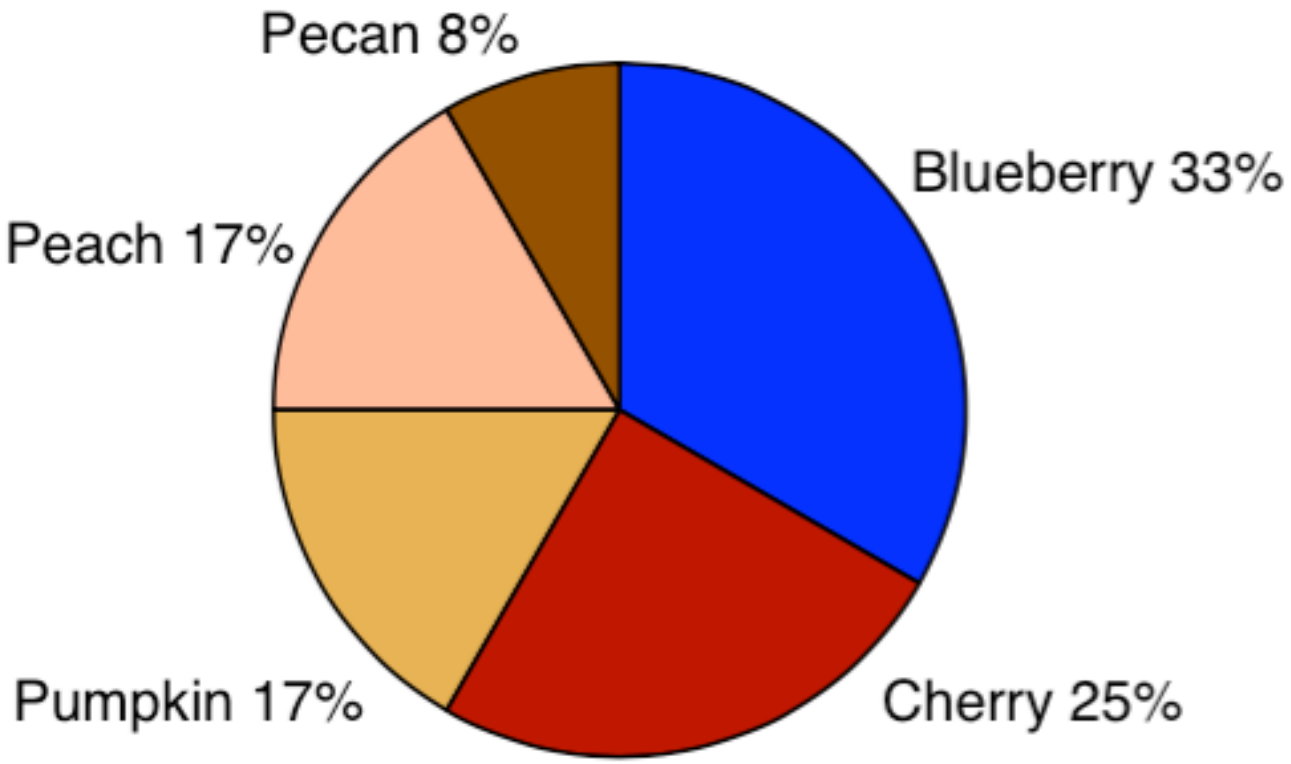
Important to be mutually exclusive and add up to 100%

Success if 10 slices or less and precision is not required

Advanced - Tree Maps

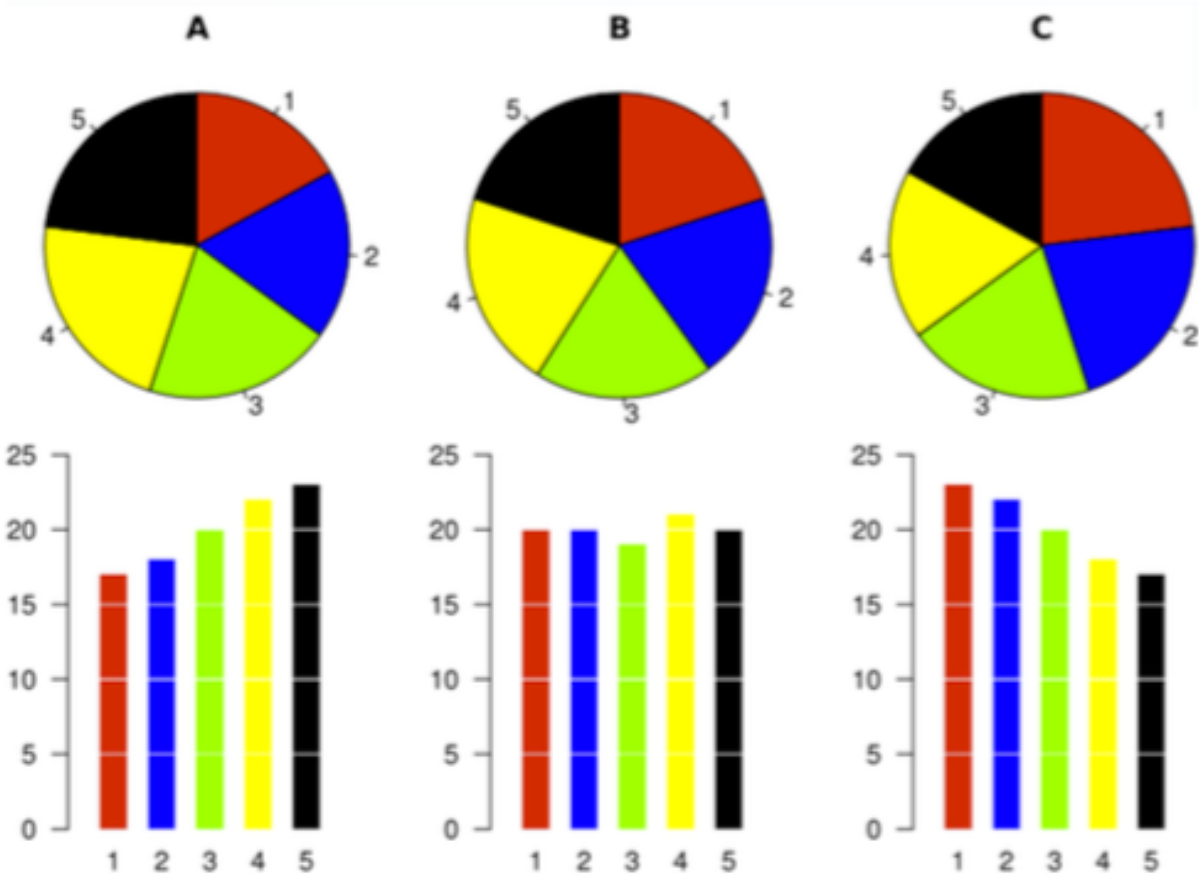


A Good Pie Graph



- Few relevant slices
- Not much precision required
- Slices ordered by size

Column Charts in Many Cases Are More Clear



- We're bad at comparing angles
- Length is much more accurate

http://en.wikipedia.org/wiki/Pie_chart

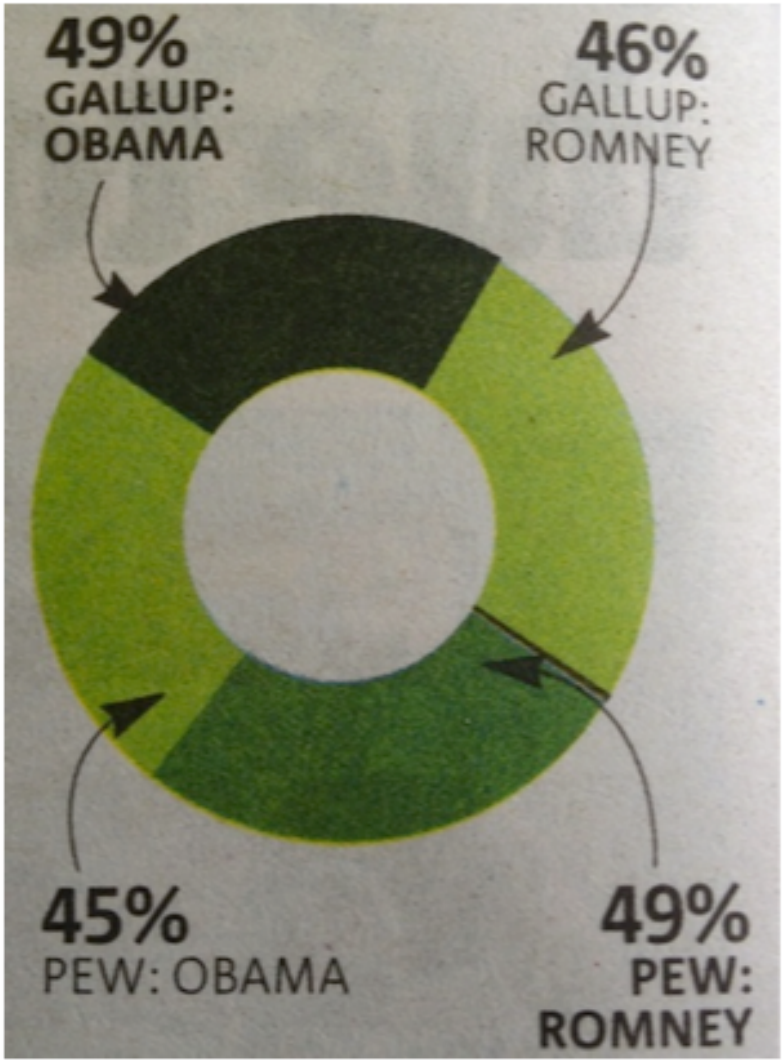
Tree Maps

Useful for comparing large Amounts of data

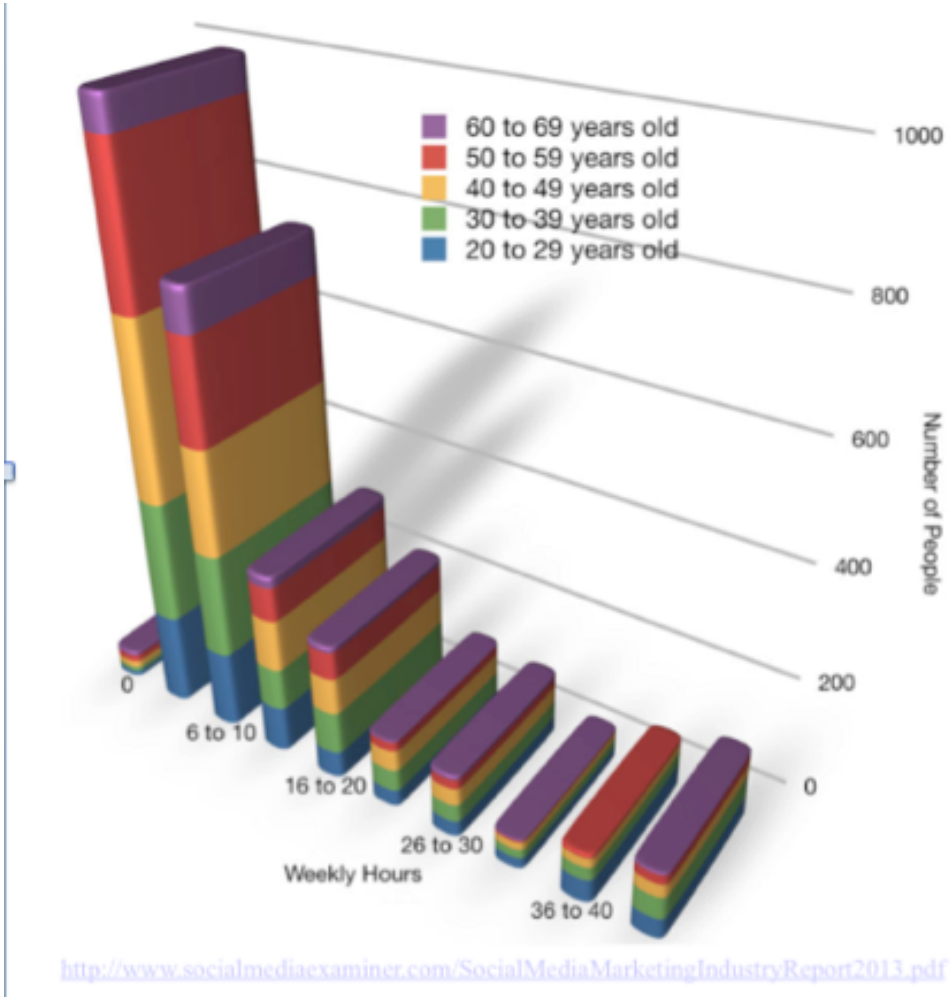
Usefulness varies – Humans are worse at comparing area than angles

What not to do…

What not to do…

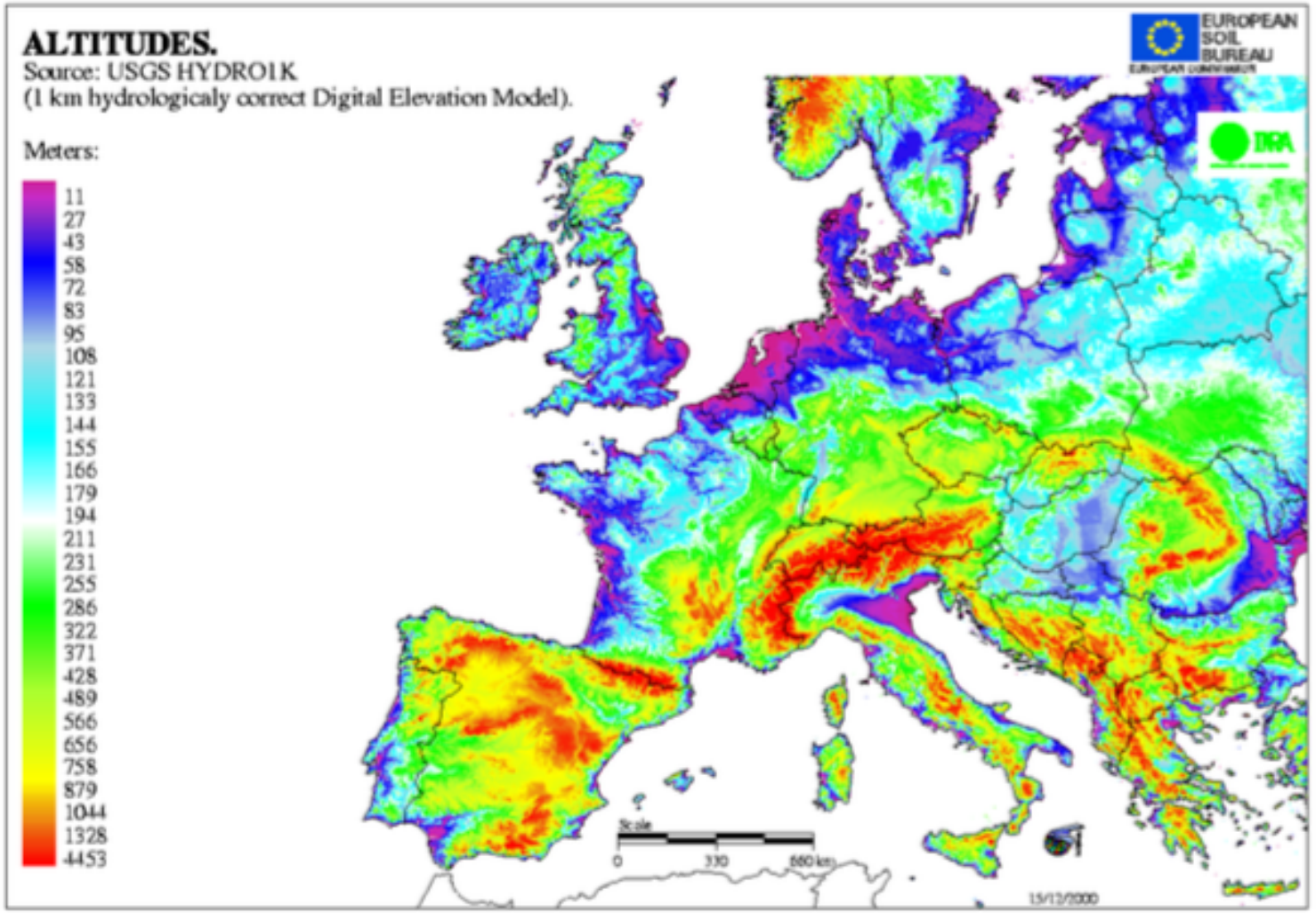


What not to do…3D



http://www.socialmediaexaminer.com/SocialMediaMarketingIndustryReport2013.pdf

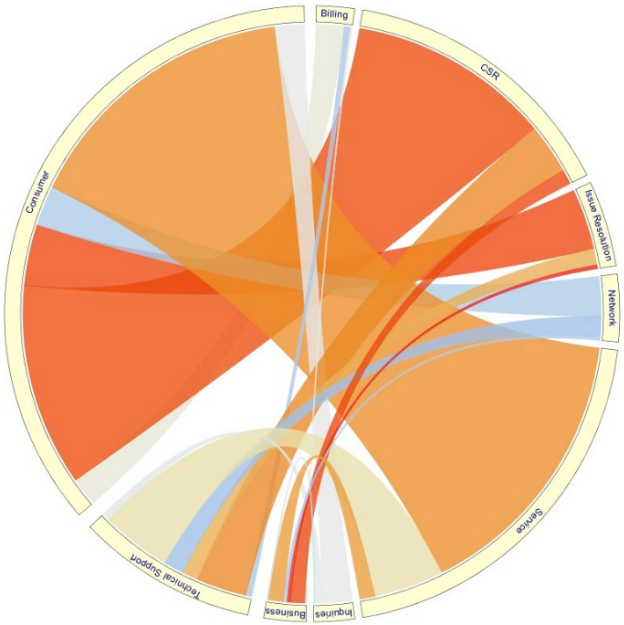
Color is difficult.

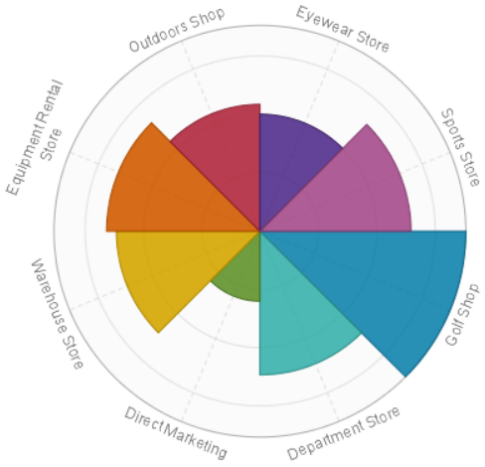


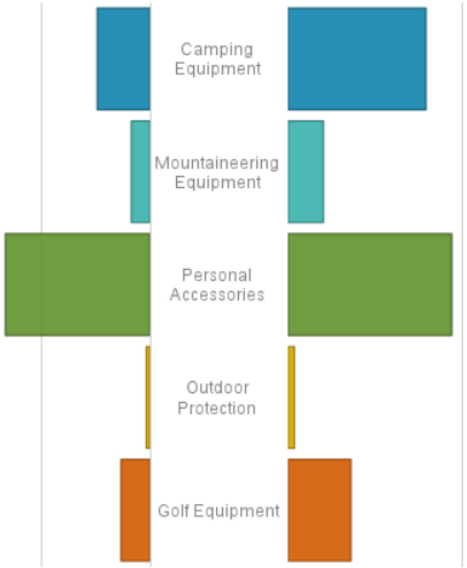
Wrong.

http://eusoils.jrc.ec.europa.eu/esdb_archive/serae/GRIMM/erosion/inra/europe/analysis/maps_and_listings/web_erosion/maps_and_listings/altitude_a3.gif

RAVE – Rapidly Adaptive Visualization Engine







RAVE

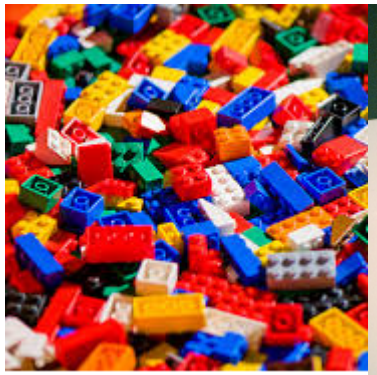
RAVE – Rapidly Adaptive Visualization Engine

RAVE specification does not define charts type such as pie, column, etc.

RAVE specification allows you to assemble parts

Traditional Charting Engine

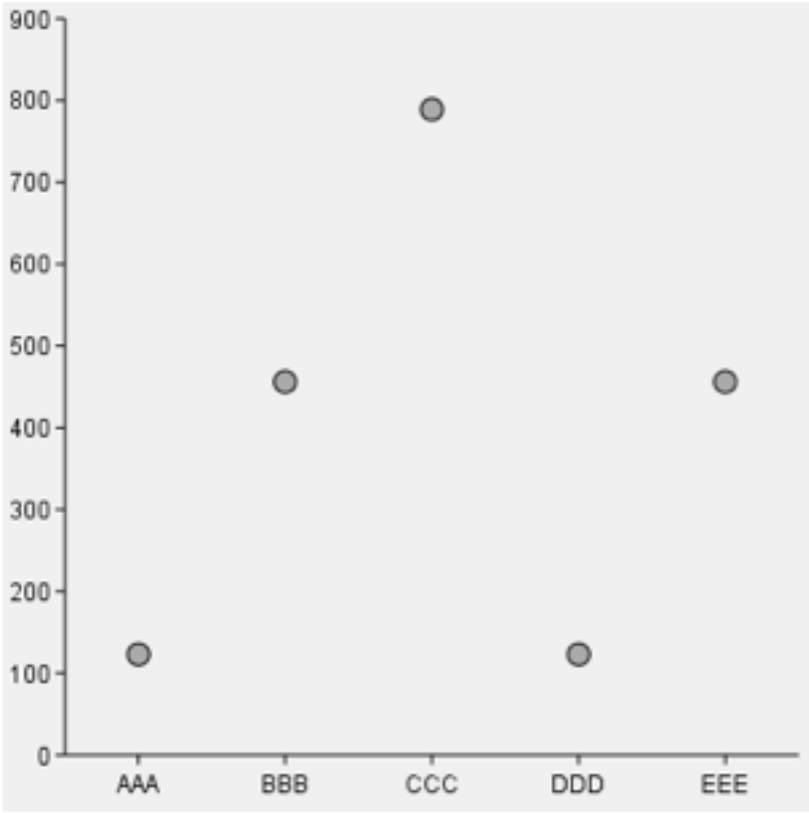
VS



RAVE

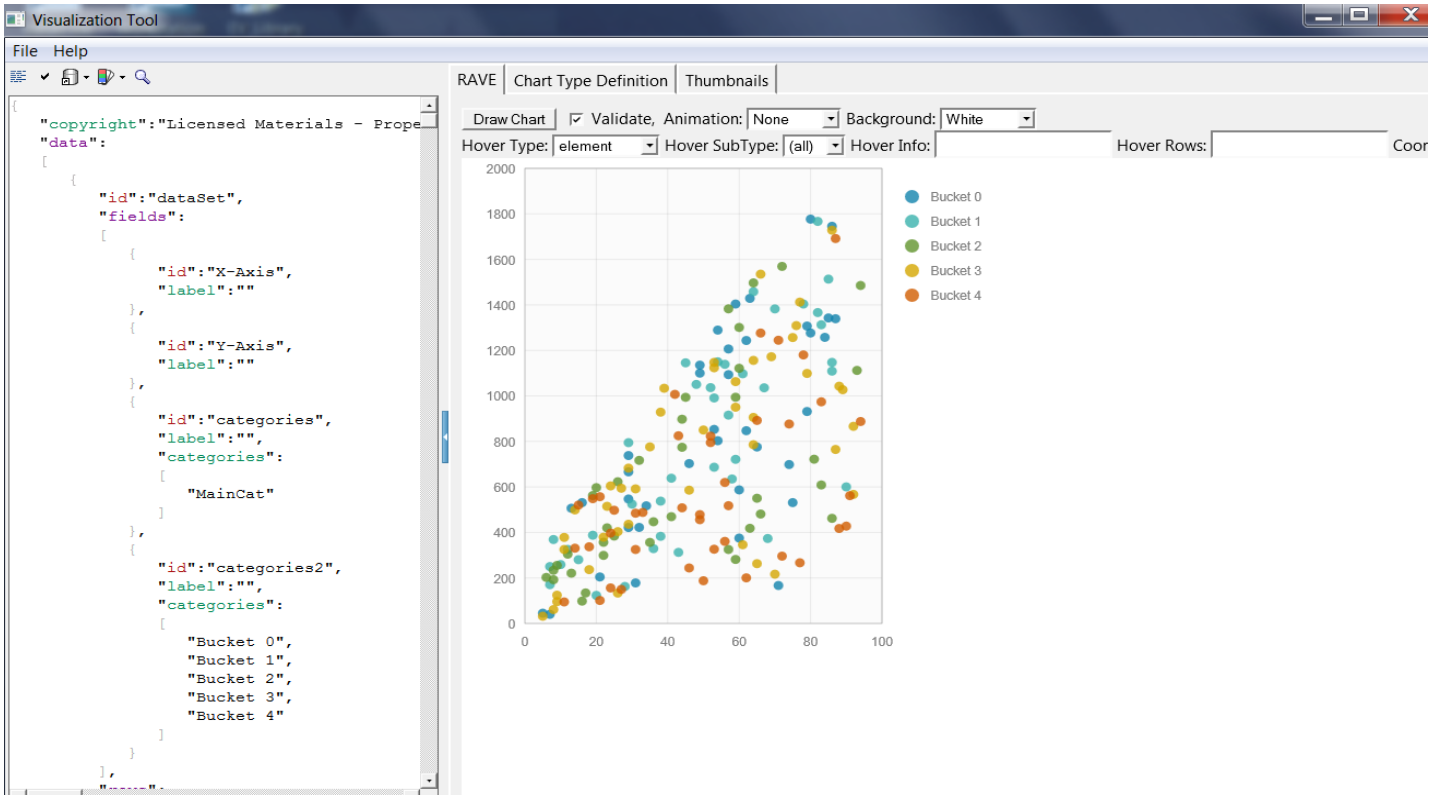
Putting it all together – a simple, complete chart

```
{
  "data": [ {
      "fields": [ { "id": "CatField" …}, {"id": "MsrField"
      …} ],
      "rows": [ [ 0, 123 ], … [ 4, 456 ] ]
  } ],
  "grammar": [ {
      "coordinates": {
              "dimensions": [ {"axis": {}}, {"axis": {}} ]
      },
      "elements": [ {
              "position": [
                  {"field": {"$ref": "MsrField"}},
                  {"field": {"$ref": "CatField"}}
              ]
      } ]
  } ],
  "legends" [ { } ],
  "version": "3.0"
}
```

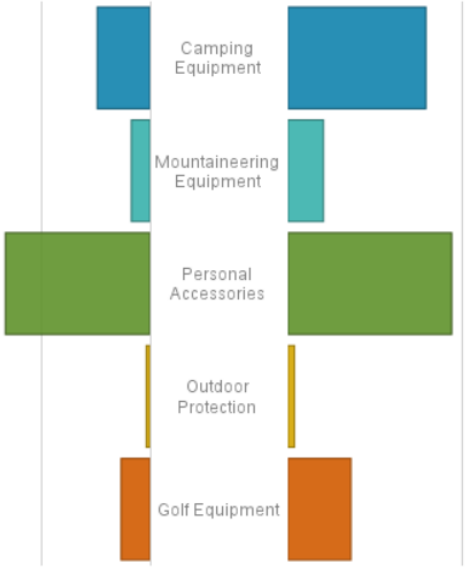


Visualization Tool

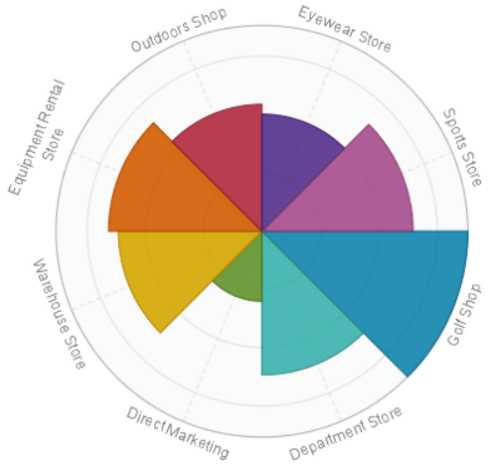
- Design to aid in the creation of visBundles for IBM Cognos BI v10.2.1



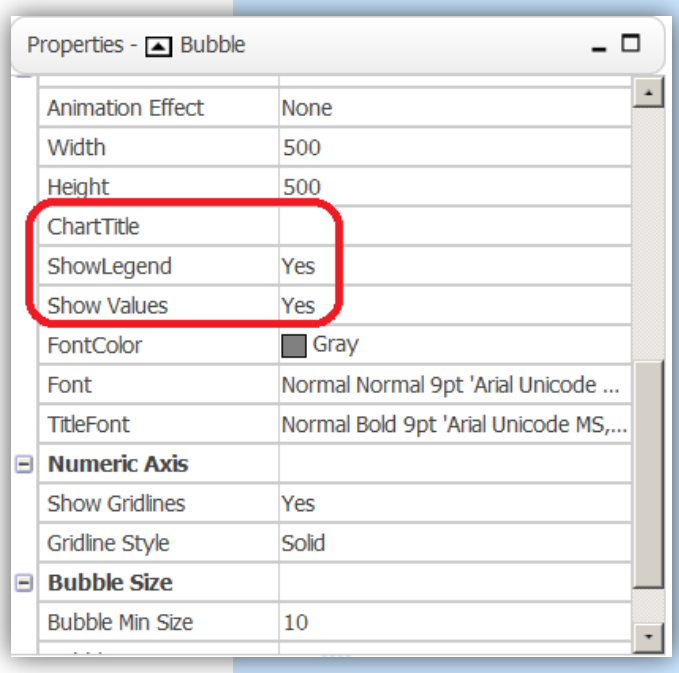
Cognos 10.2.2 Leverage new visualizations and customize them directly in Report Studio



New visualizations including, Tornado, Polar Area, Chord, and Combination



Updated Visualizations to contain properties

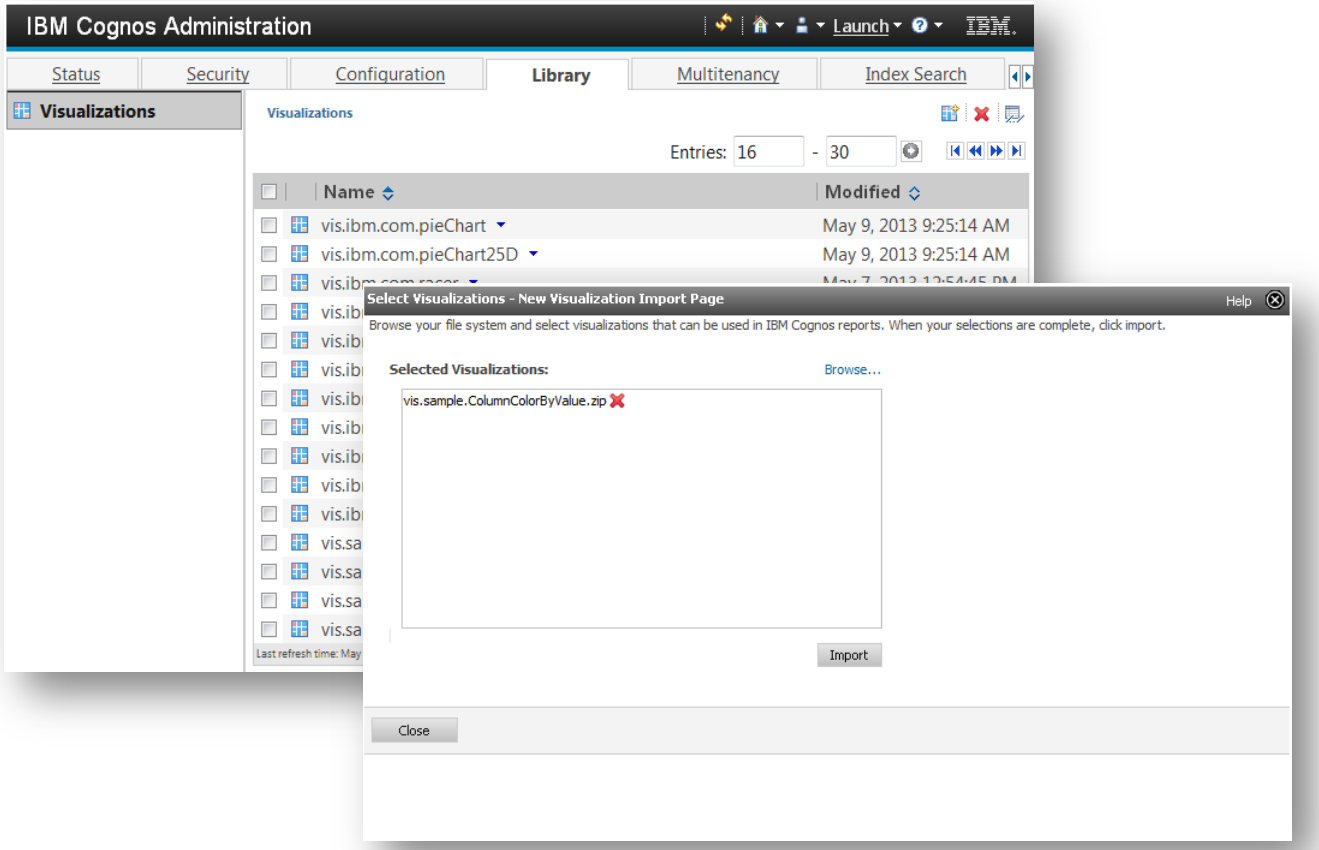


Extensible visualization properties are exposed in Report Studio & Workspace Advanced

Download new visualizations from AnalyticsZone

Administration

- Add to the Library



- Standard deployment used to move visBundlers to different servers

VisBundles

- A Visbundles is a definition of a visualization that can be consumed in Report Studio
- Visbundles are must be stored in the content store for use in Report Studio
- A Visbundle is a zipped file that has a strict folder structure and set of files

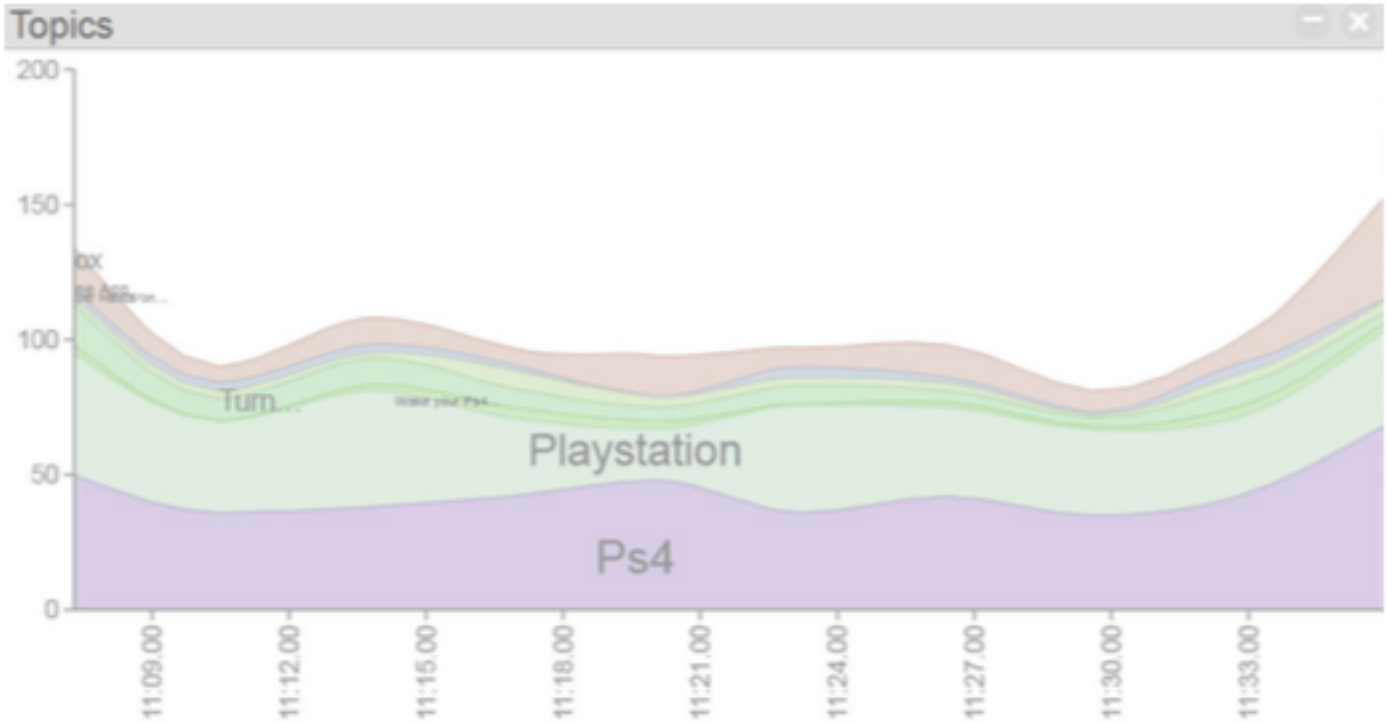
34

Creating effective visualizations

Choosing the right visual properties

Learn how to properly choose the visual property (position, shape, size, color and others) to encode the different types of data that will be presented in a visualization.

Download your copy
http://bit.ly/successfulvis



Position is everything.

Because position is the *most accurate* & easiest* to perceive, we must use it for our *most important* data.

Then we can add other data dimensions using:

- Size
- Shape
- Color
- Connection
- Etc.

* usually

The two most important factors in visualization

1. Position is everything.
2. Color is difficult.