Sekou Tyler

Recap

1. What is a dimension
2. What is a measure/fact
3. What is the basic form of data modeling called?
4. Why is understanding data modeling important?

The History of Data Visualization

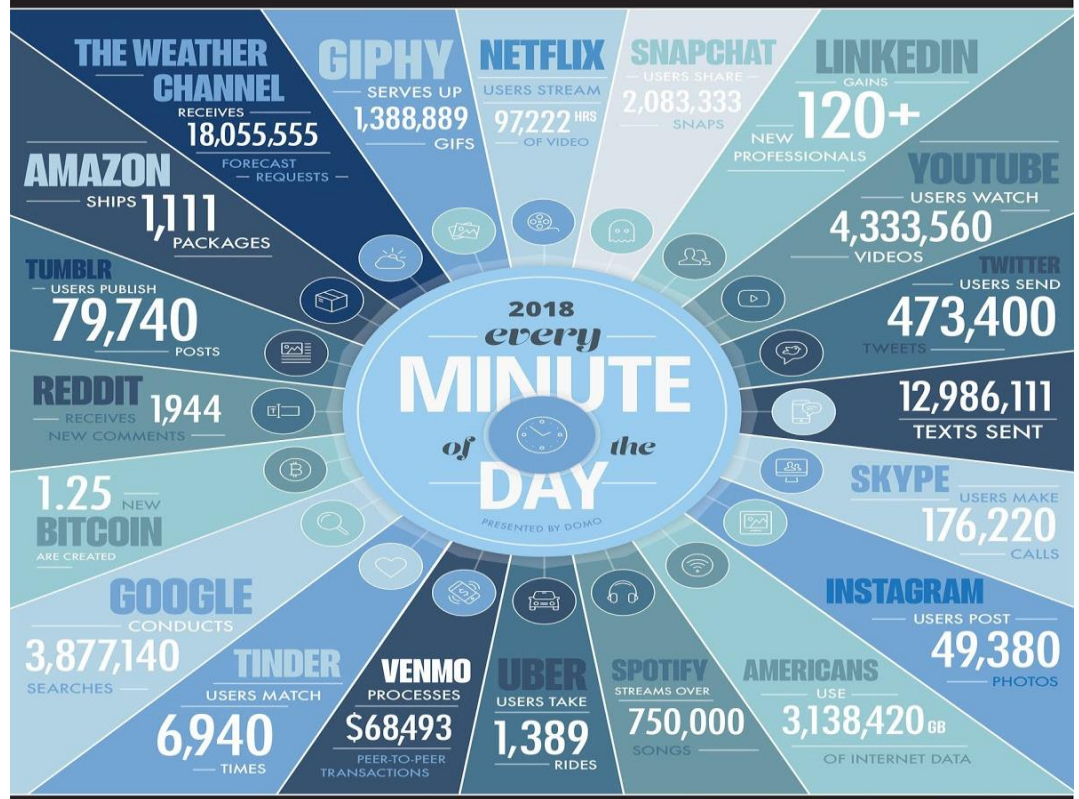
Every day we create 2.5 quintillion (10^{18}) bytes of data - so much that **90 percent of the world's data today has been created in the last two years** alone.

-IBM CMO Study, 2011

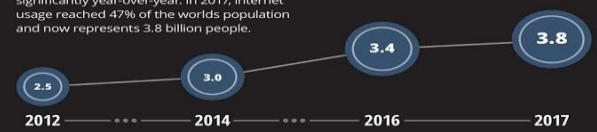
DATA NEVER SLEEPS 6.0

How much data is generated *every minute?*

There's no way around it: big data just keeps getting bigger. The numbers are staggering, but they're not slowing down. By 2020, it's estimated that for every person on earth, 1.7 MB of data will be created every second. In our 6th edition of Data Never Sleeps, we once again take a look at how much data is being created all around us every single minute of the day—and we have a feeling things are just getting started.



The world's internet population is growing significantly year-over-year. In 2017, internet usage reached 47% of the worlds population and now represents 3.8 billion people.



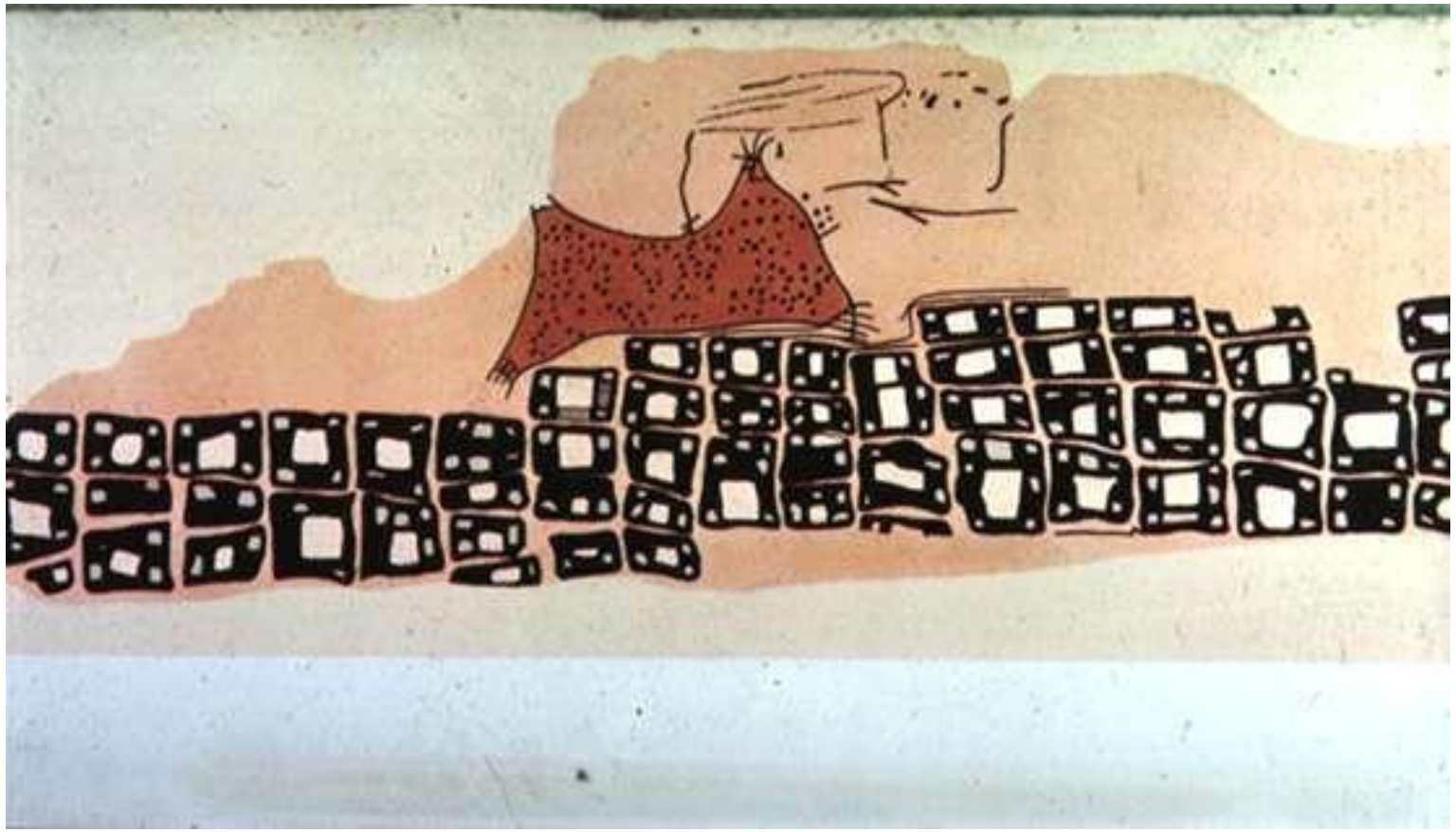
GLOBAL INTERNET POPULATION GROWTH 2012–2017
(IN BILLIONS)

The ability to make data-driven decisions is crucial to any business. With each click, swipe, share, and like, a world of valuable information is created. Domo puts the power to make those decisions right into the palm of your hand by connecting your data and your people at any moment, on any device, so they can make the kind of decisions that make an impact.

Learn more at domo.com

SOURCES: STATISTA, LINKEDIN, INTERNET LIVE STATS, EXPANDED RAMBLINGS, SLASH FILM, RIAA, BUSINESS OF APPS, INTERNATIONAL TELECOMMUNICATIONS UNION, INTERNATIONAL DATA CORPORATION

Çatalhöyük – 6200 BC



Consider Your Audience

- Decision maker? What's known?
- Relevant background info?
- Default Biases?
- What data should be used?
- Is audience familiar with the data?
- Risk? Do we need hedge them upfront?
- What will they use it to do?
- What does success look like?
- One sentence test.

Storyboarding

Problem

-What are we trying to solve

Who

-Audience

-You

What

-Action

Mechanism

-Tableau
-PowerPoint?
-Power BI?
-Excel?

Tone

-Success/Failure?

How

-Possible types of graph/chart

Source: *storytelling with data: a data visualization guide for business professionals* (Wiley 2015)

Different Types

Two main types of data visualization

- Exploration
- Explanation

Exploration

- Discover new areas of interest
- Pose new questions
- Discover new stories

Explanation

- Answer a question
- Support a decision
- Convey information
- Increase efficiency

Two main types of data

- Qualitative
- Quantitative

Qualitative

- Can also be categorical
  - Favorite color = blue
  - Gender, State, etc.

Quantitative

- Expressed in numbers and can be counted and aggregated easily
- Fully additive facts

How we see the world

The need to visualize data

"Use a picture. It's worth a thousand words.“

-Tess Flanders, 1911

The need to visualize data

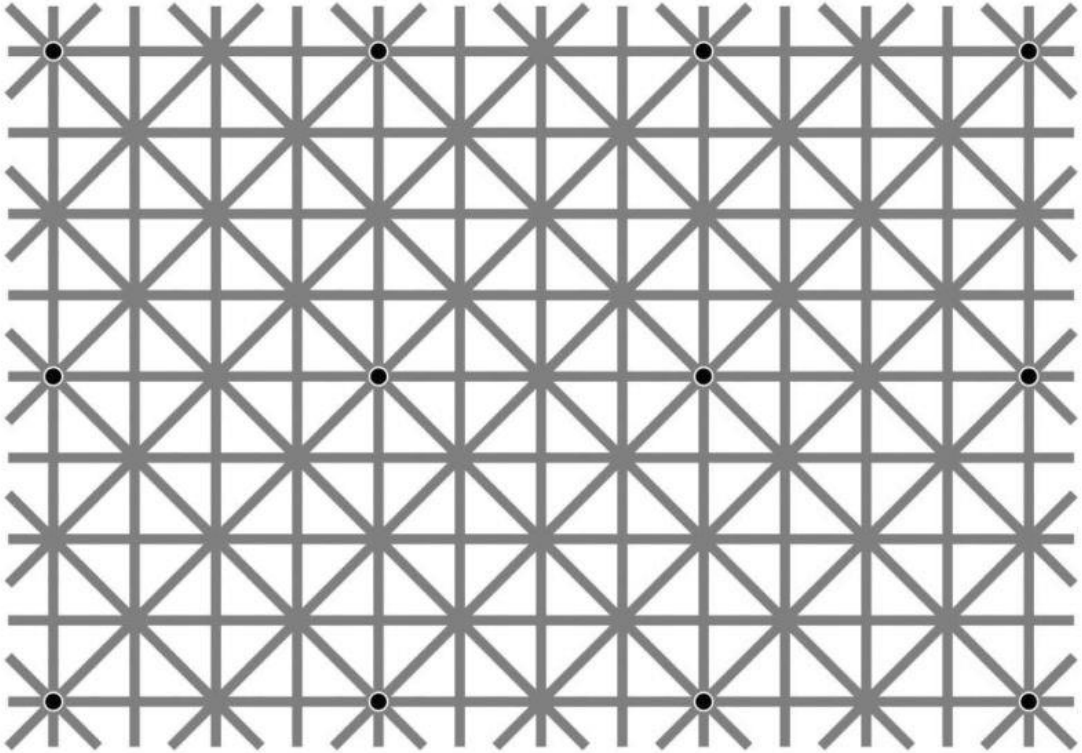
- Human brain processes images 60,000x faster than text.

-Persuasion and the Role of Visual Presentation Support: The UM/3M Study, 1986

- 90 percent of the information transmitted to the brain is visual.

-MIT News, January 16, 2014

How many dots do you see?



Ninio’s Extension Illusion

How many dots do you see?

- There are 12 dots. It is difficult to see all of the dots because the grid prevents us from seeing the whole picture. If we removed the grid we could see all 12 dots, but when presented on a grid, our perception changes entirely.

- “Our visual system is lazy. Regular patterns are tempting because you can look at a small portion and think you have the whole thing figured out”- Martinez-Conde

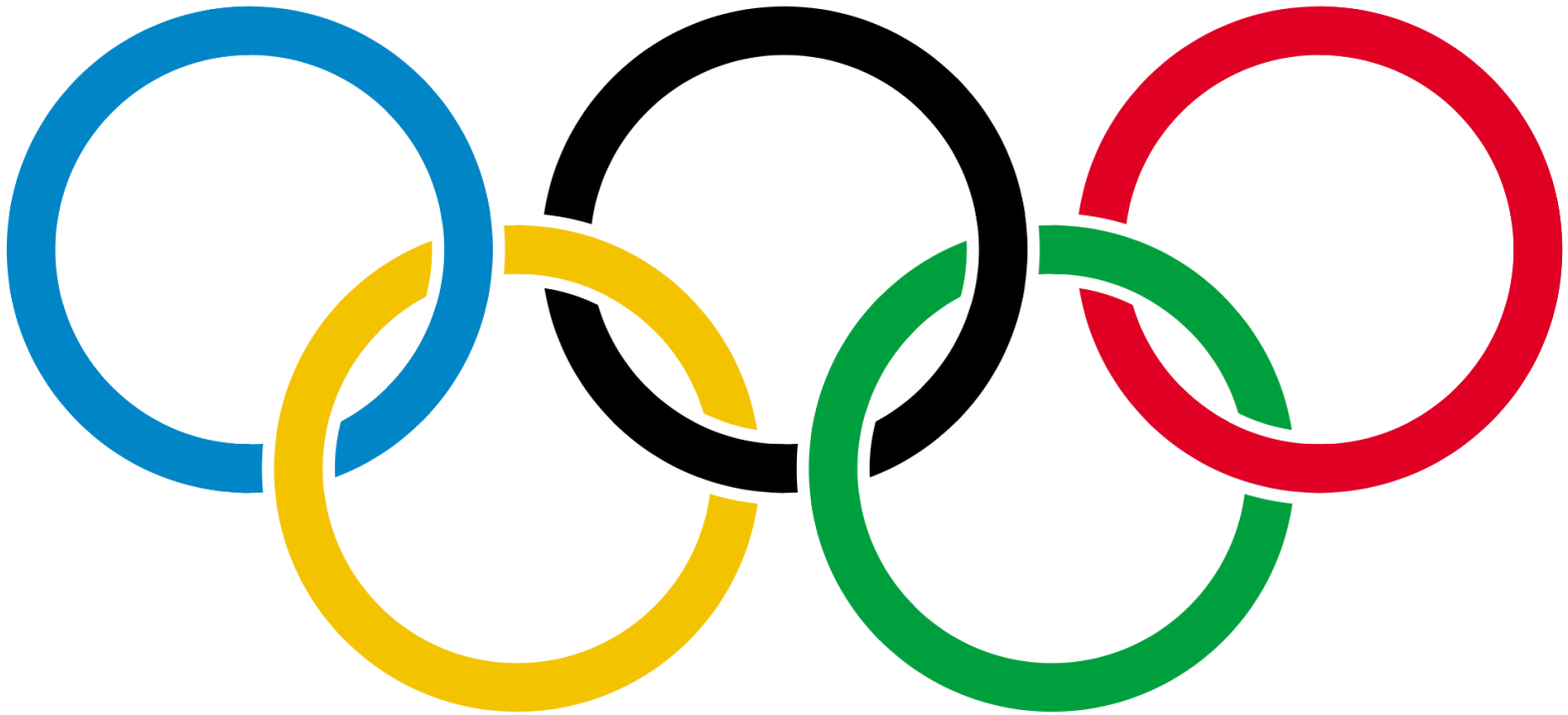
Ninio’s Extension Illusion

The Gestalt Principles

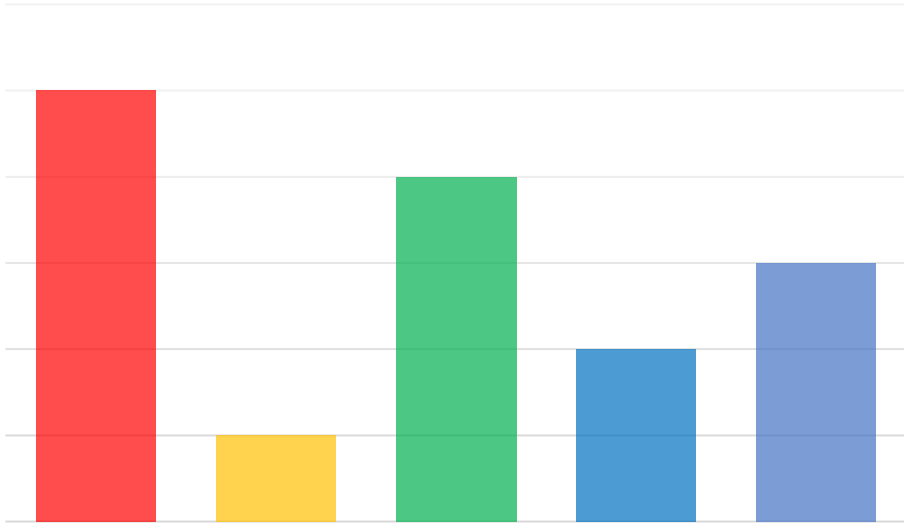
Gestalt

- Introduced by Christian von Ehrenfels
- Psychological term meaning unified whole
  - The whole is different (not greater) than the sum
- Gestalt Effect –
  - Ability of the mind to generate whole images from a collection of parts

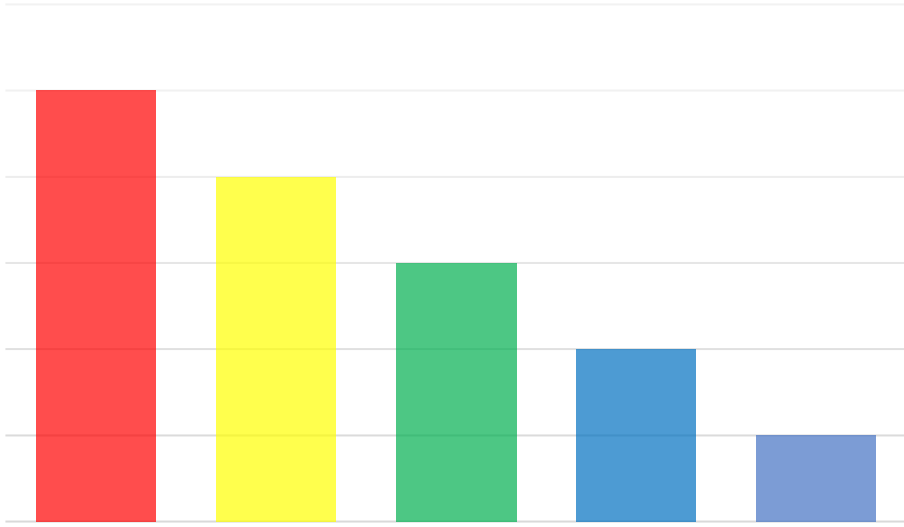
Law of Pragnanz



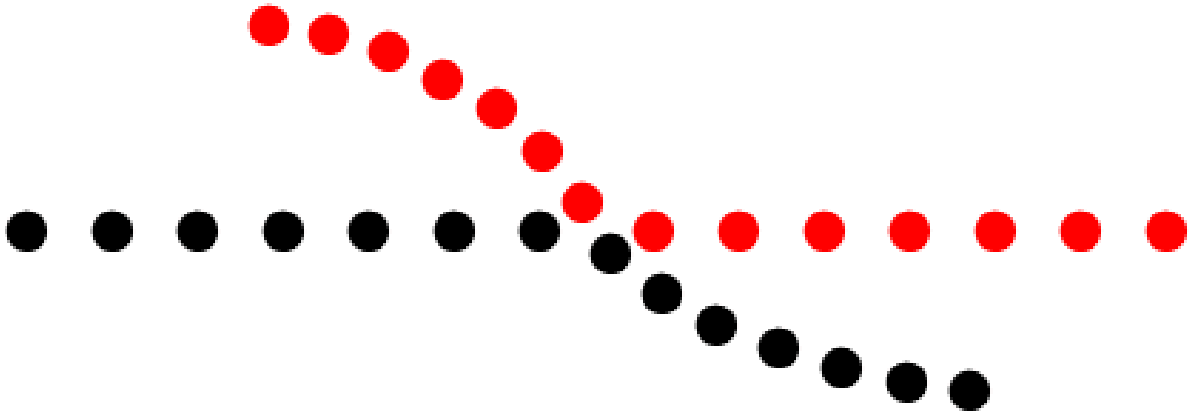
Law of Pragnanz



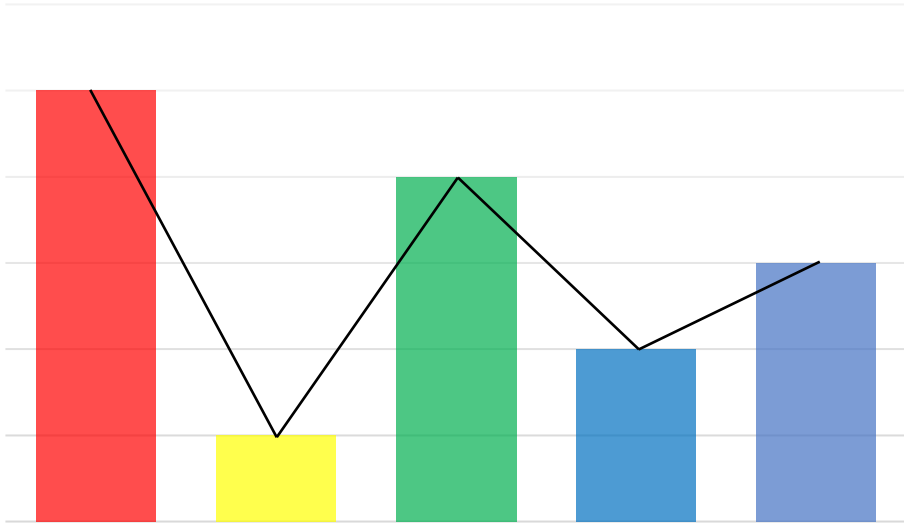
Law of Pragnanz



Law of Continuity



Law of Continuity



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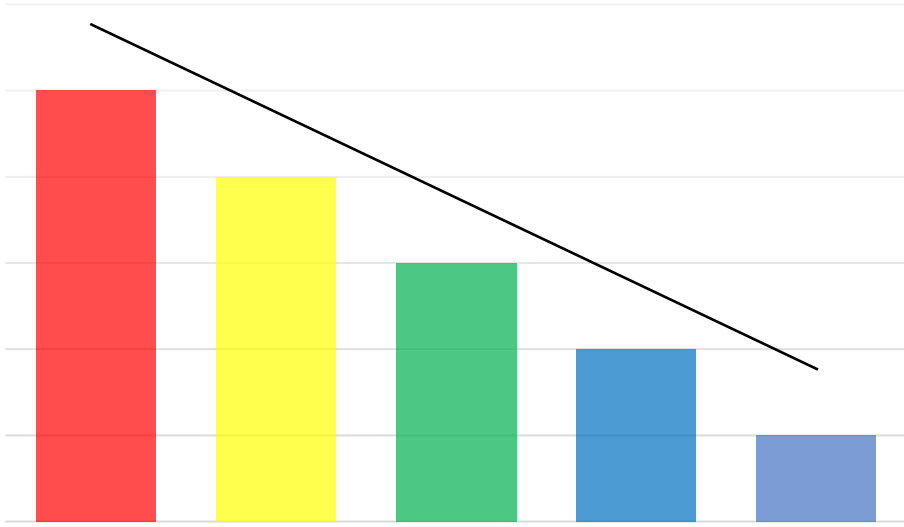
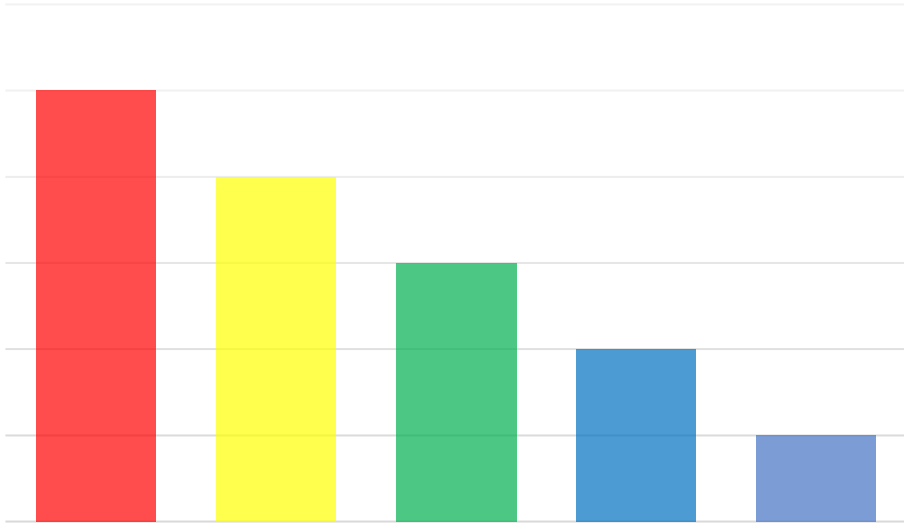
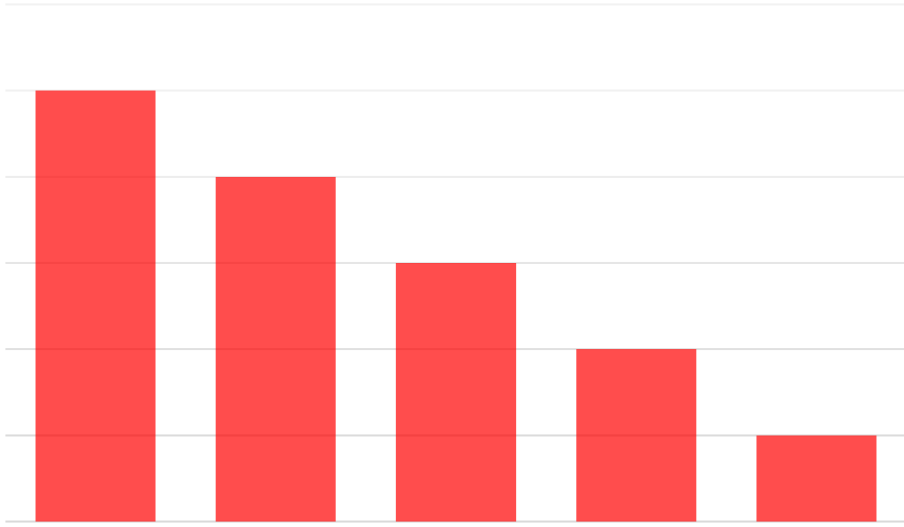


Law of Similarity

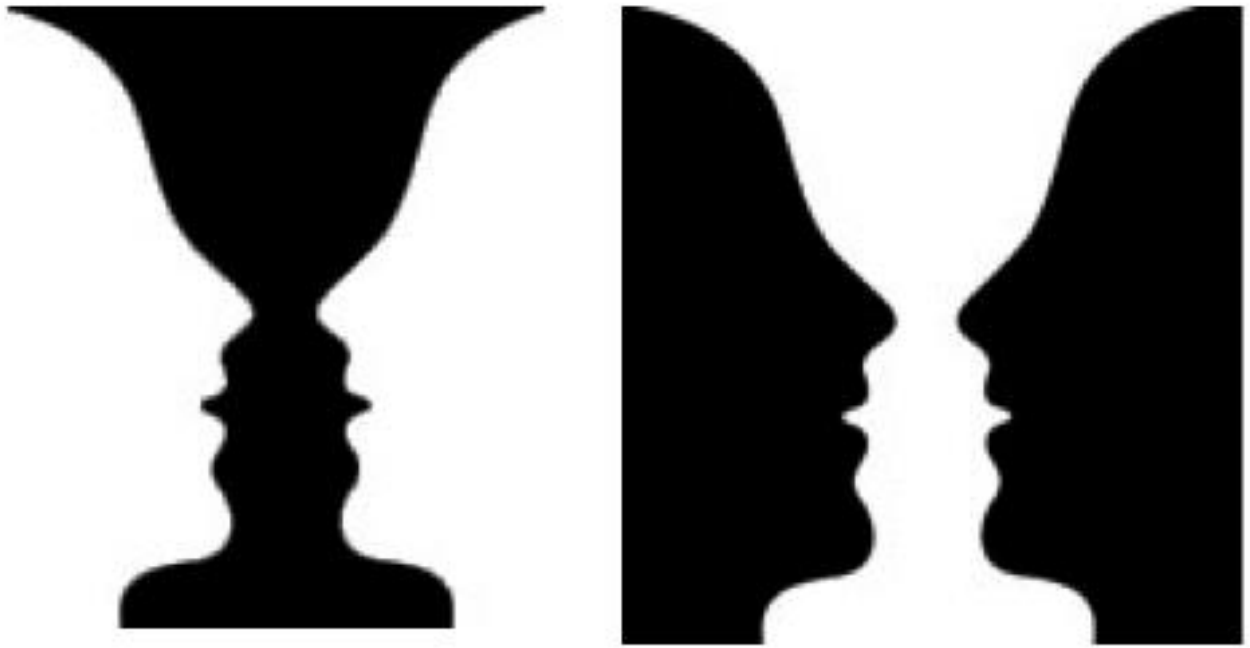
Law of Similarity



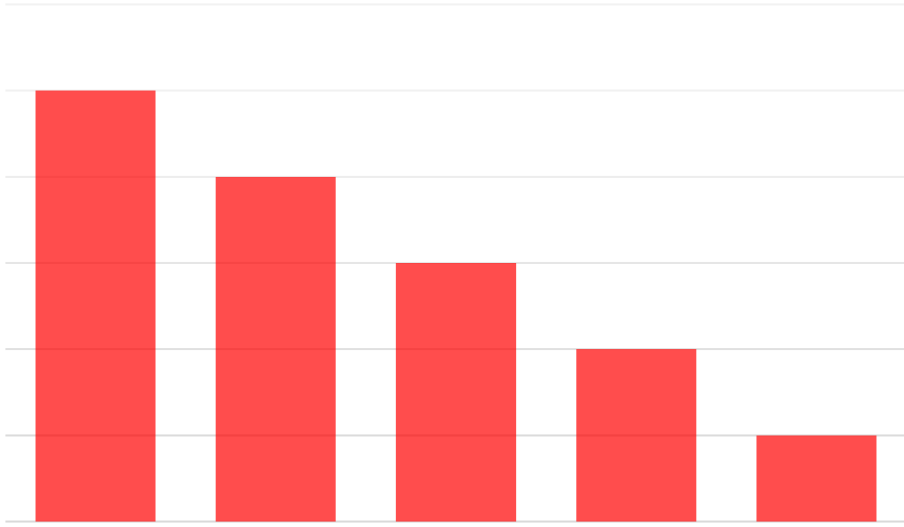
Law of Similarity



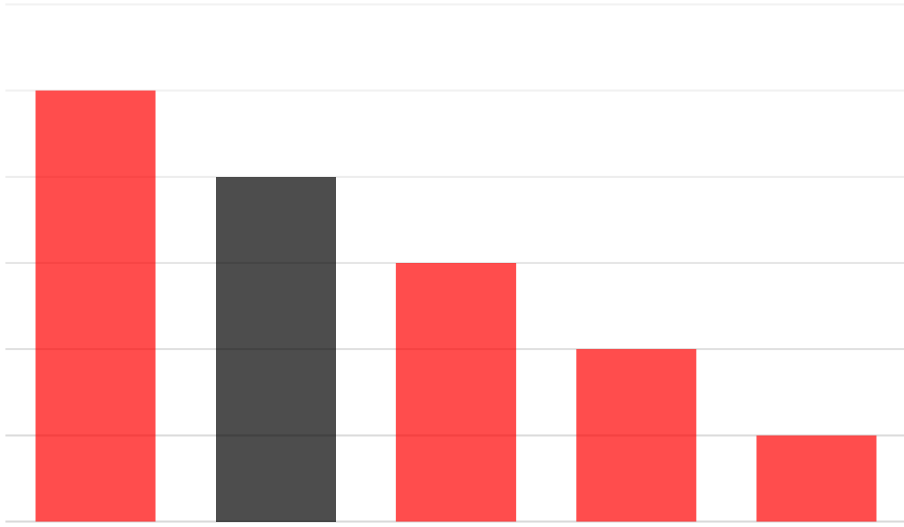
Law of Focal Point



Law of Focal Point

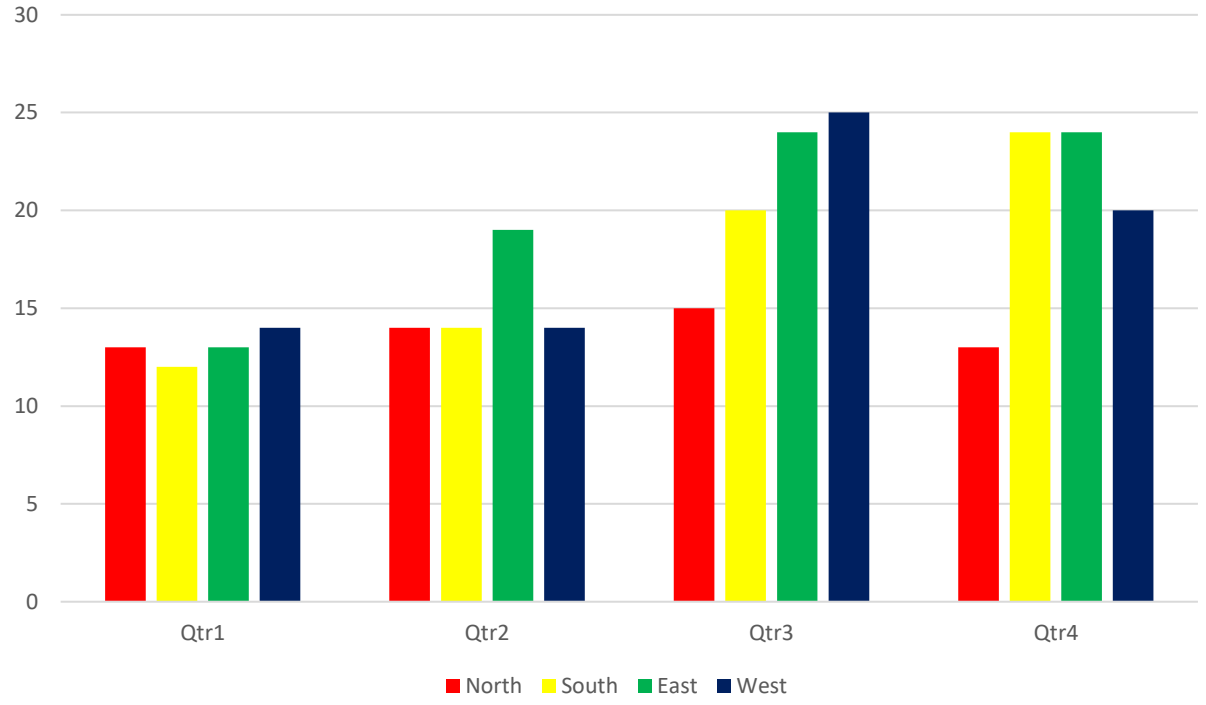


Law of Focal Point

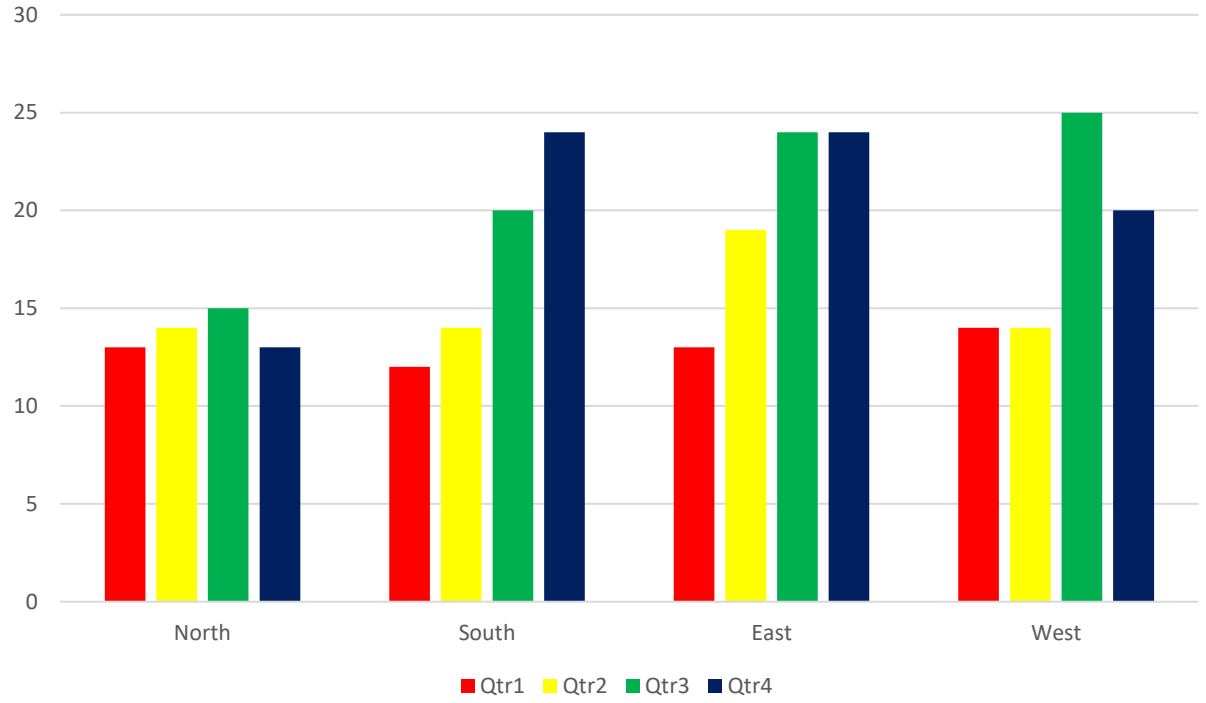


Law of Proximity

Law of Proximity



Law of Proximity



Colors

Colors

- We don’t see the same thing.
- They have innate meanings and feelings

Normal Vision

Deuteranopia

Protanopia

Tritanopia

What can we do?

- Be conscious of red and greens together.
- Find a CVD friendly palette when possible.
- Shading and gradients!
- Use help!
  - The Colorlab - http://colorlab.wickline.org/colorblind/colorlab/
  - Coblis - http://www.color-blindness.com/coblis-color-blindness-simulator/

Pitfalls to Avoid

- Not engaging the audience or user first!
- Visual Clutter – Keep it Simple
- Color Abuse
- Poor Design
- Bad Data
- Pie Charts ☺

Resources

- Gestalt Psychology – http://en.wikipedia.org/wiki/Gestalt_psychology
- Color Matters – http://www.colormatters.com
- CVD Color Lab - http://colorlab.wickline.org/colorblind/colorlab/
- Coblis - http://www.color-blindness.com/coblis-color-blindness-simulator/
- Data Visualization Catalogue - https://datavizcatalogue.com/search.html

DATA

SORTED

ARRANGED

PRESENTED
VISUALLY


+ableau®
SOFTWARE

What is Tableau

What is Tableau

Tableau is a suite of products that enables anyone to create, collaborate and captivate. Tableau compliments your natural ability to understand data visually.

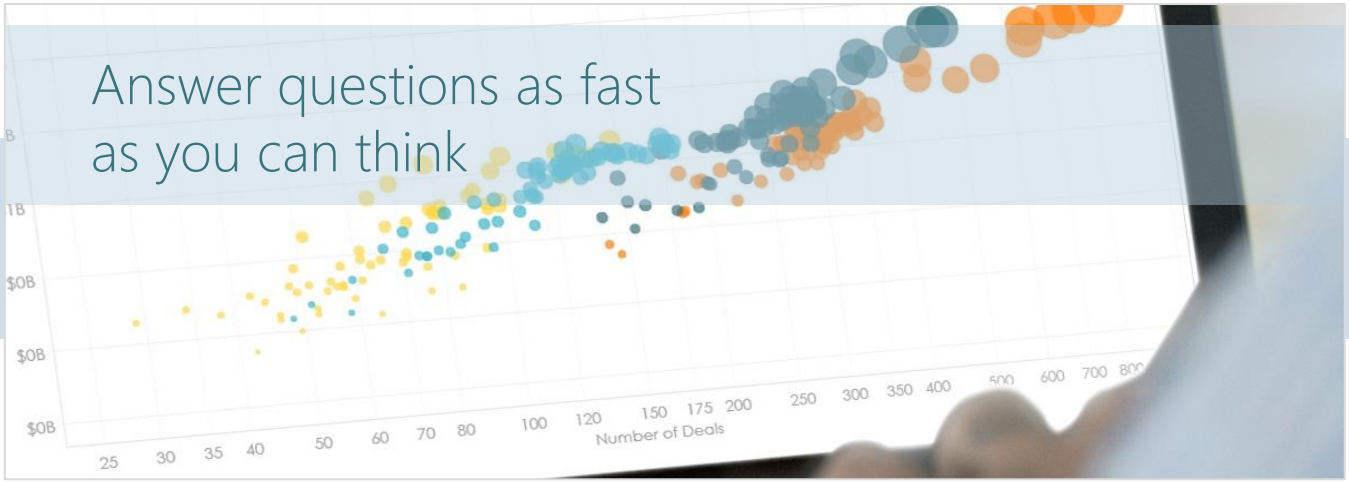
"Tableau helps people see and understand their data."

Tableau Product Family

Tableau Public

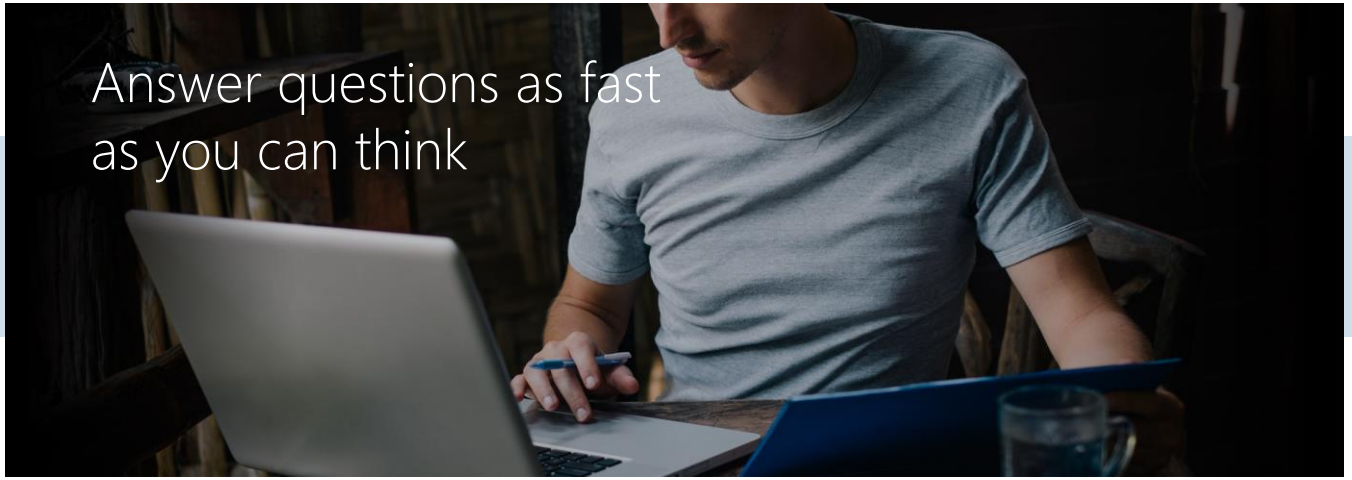
http://bit.ly/tabpublic

Tableau Desktop



http://bit.ly/tabdesktop

Tableau Reader



http://bit.ly/tabreader

Tableau Online

http://bit.ly/tableauonline

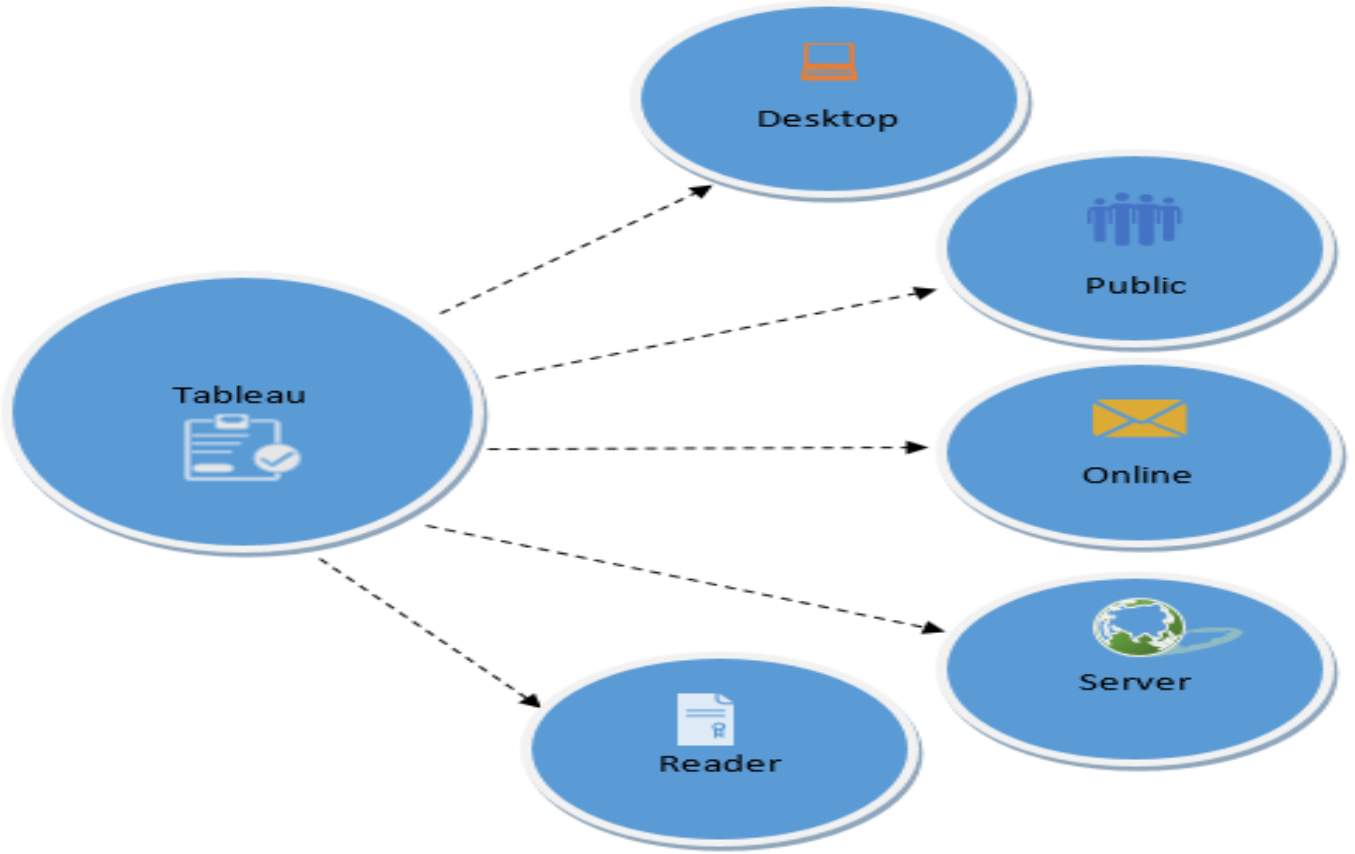
Tableau for Students

http://bit.ly/tabstu

Tableau for Non-Profits

http://bit.ly/tabnonprofit

Tableau Public



Source: https://www.guru99.com/what-is-tableau.html

Tableau: Pros and Cons

Pros:

- **Top of the line visualization capabilities**
- **Multiple Data Connections**
  https://help.tableau.com/current/pro/desktop/en-us/exampleconnections_overview.htm
- **High Performance**
  The tool also operates fast even on big data, which makes its powerful performance an important point in the list the advantages of Tableau.
- **Community**
  Large online and in person community
- **Mobile-Friendliness**
  Tableau Mobile has been downloaded more than 50000 times in Google play store

Cons:

- **Tableau Public is free, but only connects to Excel files and can only be shared to the public.**
  Tableau Server and other products have much higher cost in comparison to other tools.
- **Higher Learning Curve for Non Technical Users**
- **No custom visual imports**
- **Static and single value parameters**
- Very difficult to automate and update parameters on a dashboard.
- **Formatting for a lot of columns is very time consuming**
  - Tableau's conditional formatting and limited 16 column table displays are pain points for users. No way to change formatting for multiple columns at once.

Tableau: Definitions

•A **worksheet** contains a single view along with shelves, cards, legends, and the Data and Analytics panes in its side bar. For details on the worksheet workspace, see The Tableau Workspace.

•A **dashboard** is a collection of views from multiple worksheets. The Dashboard and Layout panes are available in its side bar. For more details about creating dashboards, see Dashboards.

•A **story** contains a sequence of worksheets or dashboards that work together to convey information. The Story and Layout panes are available in its side bar. For more details about creating stories, see Stories.

•A worksheet is where you build views of your data by dragging and dropping fields onto shelves.

•A dashboard is a combination of several views that you can arrange for presentation or to monitor.

•A story is a sequence of views or dashboards that work together to convey information.


tableau®
SOFTWARE

- Create a map with the highest sales per state
- Create a chart that shows the sales per year
- Create a chart showing the top 5 subcategory
- Create a chart showing the lowest selling product
- Create a visual showing all sales
- Allow the end user to filter by year

- Create a map with the highest profit per state
- Create a chart that shows the profit by month and year
- Create a chart showing the bottom 5 products
- Create a chart showing the highest selling product
- Create a visual showing states with the lowest amount of sales
- Allow the end user to filter by city