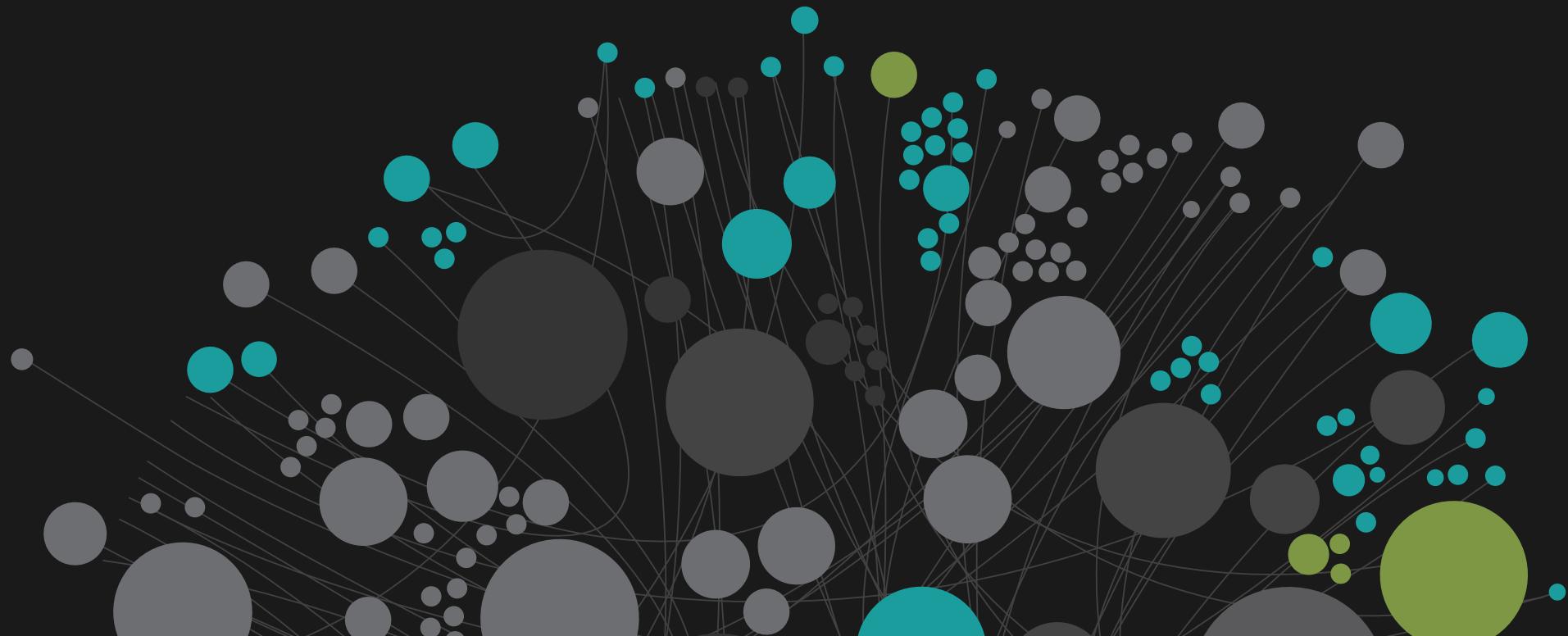


Guide to becoming a
DATA STORYTELLER



About this Guide

This is a reference guide for professionals who want to learn about Data Storytelling. This guide contains best practices related to dashboard design, appropriate use of visualization, & color palette best practices that will help create better dashboards.

Data storytelling is a methodology for communicating information - tailored to a specific audience - with a compelling narrative. Evolutionarily, we are hard-wired to share stories as a means of knowledge transfer. Theorists even suggest that storytelling was the primary launchpad for the transmission of knowledge across large groups of people, which formed cultures as we know them today and allowed evolutionary success across generations. Now, with so much data available to us, data storytelling offers the best way to put a human perspective into the increasingly complex and rapidly changing world of the digital disruption.

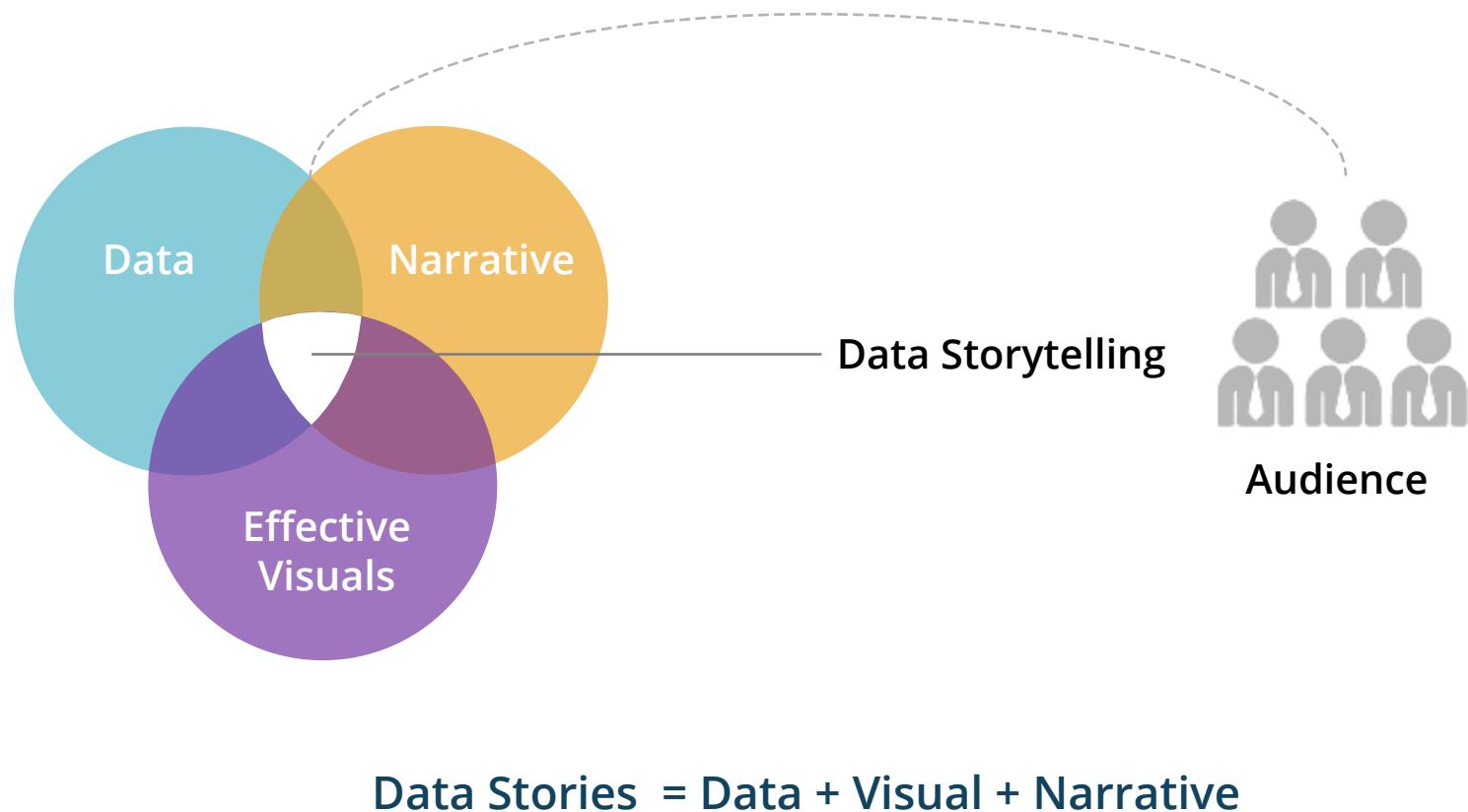


What to expect from this guide

Data Storytelling - What it means & Why we practise it	02
Categorizing Analytical Applications	05
• Types of Dashboards	
• Dashboard Anatomy	
• Color palettes	
Dashboard Design Best Practices	15
Standard Visualizations	22
Advanced Visualizations	49
Visualization comparison table	64

What is Data Storytelling?

Data storytelling is a methodology for communicating information - tailored to a specific audience - with a compelling narrative. The key outcome here is higher user adoption of Business Analytics & Information Management systems.



Why Data Storytelling?

Stories resonate and stick with us in a way data alone cannot. They have a clear beginning, middle & end; the power of repetition, narrative flow, and connection with spoken & written skills. Stories tie together information, giving our presentation or communication a framework that our audience can easily follow.

Data tells you what's happening, stories tell you why it's happening



To effectively communicate
your findings to others



To convince others
to take action



To show others
the reason why

Skillset required to become a good Data Storyteller

Data Storytelling Expert

Analytical Skills

- Business Intelligence
- Information architecture
- Data Analysis
- Development methodology
- Knowledge of BI tools**



UI/UX Skills

- Design thinking
- Cognitive Science
- Prototyping
- User interface design
- Color theory**
- Information graphics

Data Visualization skills

- Visual problem framework
- Visual storytelling
- Knowledge of various charts**
- DV Best Practices**

*This book focuses on the highlighted points



Categorizing Analytical Applications



Categorizing Analytical Applications

Types of Analytical Applications



STRATEGIC

Target Users- Decision makers & Senior Management.

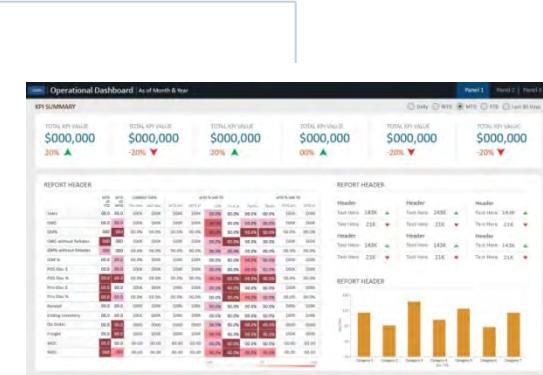
Analysis type - High level measures of performance, Snapshots of daily, weekly & monthly data.



ANALYTICAL

Target Users- Mid management & Planning team.

Analysis type - Complex data with rich comparison. Interactive display and historical data.



OPERATIONAL

Target Users- Operational workers.

Analysis type - Monitoring activities that are constantly changing. Shows real time or near real time data.

Strategic Dashboard

Target Users-Decision makers & Senior Management.

Analysis- High level measures of performance Snapshots of daily, weekly & monthly data.



Recommended Visualization:

- Bar Chart
- Spark Line
- Bullet Chart
- Heat Grid

Visualization Strategy:

Explanatory

Number of Sections:

Not more than 6-7

Key Design Considerations:

- Displays a high level overview of the business state
- Focuses on high level performance measures and Key KPIs
- More focus on actual goals instead of target
- Typically displays static snapshots of daily, weekly, or monthly data
- Provides limited user interaction
- Showcases opportunities available to the business

Best Practices:

- Avoid including too many details
- Avoid use of advance visualizations – D3.js
- Highlight outliers effectively
- Use thresholds, highlight positive and negative values
- Focus on actionable insights rather than making the dashboard attractive



Analytical Dashboard

Target Users-Mid management & planning team

Analysis- Complex data with rich comparison. Interactive display & historical data.



Recommended Visualization:

Trend Line	Time Series	Micro Chart	Scatter Plot
Bubble Graph	Stack Graph	Heat Map	

Visualization Strategy:

Exploratory

Number of Sections:

Not more than 6-7

Key Design Considerations:

- More complex data with rich comparisons
- More focus on historic data
- Interactive display with high user interaction
- Typically displays historic data with YOY (Year on Year) comparison
- Showcases an in depth analysis of data
- Includes drill down functionalities
- Offers the flexibility to filter data from multiple parameters
- Includes data discovery capabilities

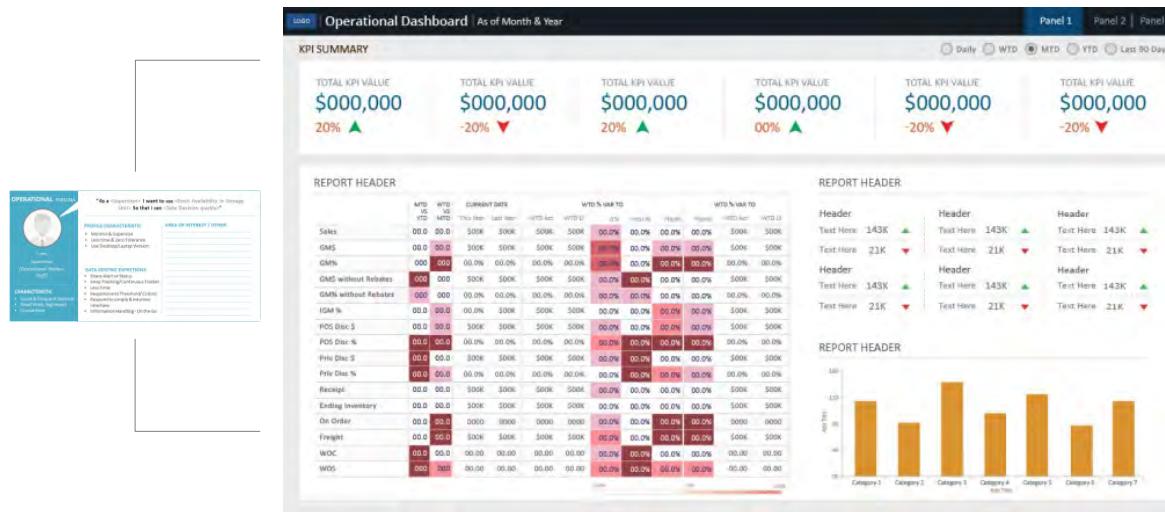
Best Practices:

- Use interactive visualizations
- Highlight insights properly
- Focus on actionable insights rather than making the dashboard attractive

Operational Dashboard

Target Users-Operations professionals

Analysis- Monitoring activities that are constantly changing. Shows real time or near real time data.



Recommended Visualization:

Heat Grid/ Threshold Grid	Deviation Graph	Threshold/ Up-Down Arrows	Heat Map
---------------------------------	--------------------	---------------------------------	----------

Visualization Strategy:

Explanatory

Number of Sections:

Not more than 3-4

Key Design Considerations:

- Focuses on high level measures of performance and Key KPIs
- More focus on real or near real time data
- Offers Quick & static snapshot
- Typically displays static snapshots of daily data
- Displays high level overview of the state of the business
- Showcases up and down in daily business
- More focus on outliers

Best Practices:

- Avoid putting too many details
- Keep visualizations simple but actionable
- Make good use of pre-attentive attributes
- Use thresholds and highlight positive & negative values
- Focus on actionable insights rather than making the dashboard attractive



DASHBOARD ANATOMY

A Dashboard is a visual display of the most important information needed to achieve one or more objectives that fit entirely on a single computer screen, so it can be monitored at a glance.

Corporate Branding

It's highly recommended to follow corporate brand guidelines while designing the layout and color theme of the dashboard. Top left corner is the ideal place to present your logo.

Dashboard Header

The header appears at the top of every dashboard screen. The top left area is the perfect place for your header along with your logo and business identity.

Date and Currency

You should mention the dashboard's execution date in the top bar. Eg: As of DD/MM/YY, or the standard date format used across the dashboard. It is also recommended to show currency used in the header. Eg: All values in US\$.

Report Area

This is the report area. You should try to keep the layout flexible, so it can be adjusted according to the size of the visualization.



Footer

The lowest bottom section can contain footer information like Copyright details, last executed date, etc.

Summary Section

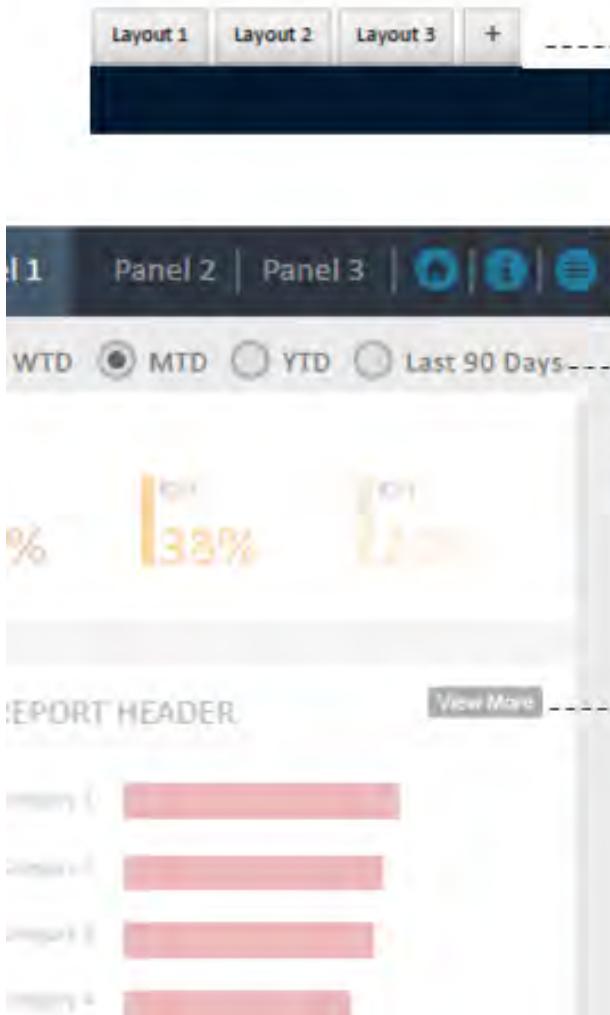
This is the most visible part of the dashboard. It should contain high level overview /Key KPIs that answer your dashboard's main objective.

Report Header

Every report should have a header. Use headlines that capture the user's attention. Avoid dark backgrounds and all UPPER CASE headers.



DASHBOARD ANATOMY



Layout Navigation

Use the dashboard layout to navigate between different dashboards.

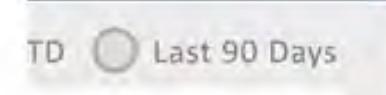


Info Icons

Use Home icons to navigate to the landing screen. Show info icons to display the flow of information or calculation of metrics.

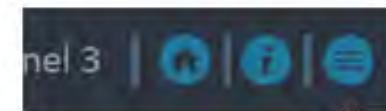
Primary Navigation

The primary navigation menu connects the user to different screens of the dashboard. Here, use of the button bar/link bar works best. Ideally, a dashboard should not contain more than 3-4 screens.



Secondary Navigation

The secondary navigation menu connects the user to different sub-screens/panels of screen. Use of a link bar/radio button is recommended.

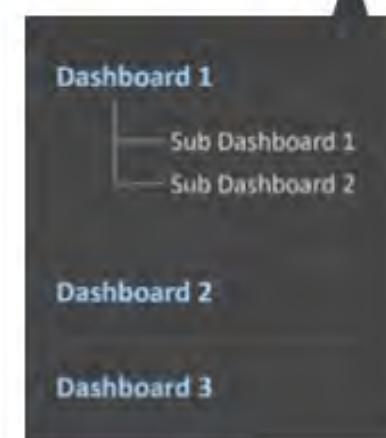


Menu Icons

Use navigation icons to move to other dashboards. The same functionality can be used if your dashboard/app has multiple panels that cannot be accommodated on the main screen.

Call to Action

The "Call to action" is used to motivate the user to take the next step. Eg: Learn more, Drill, View more.



Dashboard 1

Sub Dashboard 1
Sub Dashboard 2

Dashboard 2

Dashboard 3



COLOR PALETTE

Types of Color Palettes

SEQUENTIAL

Color is ordered from low to high



DIVERGING

Two sequential colors with a neutral mid point



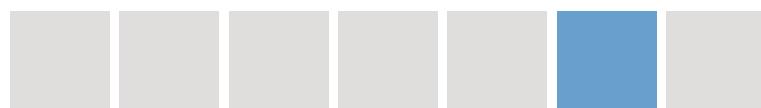
CATEGORICAL

Contrasting colors for individual comparison



HIGHLIGHT

Color used to showcase a particular value



ALERT

Color used to convey a warning





COLOR PALETTE

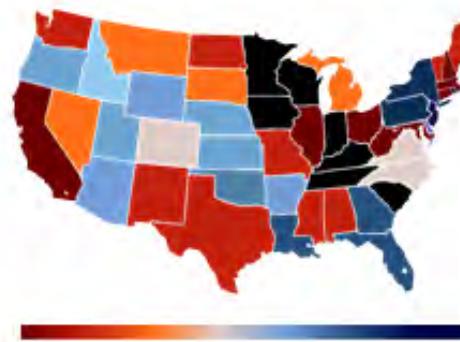
SEQUENTIAL

Color is ordered from low to high



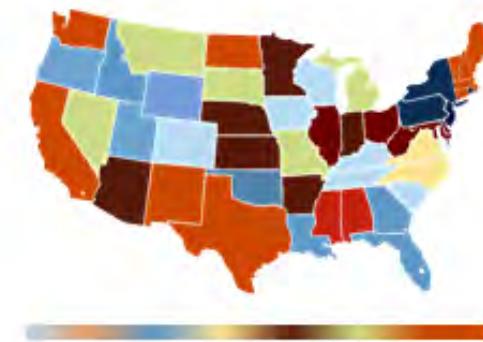
DIVERGING

Two sequential colours with a neutral mid point



CATEGORICAL

Contrasting colours for individual comparison



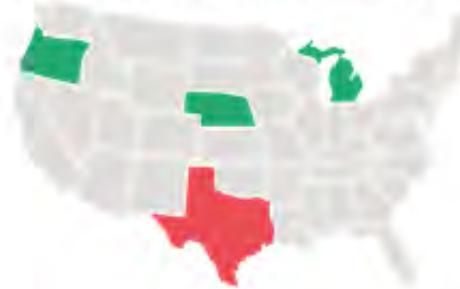
HIGHLIGHT

Colour used to showcase a particular value



ALERT

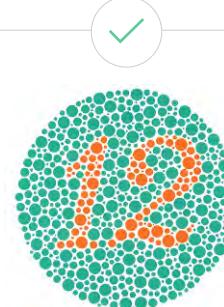
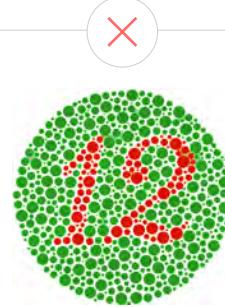
Color used to convey a warning





COLOR PALETTE - DESIGN BEST PRACTICES

1



USE OF COLOR CODE

Color blind people cannot distinguish color coded groups of data. Therefore, avoid using a combination of red and green in the same display.

3



DISTINGUISH COLORS FOR PRINTING

Most printers are black and white, so ensure use of contrasting colors for an ideal print.

2

A table titled 'Sales Summary' showing sales data. The first row shows Sales: 1,495,891,101 and % Variance: 29% ▲. The second row shows Sales: 1,495,891,101 and % Variance: 26% ▼. A red 'X' is positioned above the table.

Sales Summary	
SALES 1,495,891,101	% VARIANCE 29% ▲
SALES 1,495,891,101	% VARIANCE 26% ▼



Sales Summary

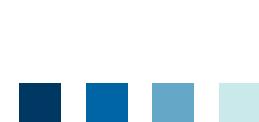
A table titled 'Sales Summary' showing sales data. The first row shows Sales: 1,495,891,101 and % Variance: 29% ▲. The second row shows Sales: 1,495,891,101 and % Variance: 26% ▼. A green checkmark is positioned above the table.

Sales Summary	
SALES 1,495,891,101	% VARIANCE 29% ▲
SALES 1,495,891,101	% VARIANCE 26% ▼

USE OF THRESHOLDS

Red and green colors should be used to represent values: Green represents a positive value and red represents a negative value.

4



AVOID A BRIGHT BACKGROUND AND FLASHY COLORS

Use a background color that contrasts sufficiently with the objects in a table or graph to ensure proper visibility.



Dashboard Design Best Practices



TOP 10 DASHBOARD BEST PRACTICES

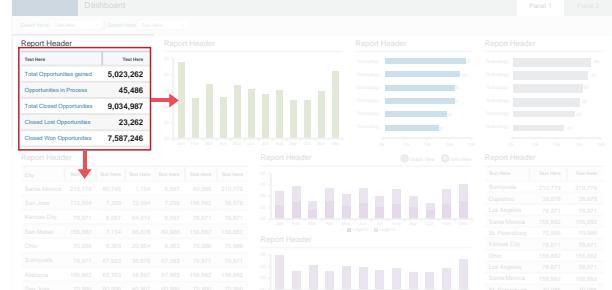
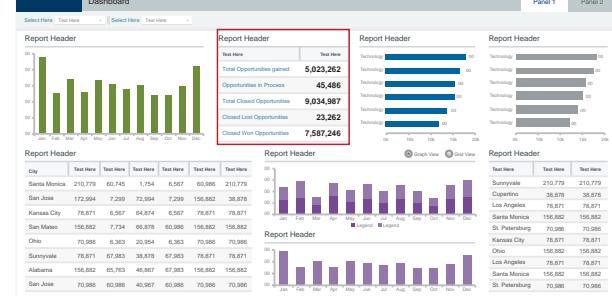
1



EXCEEDING BOUNDARIES OF THE DASHBOARD

Critical information may be overlooked if the user has to scroll to access data. All information should be visible at once.

2



INFORMATION HIERARCHY

Summary information should be at the top left corner of the dashboard. Organize related information in groups. Highlight the most important information.



TOP 10 DASHBOARD BEST PRACTICES

3



Sales Summary

KPI's	Value	Variance %
Sales	1,495,891,101	29%
Cost	872,630,528	26%



Sales Summary

SALES 1,495,891,101	% VARIANCE 29% ▲
COST 872,630,528	% VARIANCE 26% ▼

HIGHLIGHT IMPORTANT INFORMATION EFFECTIVELY

Not everything that deserves space on a dashboard is equally important. The viewer's eye should always be directed to the most crucial information first. Users should immediately be drawn to your key piece of information.

4



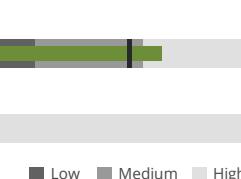
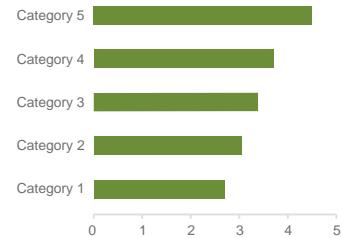
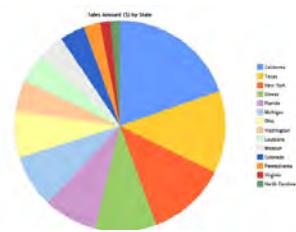
AVOID DISPLAYING EXCESSIVE DETAILS

Dashboards include high-level information for a quick overview. Too much detail, expressed too precisely, slows the pace of viewers. For Eg: Use \$3.8 M instead of \$3848305.93 or \$3848305



TOP 10 DASHBOARD BEST PRACTICES

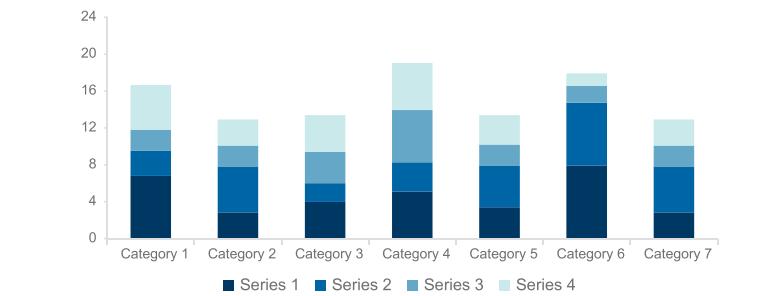
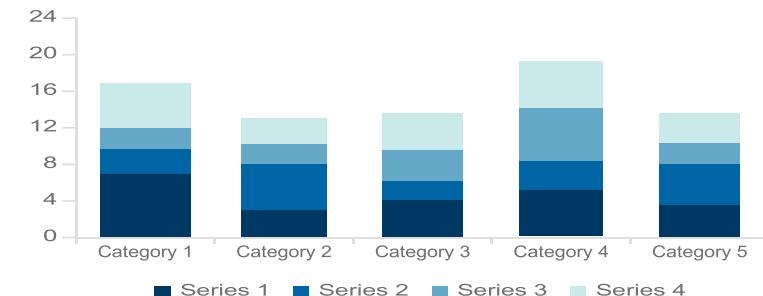
5



MAKE APPROPRIATE USE OF VISUALIZATION

Use the right representation for information. Do not overuse the visualization.

6



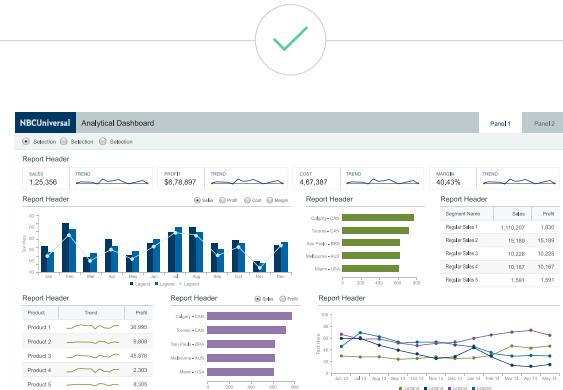
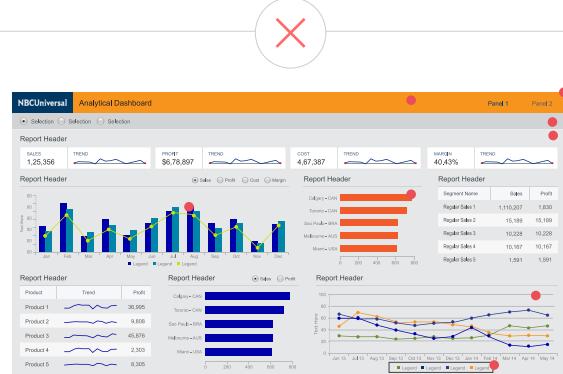
AVOID OVERRSIZING OF VISUALIZATION

Do not oversize the visualization on the screen to cover real estate. Stretching the visuals to cover white space is not a good idea.



TOP 10 DASHBOARD BEST PRACTICES

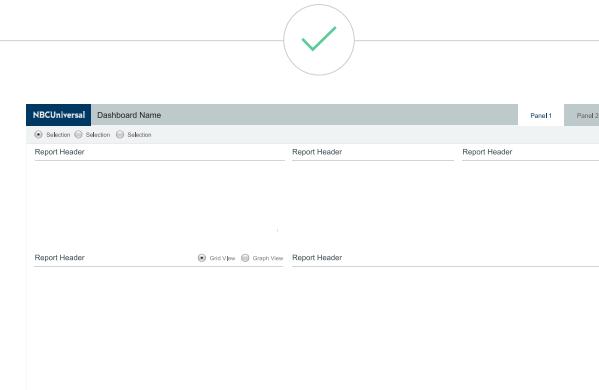
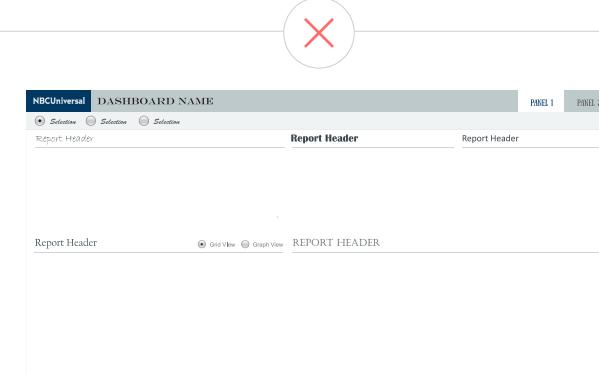
7



AVOID ALL NON DATA INK ELEMENTS

Avoid dark background colors for grids and graphs. Don't use bright fluorescent colors in graphs; Don't use borders for legends. Use grid lines only when necessary.

8



FONT SELECTION

Using too many font types makes the text hard to read & the font appears squished.



TOP 10 DASHBOARD BEST PRACTICES

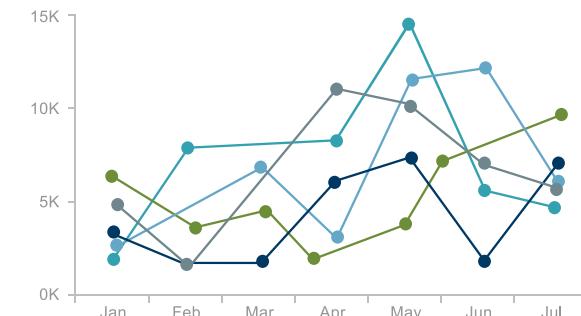
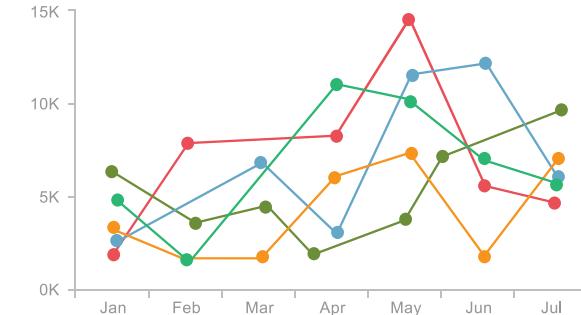
9



USA

Year	Quarter	Revenue	Profit
2004	2004 Q1	\$3,716,936	\$728,845
	2004 Q2	\$4,098,981	\$680,759
	2004 Q3	\$4,735,816	\$807,633
	2004 Q4	\$5,200,773	\$792,724
2005	2005 Q1	\$4,926,100	\$965,306
	2005 Q2	\$4,766,520	\$798,841
	2005 Q3	\$5,444,619	\$938,587
	2005 Q4	\$6,130,674	\$931,026
2006	2006 Q1	\$5,924,153	\$1,157,038
	2006 Q2	\$6,264,745	\$1,046,815
	2006 Q3	\$6,506,814	\$1,112,070
	2006 Q4	\$7,068,053	\$1,048,502
Total		\$64,785,192	\$11,008,348

10



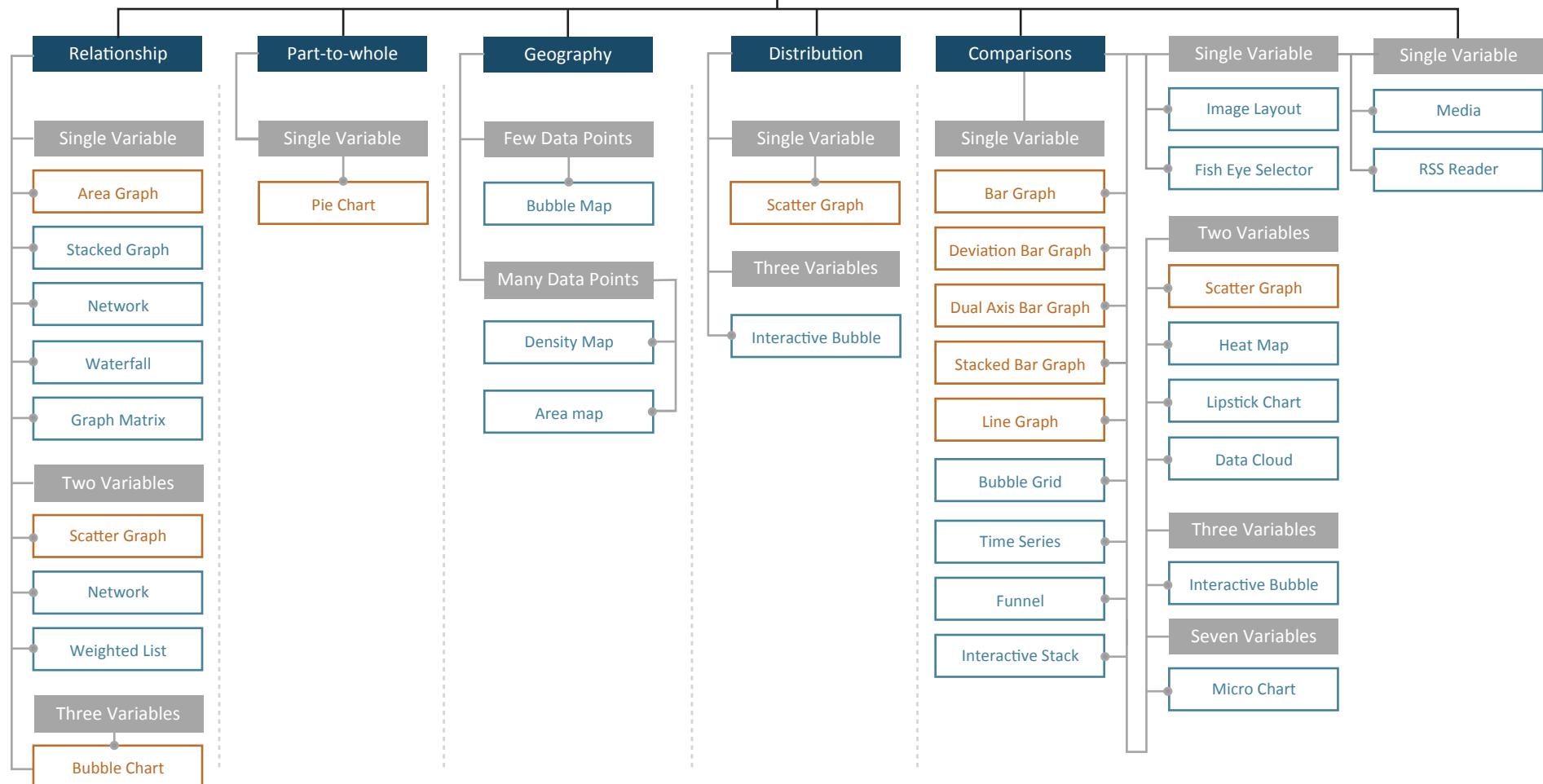
USE OF GRIDS

Headers should be distinctive from the body, delete non-data ink (bg color, gridlines); attribute headers and values should be left aligned; metric headers and values should be right aligned; total should be clearly visible.

USE OF COLORS

Red and green colors should be used to represent values: Green represents positive and red represents a negative value. Avoid use of threshold colors on graphs.

Choose the Right Chart Type for your Data



■ Standard Visualizations ■ Advanced Visualizations



Standard Visualizations



Bar Chart



Deviation Bar Chart



Dual Axis Bar Chart



Stacked Bar Chart



Line Chart



Pie Chart



Bubble Chart



Scatter Plot



Area Chart



Box Plot



Gantt Chart



HiLow Stock / Candlestick



Histogram



Pareto Chart



Radar Chart

 **BAR CHART**

When to use a Bar Chart

The classic bar chart uses either horizontal or vertical bars to show discrete, numerical comparisons among categories. One axis of the chart shows the specific categories being compared, and the other axis represents a discrete value.

Some bar graphs present bars clustered in groups of more than one (grouped bar graphs), and others show the bars divided into subparts to show cumulative effect (stacked bar graphs).

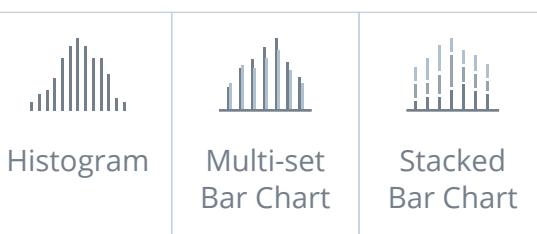
Functions

Comparisons	Patterns	Relationships
-------------	----------	---------------

Report Objects Required

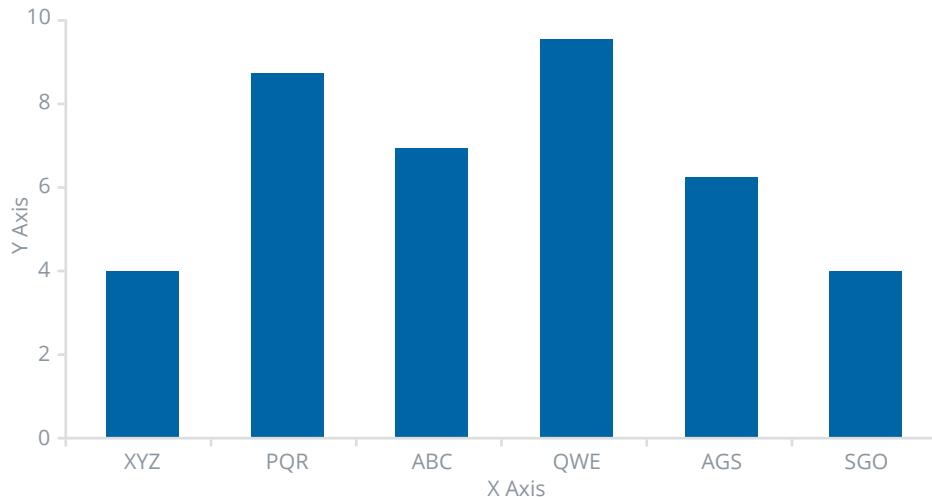
1 Dimensions	1 Measures
--------------	------------

Alternative / Related Visualizations

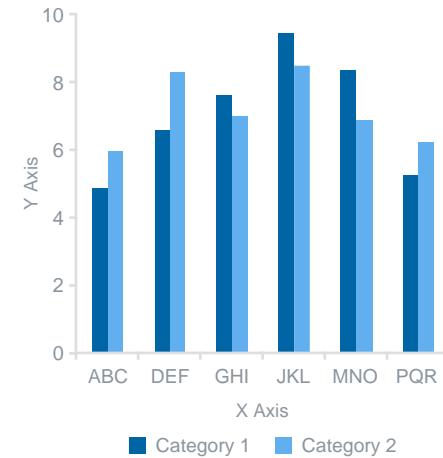
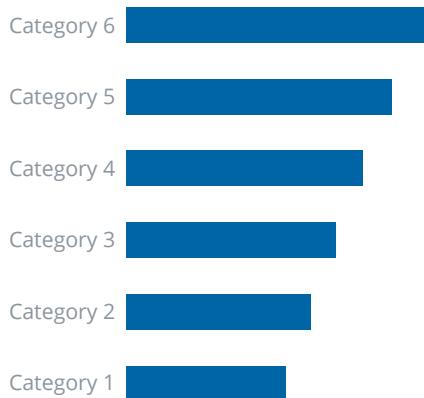


Standard Visualization > Comparisons > **Bar Chart**

Vertical Bar Chart



Variations





DEVIATION BAR CHART

When to use a Deviation Bar Chart

When graphs display deviation relationships, they communicate how one or more set of metric values differ from a primary set of values. Deviation relationships can be effectively displayed using the following objects:

- Horizontal bars (except when combined with a time-series relationship)
- Vertical bars

Functions

Comparisons Patterns Relationships

Report Objects Required

1 Dimensions

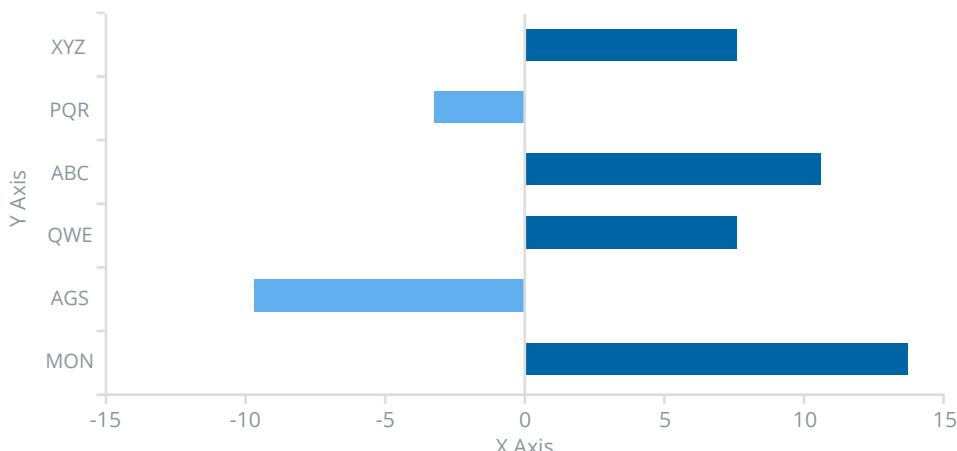
1 Measures

Standard Visualization > Comparisons > **Deviation Bar Chart**

Vertical Deviation Bar Chart



Variations Horizontal Deviation Bar Chart





DUAL AXIS BAR CHART

When to use Dual Axis Bar Chart

A Dual Axis bar chart uses either horizontal or vertical bars to show discrete, numerical comparisons among categories. It can be a combination of a bar and a line with 3 axes. One axis of the chart shows the categories and the other two axes show respective values.

Functions

Comparisons Patterns Relationships

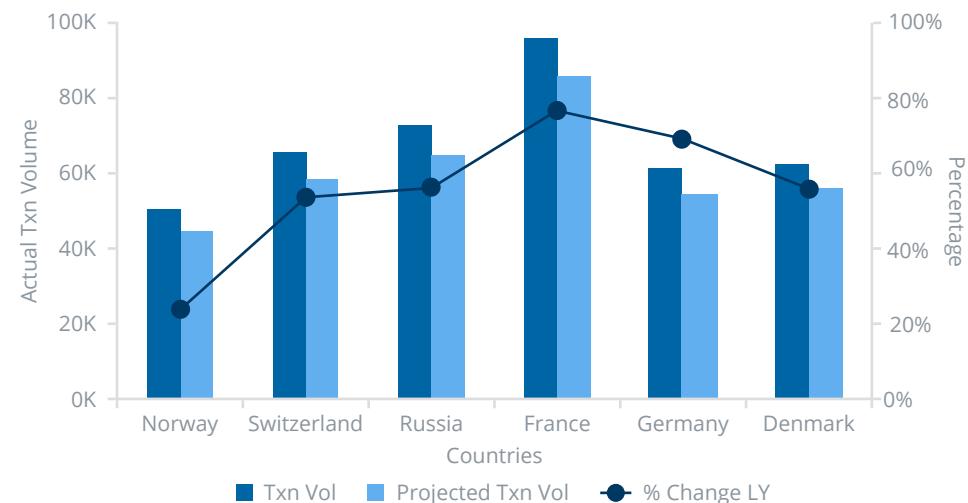
Report Objects Required

1 Dimensions

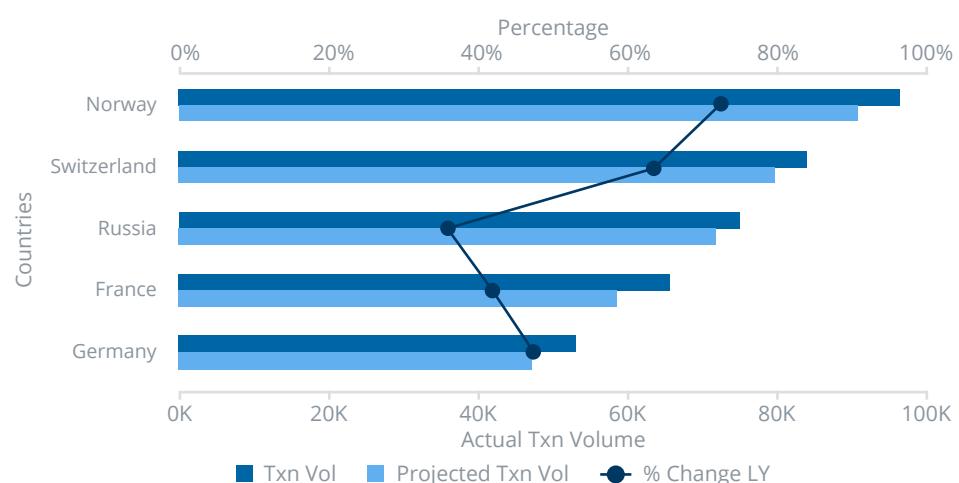
1 Measures

Standard Visualization > Comparisons > **Dual Axis Bar Chart**

Dual Axis Bar Chart



Variations Horizontal Dual Axis Bar Chart



STACKED BAR CHART

When to use a Stacked Bar Chart

Stacked Bar Graphs segment the bars of multiple datasets on top of each other. They are used to show how a larger category is divided into smaller categories and what the relationship of each part has on the total amount. There are two types of Stacked Bar Graphs:

- Simple Stacked Bar Graphs
- 100% Stacked Bar Graphs

Functions

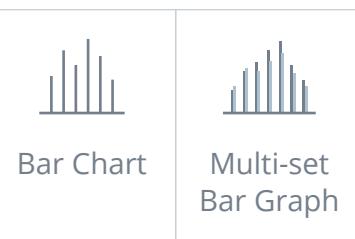
Patterns Proportions Comparisons Relationships

Part-to-a-whole

Report Objects Required

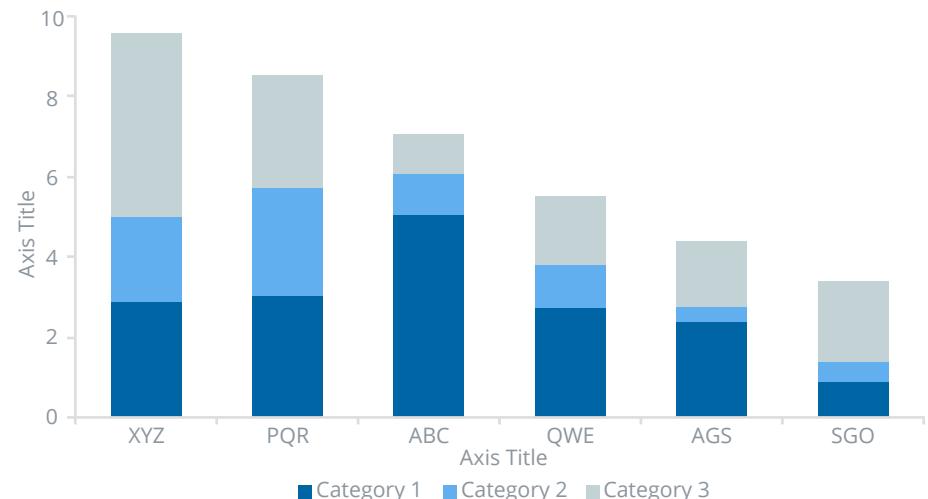
2 Dimensions 1 Measures

Alternative / Related Visualizations

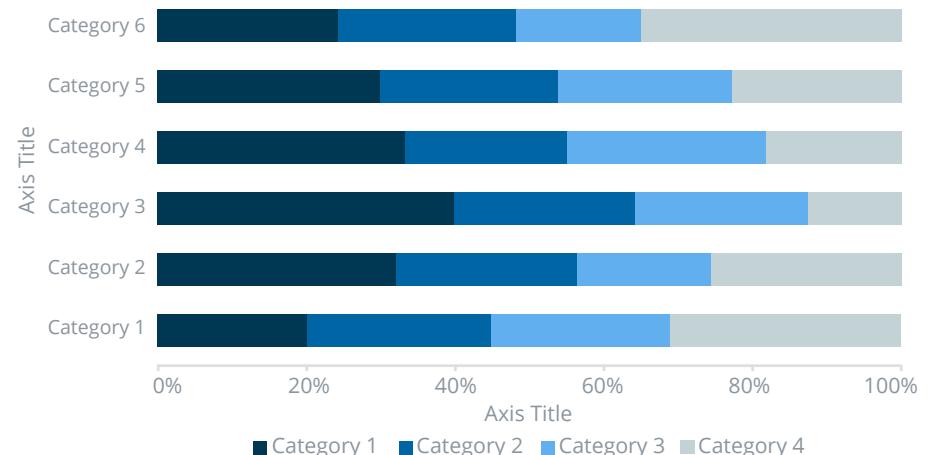


Standard Visualization > Part-to-a-whole > **Stacked Bar Chart**

Vertical Stacked Bar Graph

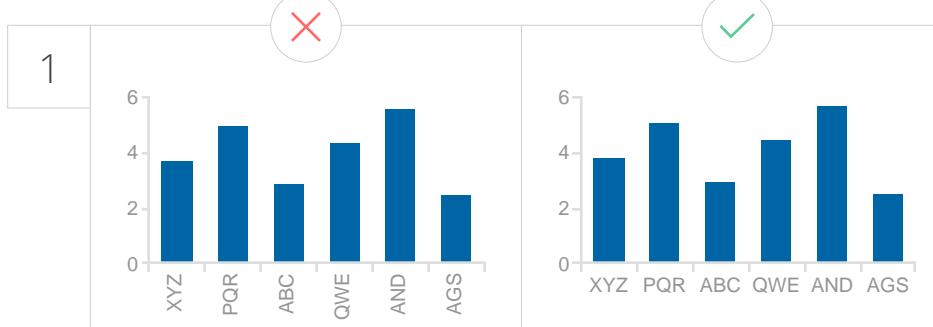


Variations Horizontal 100% Stacked Bar Chart



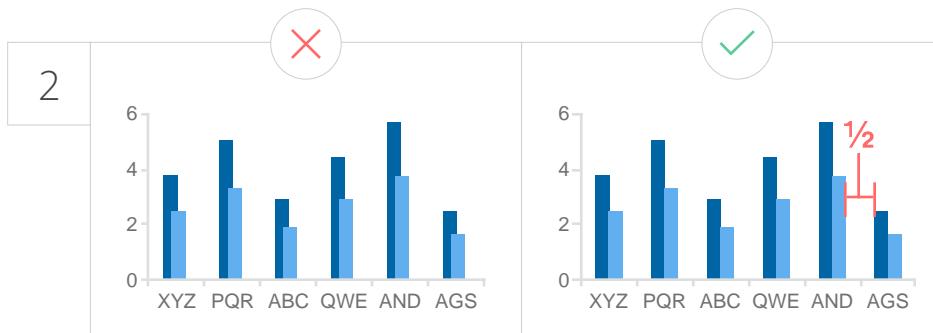


BAR CHART - DESIGN BEST PRACTICES



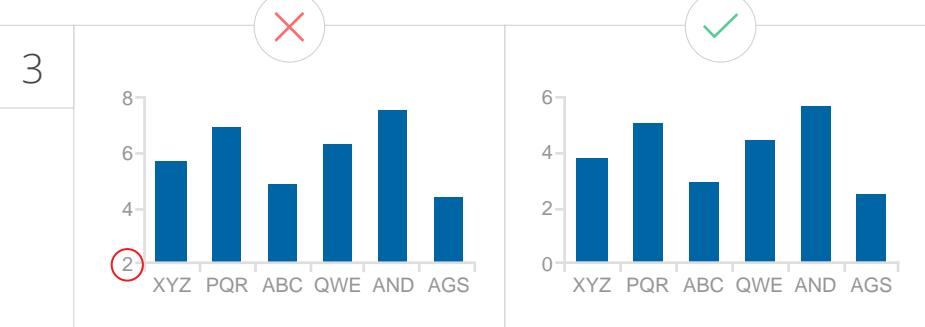
USE HORIZONTAL LABELS

Avoid steep diagonal or vertical labels as they can be difficult to read.



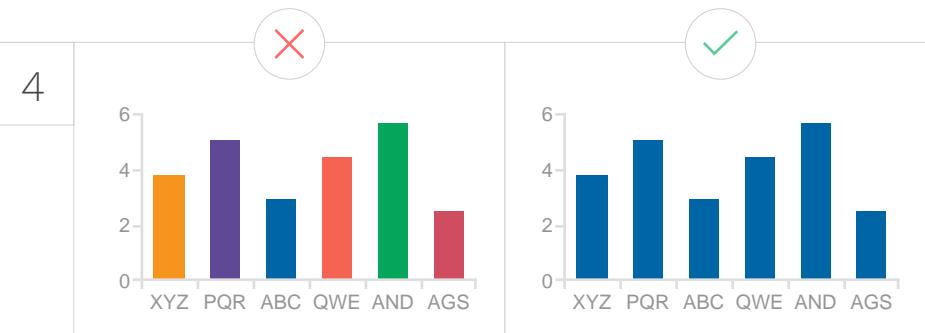
SPACE BARS APPROPRIATELY & AVOID OVERLAPPING

The space between bars should be half of a bar in width and bars should not overlap.



START THE Y-AXIS VALUE AT 0

Starting at a value above zero truncates the bars and doesn't accurately reflect the full value.

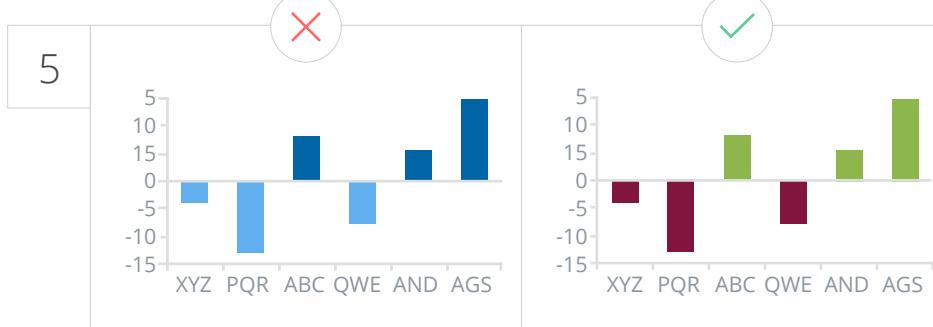


USE CONSISTENT COLORS

Use one color for bar charts. You may use an accent color to highlight a significant data point.

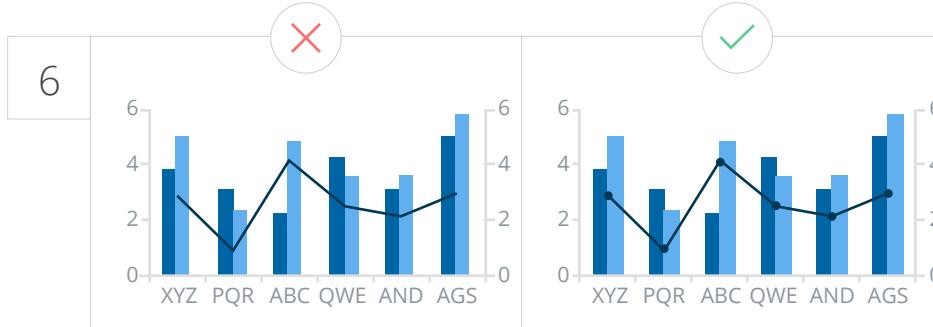


BAR CHART - DESIGN BEST PRACTICES



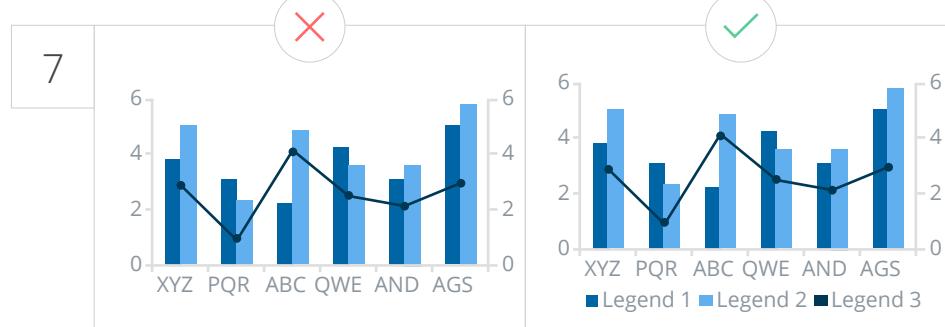
USE OF COLORS

Use easily distinguishable colors to show positive and negative values.



MAKE USE OF POINTERS

Solid filled pointers help understand the data well. They should be used on the tip of the line.



LABEL THE LEGENDS

This lets readers quickly identify lines and corresponding labels by referring to the legends.



AVOID USE OF BACKGROUND COLORS

Do not use any background colors, as they might steal focus.


LINE CHART

When to use a Line Chart

Line charts are used to display quantitative values over a continuous interval or time span. They are most frequently used to show trends and relationships (when grouped with other lines). This gives the "big picture" over an interval, to see how it has developed over that period.

Line graphs are drawn by first plotting data points on a Cartesian coordinate grid, then connecting a line between the points. Typically, the y-axis has a quantitative value, while the x-axis has either a category or sequenced scale.

Functions

Patterns	Proportions	Comparisons	Relationships
----------	-------------	-------------	---------------

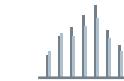
Report Objects Required

2 Dimensions	1 Measures
--------------	------------

Alternative / Related Visualizations



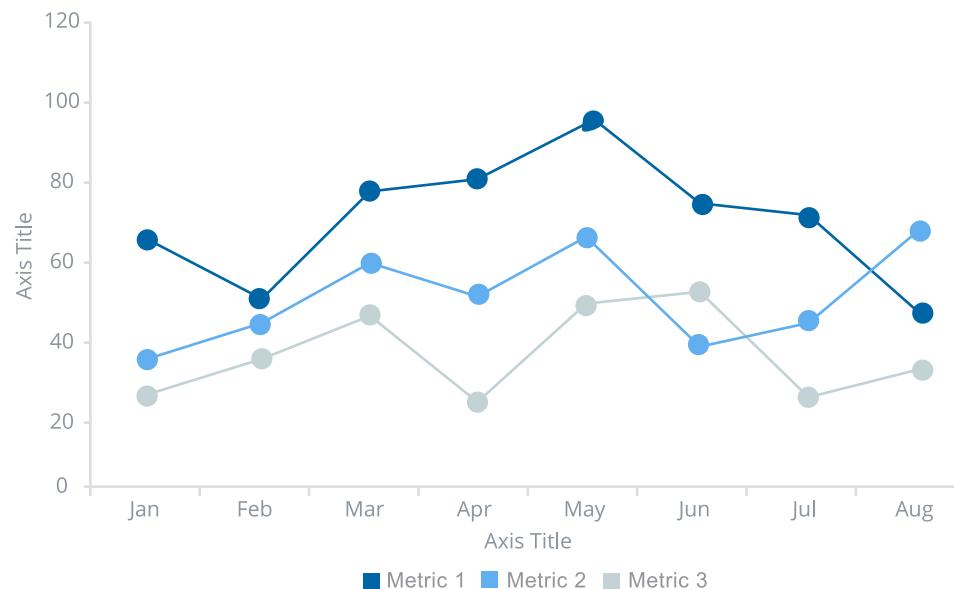
Bar Chart



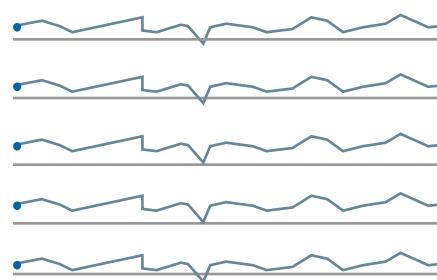
Multi-set Bar Graph

Standard Visualization > Comparisons > **Line Chart**

Line Chart

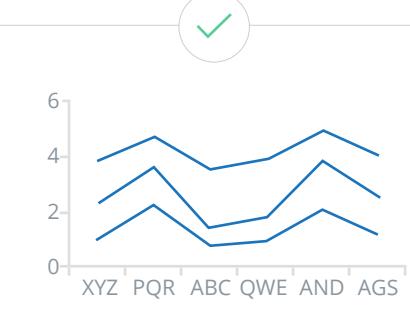
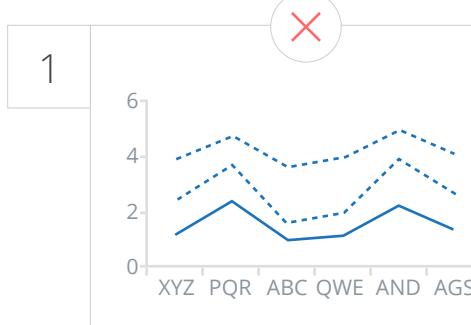


Variations Sparkline





LINE CHART - DESIGN BEST PRACTICES



USE ONLY SOLID LINES

Dashed and dotted lines can be distracting.



DON'T USE A SMOOTHED LINE

Avoid use of a smoothed line in a line graph, because it can be misleading.

MAKE USE OF POINTERS

Solid filled pointers help understand the data well. They should be used on the line tip between, or, on the corresponding labels.

LABEL THE LEGENDS

This lets readers quickly identify lines and corresponding labels by referring to the legends.



PIE CHART

When to use a Pie Chart

Pie charts help show proportions and percentages between categories, by dividing a circle into proportional segments. Each arc length represents a proportion of each category; the full circle represents the total sum of all the data, equal to 100%.

Pie charts are used for making part-to-whole comparisons with discrete or continuous data. They are most impactful with a small data set.

Functions

Comparisons

Proportions

Part-to-a-whole

Report Objects Required

1 Dimensions

1 Measures

Alternative / Related Visualizations



Stacked Bar Chart



Stacked Area Chart



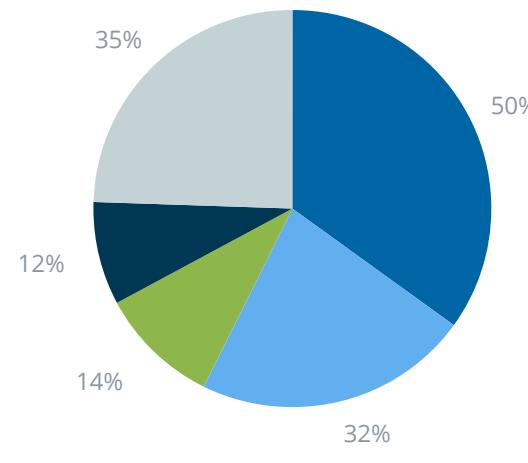
Donut Chart



Funnel

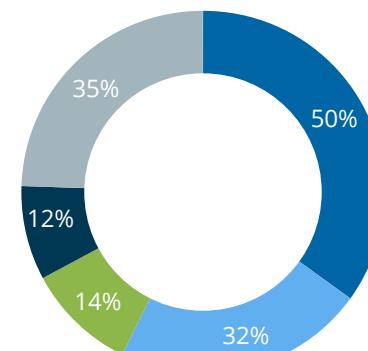
Standard Visualization > Part-to-whole > **Pie Chart**

Pie Chart



■ Category 1 ■ Category 2 ■ Category 3 ■ Category 4 ■ Category 5

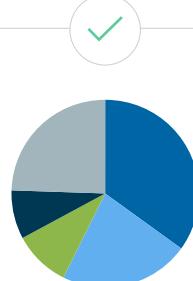
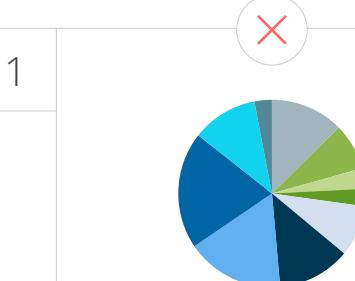
Variations Donut Chart



■ Category 1 ■ Category 2 ■ Category 3 ■ Category 4 ■ Category 5

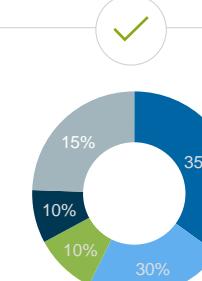
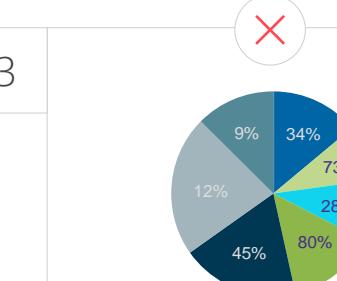


PIE CHART - DESIGN BEST PRACTICES



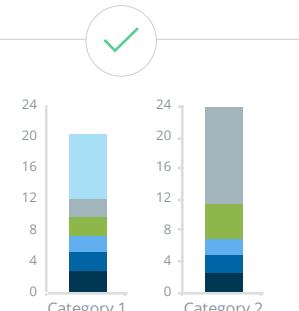
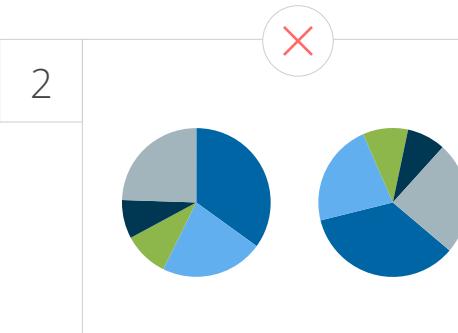
VISUALIZE NO MORE THAN 5 CATEGORIES PER CHART

It is difficult to differentiate between small values; depicting too many slices decreases the impact of the visualization. .



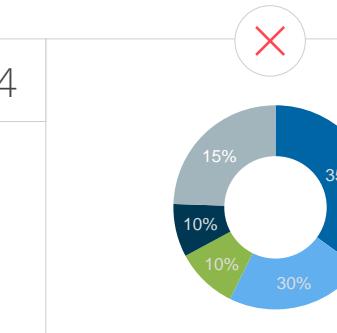
MAKE SURE ALL THE DATA ADDS UP TO 100%

Verify that values total 100% and that pie slices are sized in proportion to their corresponding value.



DON'T USE MULTIPLE PIE CHARTS FOR COMPARISON

Slice sizes are very difficult to compare side-by-side. Use a stacked bar chart instead.



USE STACKED BAR GRAPH INSTEAD OF PIE OR DONUT

Use of Stacked bar graph is recommended as it makes the values easy to read as compared to a pie chart.



BUBBLE CHART

When to use a Bubble Chart

Bubble Charts are typically used to compare and show the relationships between labeled/categorized circles, by the use of positioning and proportions. The overall picture of Bubble Charts can be used to analyze patterns/correlations.

Bubble Charts use a Cartesian coordinate system to plot points along a grid where the X and Y axis are separate variables. Each point is assigned a label or category (either displayed alongside or on a legend). Each plotted point then represents a third variable by the area of its circle. Colors can also be used to distinguish between categories or to represent an additional data variable.

Functions

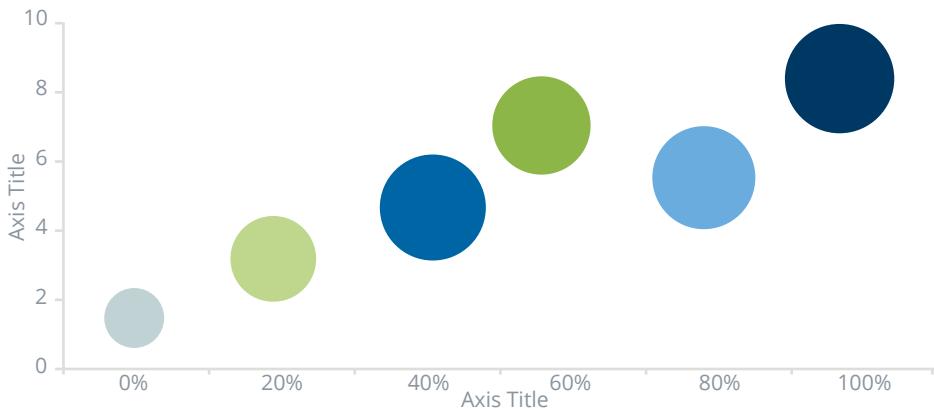
Patterns Comparisons Relationships

Report Objects Required

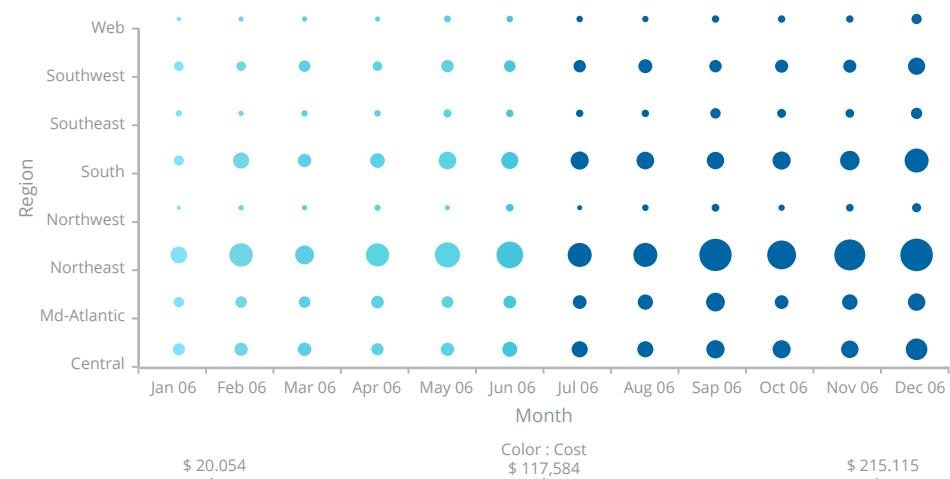
1 Dimensions 3 Measures

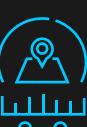
Standard Visualization > Relationship > **Bubble Chart**

Bubble Chart

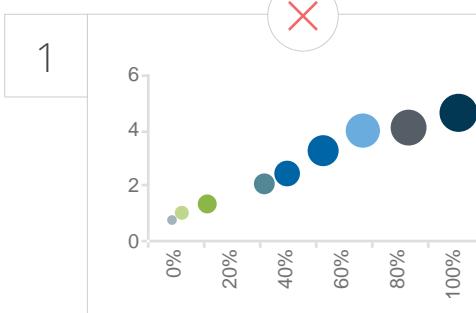


Variations Bubble Grid



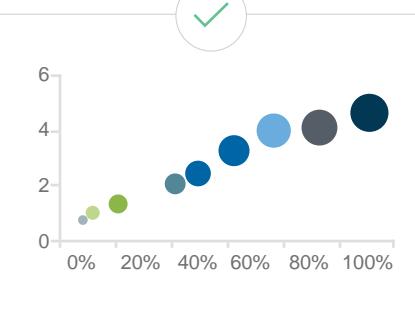


BUBBLE CHART - DESIGN BEST PRACTICES



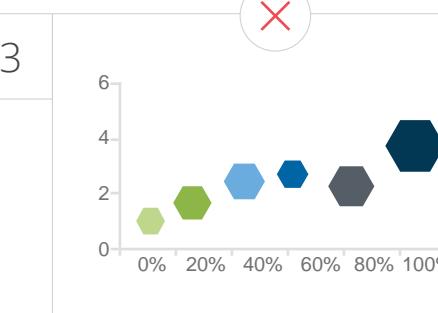
USE HORIZONTAL LABELS

Avoid steep diagonal or vertical labels, as it can be difficult to read.



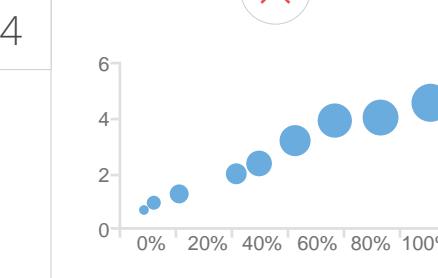
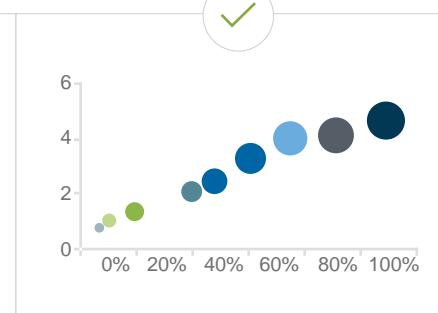
SIZE BUBBLES APPROPRIATELY

Bubbles should be scaled according to area, not diameter.



DON'T USE ODD SHAPES

Avoid adding too much detail or using shapes that are not entirely circular; this can lead to inaccuracies.



USE APPROPRIATE COLORS

Use a single color with varying shades or a spectrum between two analogous colors to show intensity.



SCATTER PLOT

When to use a Scatter Plot

A Scatter plot can help you identify the relationships that exist between different values. By displaying a variable in each axis, you can detect if a relationship or correlation between the two variables exists.

The Various types of correlations that can be interpreted are positive (values increase together), negative (one value decreases as the other increases), null (no correlation), linear, exponential and U-shaped. The strength of the correlation can be determined by how closely packed the points are to each other on the graph.

Functions

Patterns	Proportions	Comparisons	Relationships
----------	-------------	-------------	---------------

Report Objects Required

1 Dimensions	2 Measures
--------------	------------

Alternative / Related Visualizations



Interactive
Bubble Graph



Bubble Grid

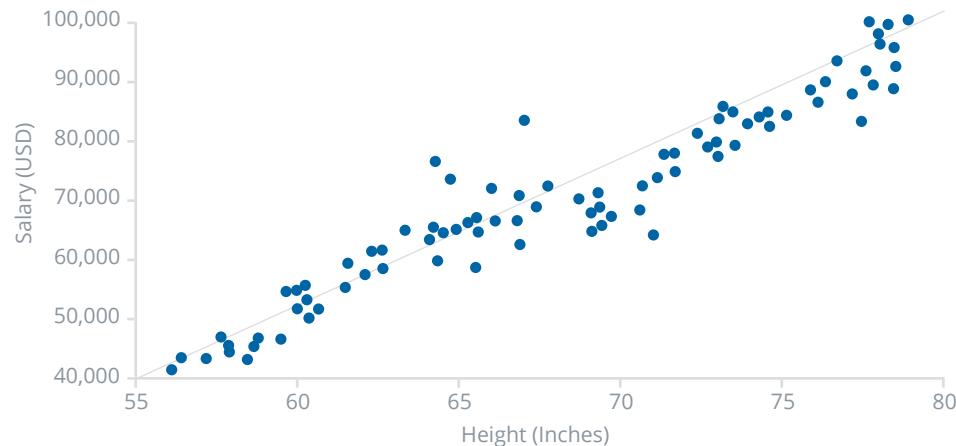


Polar chart /
Radar chart

Standard Visualization > Relationship > **Scatter Plot**

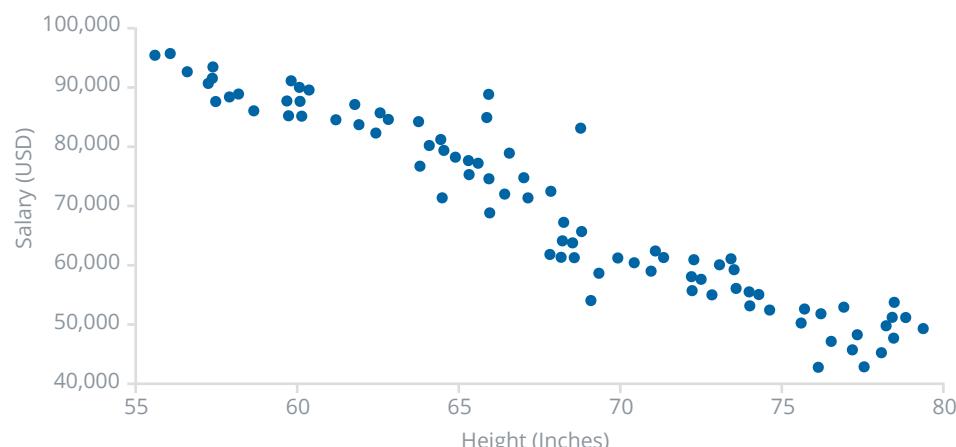
Scatter Plot

Height and Salary of Employee



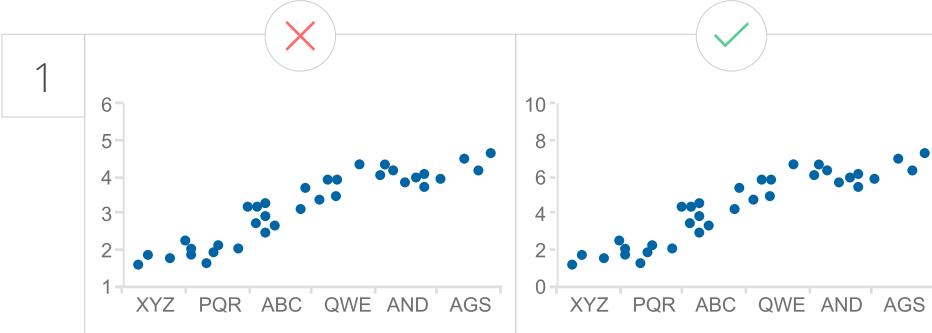
Variations Negative Scatter Plot

Height and Salary of Employee



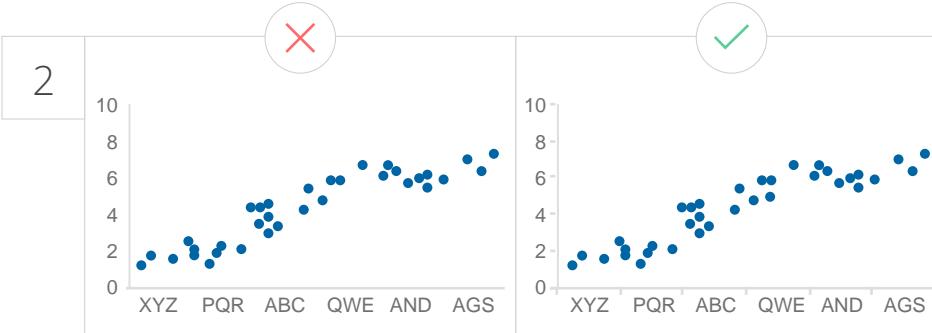


SCATTER PLOT - DESIGN BEST PRACTICES



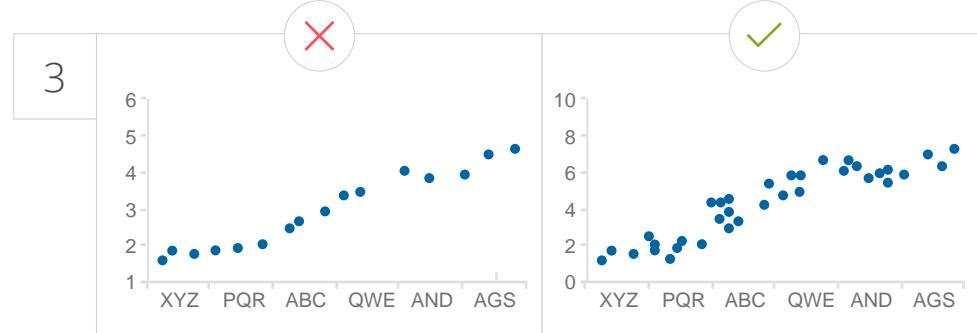
START Y - AXIS VALUE AT 0

Starting the axis above zero truncates the visualization of values.



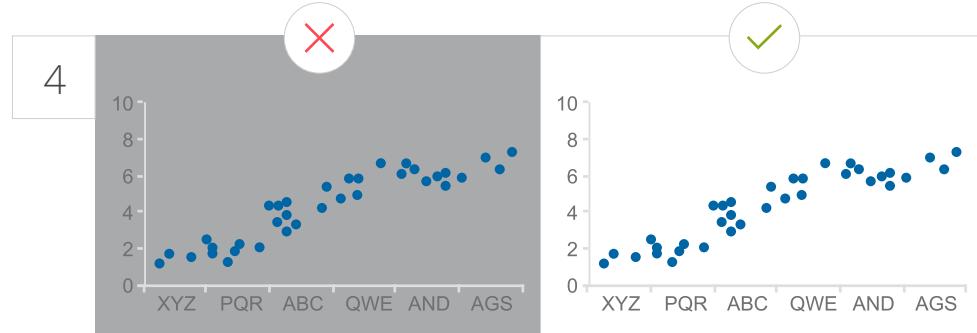
AXIS TICK MARKS

Always enable axis tick marks for better understanding.



USE OF DATA SETS

Remember that Scatter is used for huge data sets.



AVOID USE OF BACKGROUND COLORS

Do not use any back ground colors.



AREA CHART

When to use an Area Chart

Area Charts are Line Charts with the area below the line filled in with a certain color or texture. Area Graphs are drawn by first plotting data points on a cartesian coordinate grid, then joining a line between the points and finally filling in the space below the completed line.

Like Line Charts, Area Charts are used to display the development of quantitative values over an interval or time period. They are most commonly used to show trends and relationships.

Functions

Patterns

Data over time

Relationships

Report Objects Required

1 Dimensions

1 Measures

Alternative / Related Visualizations



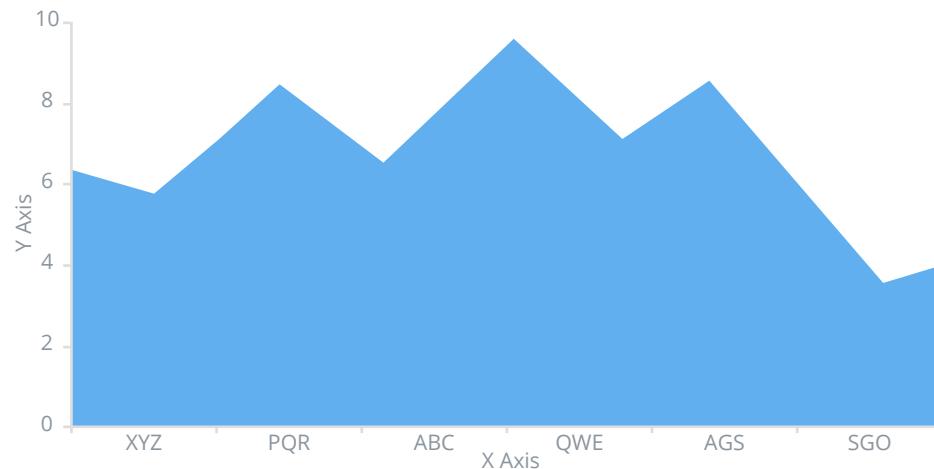
Line Chart



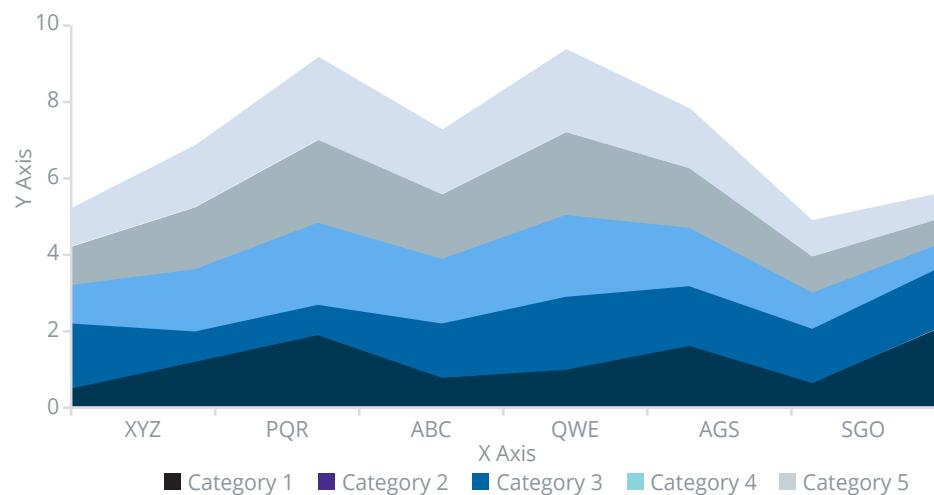
Stacked Area Chart

Standard Visualization > Comparisons > **Area Chart**

Area Chart

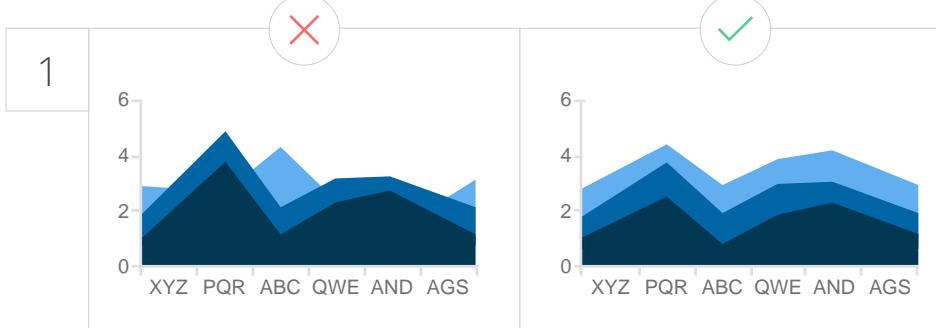


Variations Stacked Area Chart





AREA CHART - DESIGN BEST PRACTICES



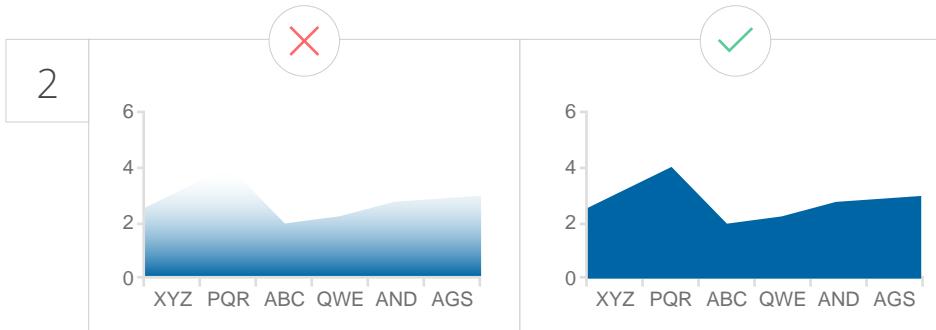
MAKE IT EASY TO READ

In stacked area charts, arrange data to position categories with highly variable data on the top and least variable at the bottom.



DON'T DISPLAY MORE THAN 4 DATA CATEGORIES

Too many categories will result in a cluttered visual that is difficult to decipher.



AVOID GRADIENT AND TRANSPARENT COLORS

In standard area charts, ensure data isn't obscured in the background by ordering colors thoughtfully and using transparency.



MAKE USE OF POINTERS

Solid filled pointers help in understanding the data well. It should be used on line tip between, or, on the corresponding labels.

 **BOX PLOT**

When to use a Box Plot

A box plot is a convenient way to visually display groups of numerical data through their quartiles. It shows distribution of data based on minimum, maximum, median, and percentiles.

Typically used in descriptive statistics, box plots are a great way to quickly examine one or more data sets graphically. Although they may seem primitive in comparison to a histogram or density plot, they have the advantage of taking up less space, which is useful when comparing distributions between many groups or data sets.

Functions

Range	Distribution
-------	--------------

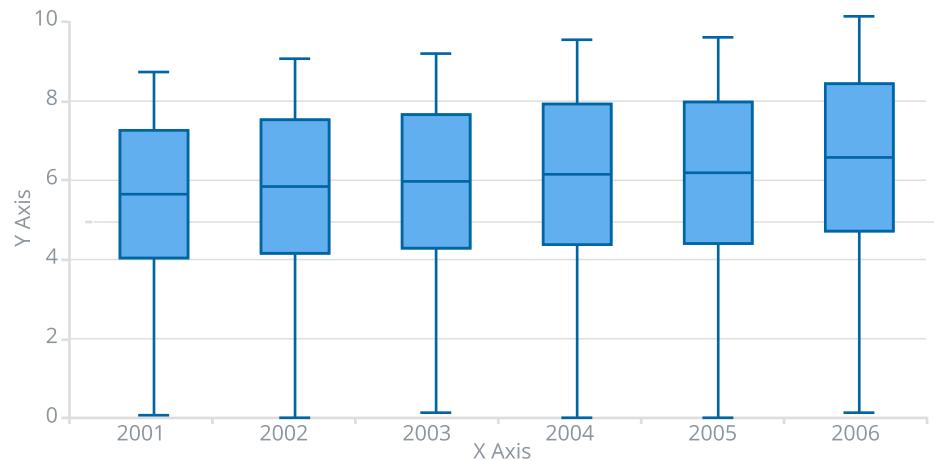
Report Objects Required

1	Dimensions
---	------------

5	Measures
---	----------

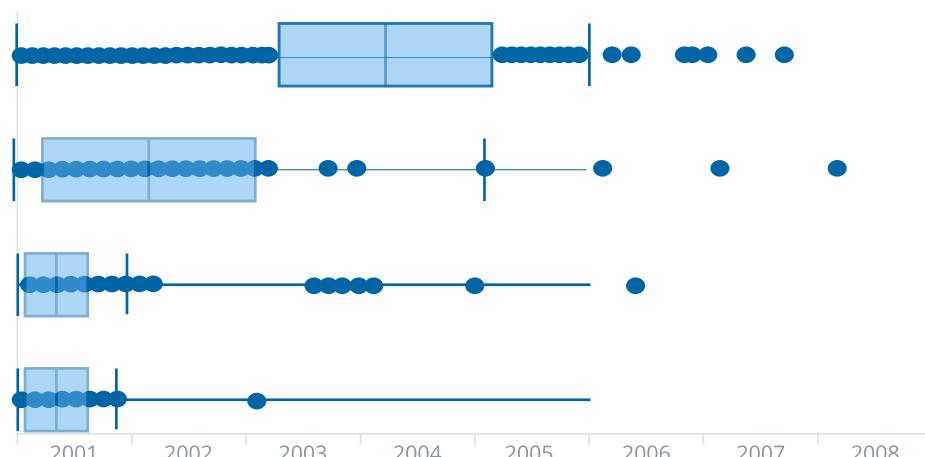
Standard Visualization > Distribution > **Box Plot**

Box Plot



Variations

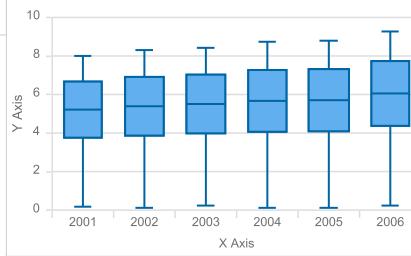
Horizontal Box Plot



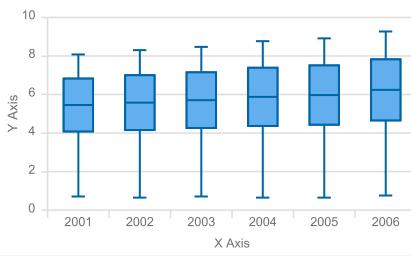


BOX PLOT - DESIGN BEST PRACTICES

1



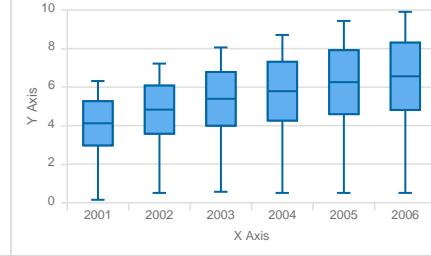
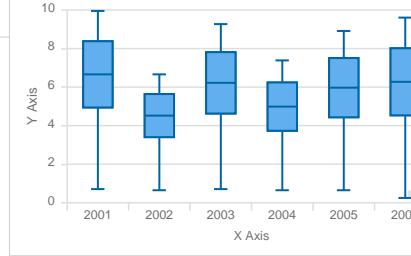
2



SPACE BARS APPROPRIATELY

Keep bar width and spacing between the bars same for each data series. Otherwise, there is an implied meaning.

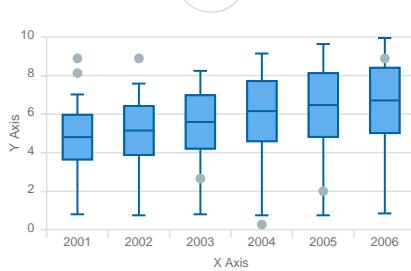
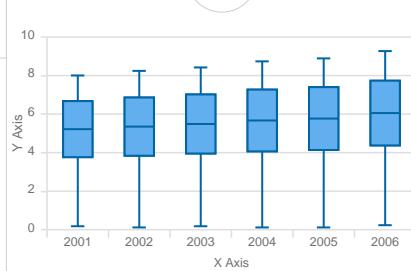
3



GROUP THE DATA SERIES

Group data series next to each other for direct comparison.

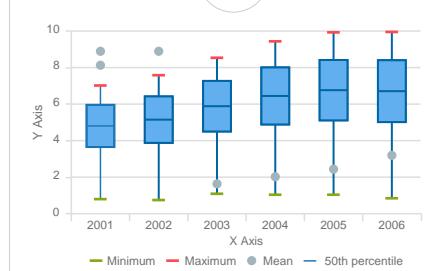
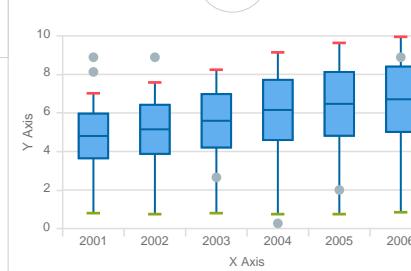
2



INCLUDE A KEY IF NEEDED

Include a key if the box plot shows additional elements such as outliers.

4



EXPLAIN THE DATA

The function of a box plot might not be instantly understandable by all audiences. Some explanation might be required. Its use in dashboards is somewhat limited – often the box plot is used to display research data.



GANTT CHART

When to use a Gantt Chart

Gantt charts (also referred to as project timelines) are bar charts that help plan and monitor project development or resource allocation on a horizontal time scale. They are essentially horizontal bar charts which provide graphical illustration of a schedule that can help users plan, coordinate, and track specific tasks in a project. The data analyzed in a Gantt chart has a defined starting and ending value; for example, Project A begins 4/15/06 and ends 5/10/06.

Functions

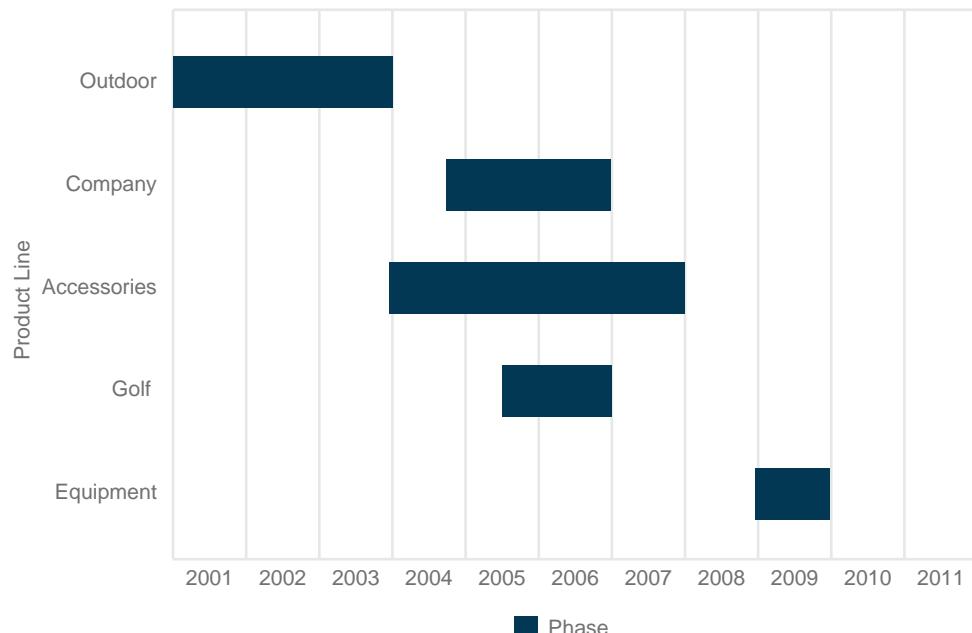
Range Comparisons

Report Objects Required

1 Dimensions 2 Measures

Standard Visualization > Comparisons > **Gantt Chart**

Gantt Chart





GANTT CHART - DESIGN BEST PRACTICES



DO NOT TRY TO OVERRULE DAY-TO-DAY SEMANTICS

Red usually means alert, danger or stop. Yellow stands for warning and Green indicates OK, go ahead. Hence, use these colors if you want to express the corresponding semantics.



USE SAME COLORS FOR SIMILAR ACTIVITIES

Display grouped tasks using the same color tint for all bars of each group, and for the corresponding table area as well.



THE COLOR SHOULD REPRESENT THE INFORMATION

Don't guide your users attention to the less important things by using bold colors for them.



COLORING OF SHORT AND SUBSEQUENT ACTIVITIES

Make use of different colors to represent different categories especially if the categories are very short.



HILOW STOCK / CANDLESTICK

When to use a HiLow Stock / Candlestick

This chart control displays financial data as a series of candlesticks representing the high, low, opening, and closing values of a data series (four metrics). The top and bottom of the vertical line in each candlestick represent the high and low values for the data point, while the top and bottom of the filled box represent the opening and closing values.

Functions

Range Distribution

Report Objects Required

1 Dimensions 3 Measures

Alternative / Related Visualizations



Box Plot



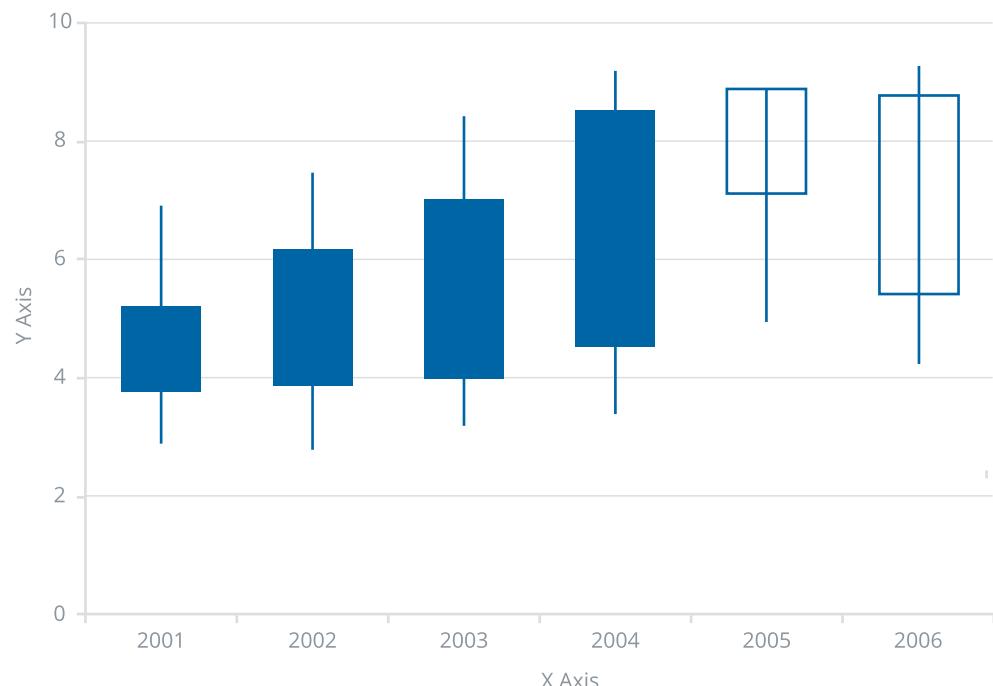
Histogram



Line Chart

Standard Visualization > Comparisons > **HiLow Stock / Candlestick**

HiLow Stock / Candlestick





HISTOGRAM

When to use a Histogram

A histogram visualizes the distribution of data over a continuous interval or a certain time period. Each bar in a histogram represents the tabulated frequency at each interval/bin. The total area of the histogram is equal to the total number of datasets.

Histograms help give an estimate of where values are concentrated, what the extremes are and whether there are any gaps or unusual values.

Functions

Patterns	Distribution	Comparisons	Data over Time
Probability		Range	

Report Objects Required

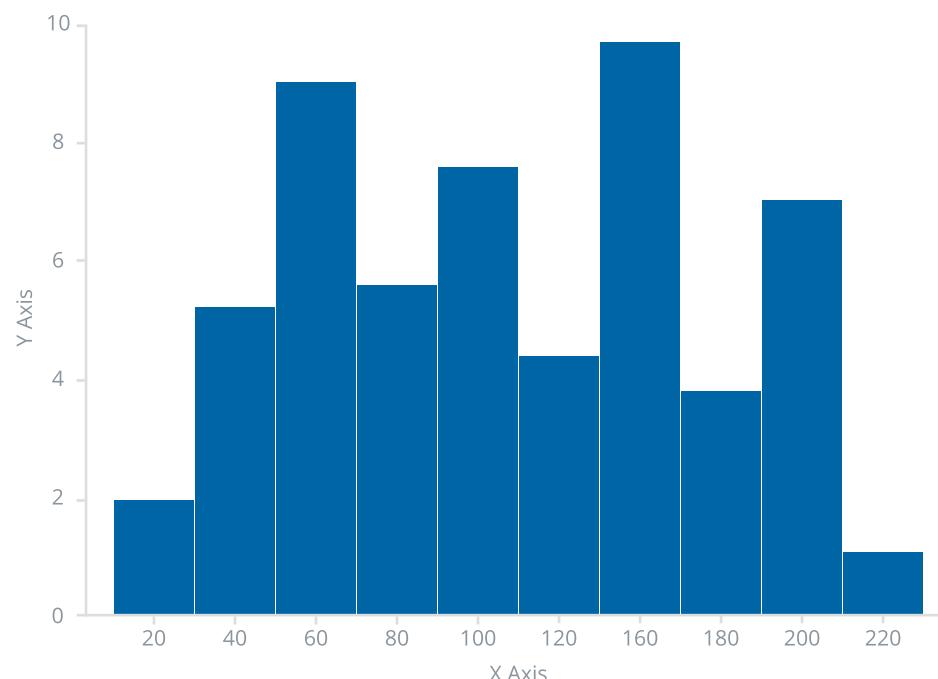
1	Dimension
1	Measure

Alternative / Related Visualizations



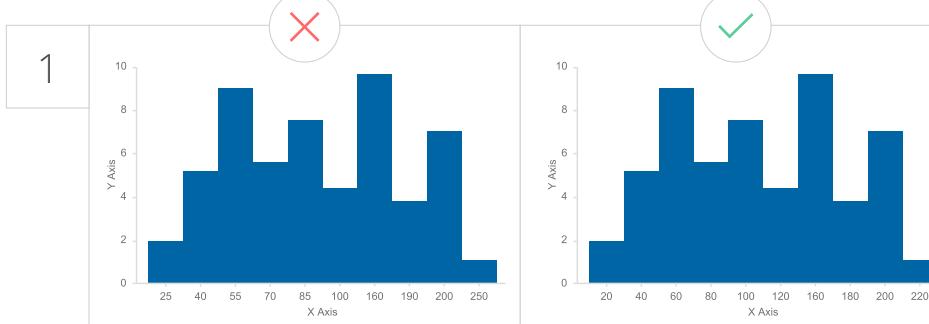
Standard Visualization > Comparisons > **Histogram**

Histogram



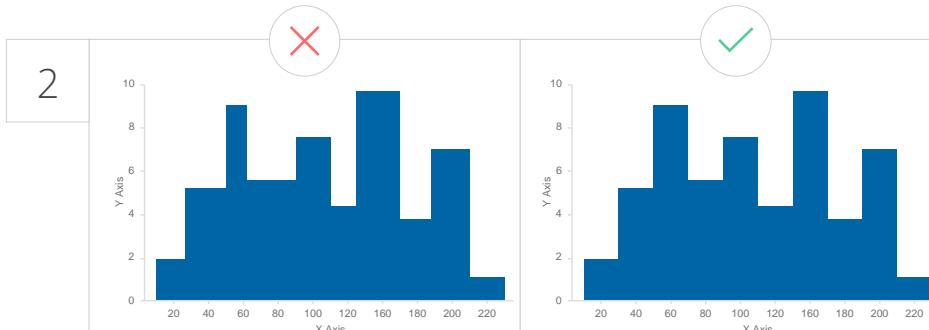


HISTOGRAM - DESIGN BEST PRACTICES



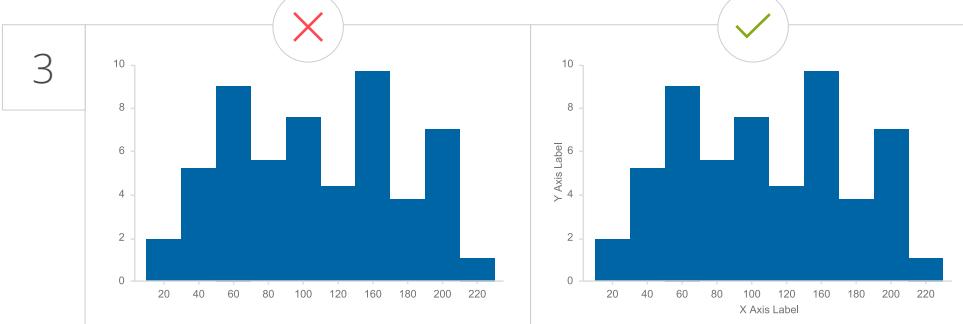
SHOW CONTINUOUS DATA

Always show continuous data where the bins represent ranges of data.



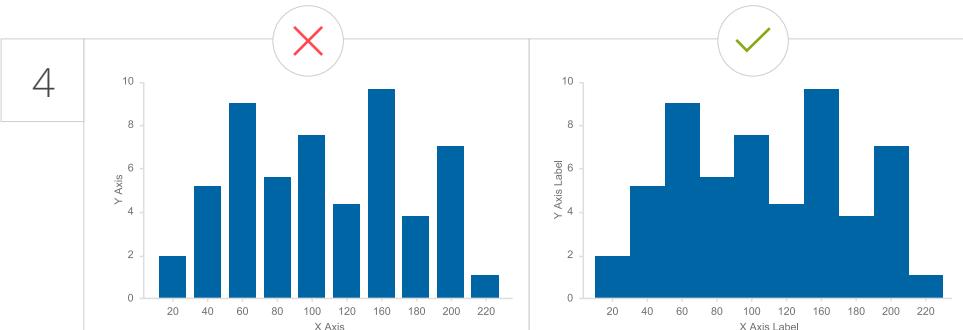
USE BINS APPROPRIATELY

The bins (intervals) must be adjacent, and equal in size.



LABEL THE DATA

Label the data drawn in the y-axis (that counts the number of data points in each bin) and also label your bins.



NO GAPS BETWEEN BARS

Do not keep any gaps between the bars.



PARETO CHART

When to use a Pareto Chart

A Pareto chart is designed to help identify the cause of a quality problem or loss. It includes a Histogram that shows how often a specific problem is occurring or the different types of problems that are occurring. In general, Pareto charts allow you to display the specific areas in which improvement or investigation is necessary.

It contains both a bar and a line chart. The values are represented by descending bars and the running % to total is represented by the line. It depicts the percent journey to total & also displays actual values.

Functions

Range	Comparisons	Data over Time
-------	-------------	----------------

Report Objects Required

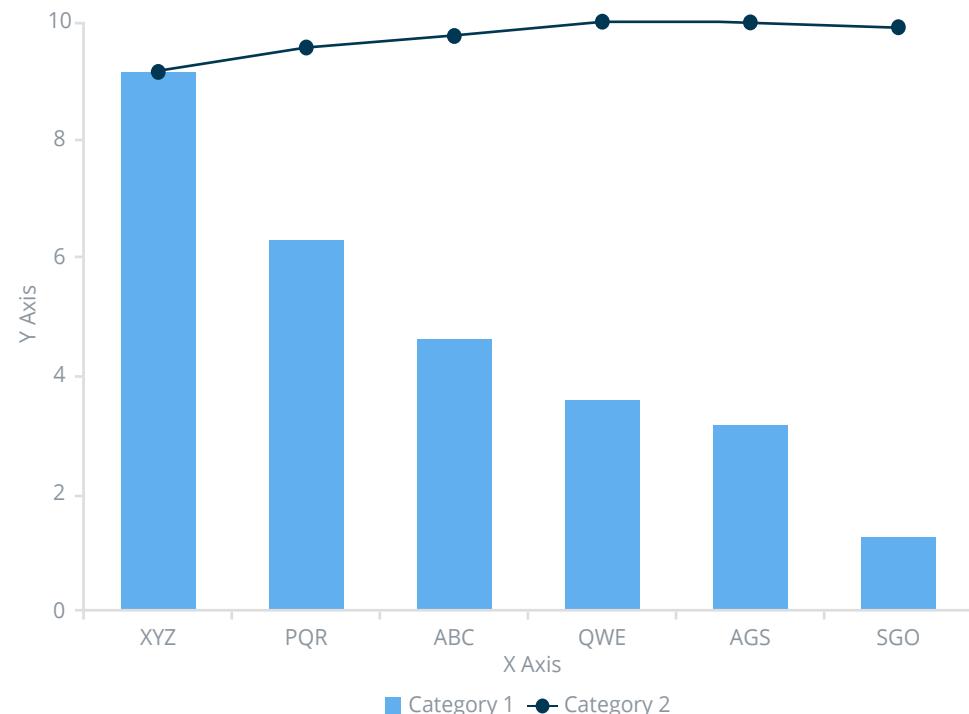
1 Dimensions	1 Measures
--------------	------------

Alternative / Related Visualizations

Pie Chart	Stacked Bar Chart

Standard Visualization > Comparisons > **Pareto Chart**

Pareto Chart

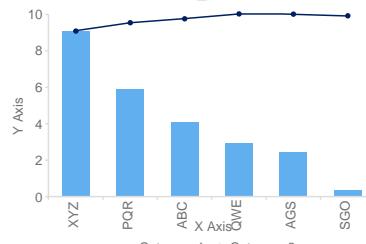




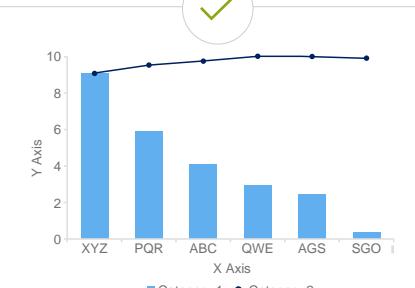
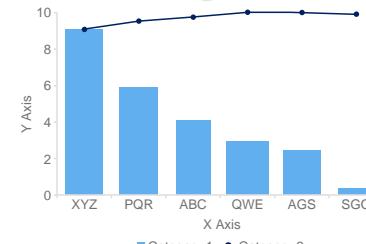
PARETO CHART - DESIGN BEST PRACTICES



1



3

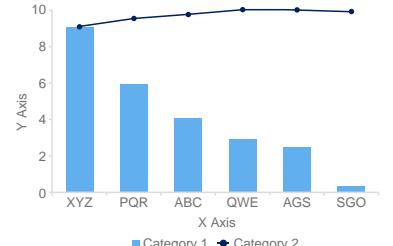
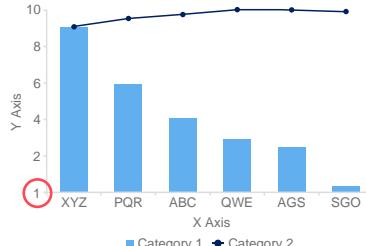


USE HORIZONTAL LABELS

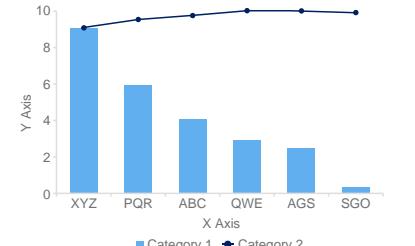
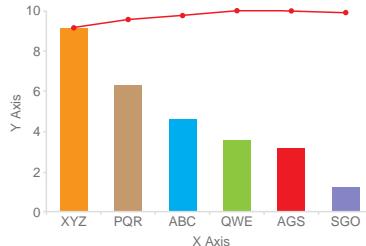
Avoid steep diagonal or vertical labels, as they are difficult to read.



2



4



START THE Y-AXIS VALUE AT 0

Starting at a value above zero truncates the bars and doesn't accurately reflect the full value.

USE CONSISTENT COLORS

Use one color for bar charts. You may use an accent color to highlight a significant data point.



POLAR CHART / RADAR CHART

When to use a Polar Chart / Radar Chart

Radar Charts are a way of comparing multiple quantitative variables. This makes them useful for seeing which variables have similar values or if there are any outliers amongst each variable. They are also useful for seeing which variables are scoring high or low within a dataset, making them ideal for displaying performance.

Functions

Patterns Relationships Comparisons

Report Objects Required

1 Dimensions 1 Measures

Alternative / Related Visualizations



Pie Chart



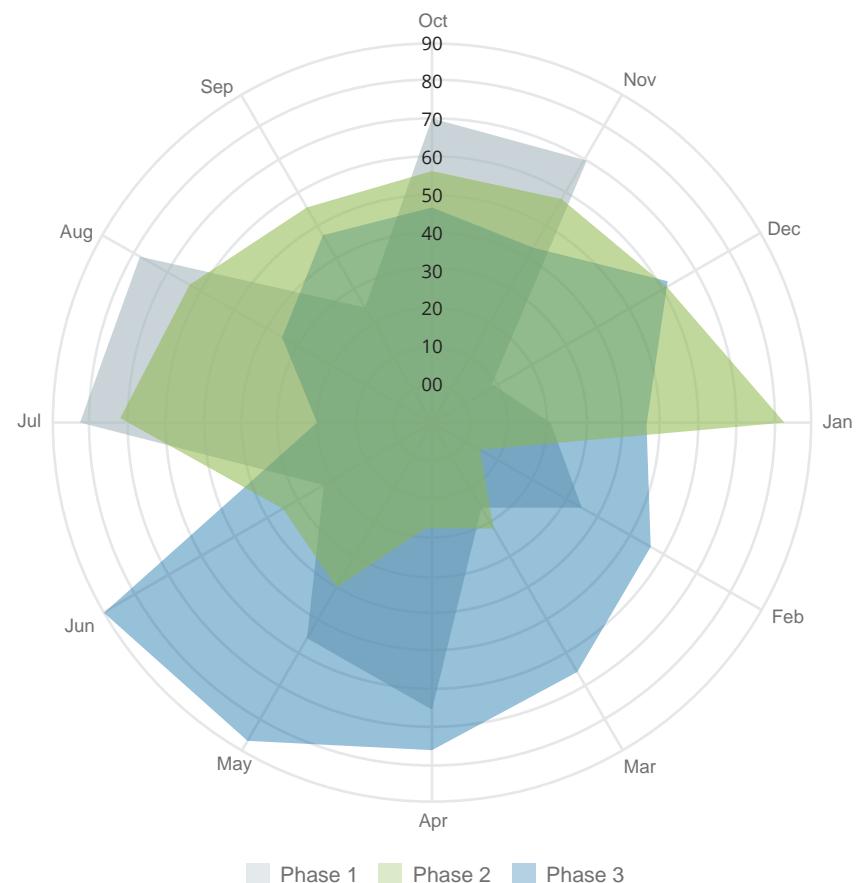
Scatter Plot



Bubble Grid

Standard Visualization > Relationship > **Polar Chart / Radar Chart**

Polar Chart / Radar Chart





Advanced Visualizations

Water Fall

Gauges

Time Series

Maps

Heat Map

Bubble Grid

Funnel

Graph Matrix

Lipstick Chart

Micro Charts

Network Visualization

Image Layout

Media

Data Cloud

WATER FALL

When to use a Waterfall

A Waterfall visualization highlights the increments and decrements of the values of metrics over time. Analysts can use the widget to identify aspects of their business that are contributing to the fluctuations in the values. The visualization can also be used to perform "what-if" analyses. For e.g., % Revenue Y/Y Variance by Month. It shows how different aspects of the business positively or negatively affect the bottom line.

Functions

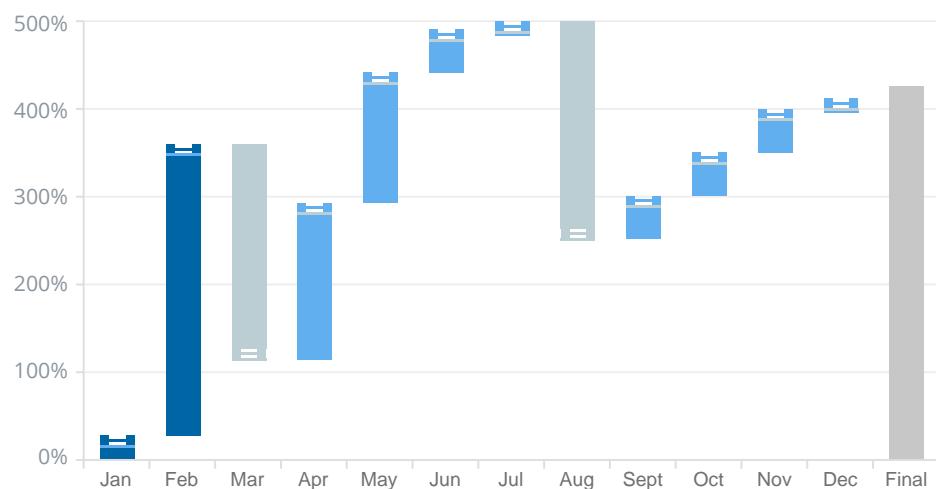
Patterns Relationships

Report Objects Required

1 Dimensions 1 Measures

Advanced Visualization > Water Fall

Water Fall





GAUGES

When to use a Gauge

A Gauge visualization is a simple status indicator that displays a needle that moves within a range of numbers displayed on its outside edges. A real-world example of a gauge is a car's speedometer.

Like the Cylinder and Thermometer widgets, this type of visualization is designed to display the value of a single metric. The needle within the gauge is a visual representation of that single metric value.

Functions

Comparison

Benchmarks

Report Objects Required

1 Dimensions

1 Measures

Advanced Visualization > **Gauges**

Gauges





TIME SERIES

When to use a Time series

A Time Series Slider is an area graph that allows a document analyst to choose which section of the graph to view at a time. The visualization consists of two related graphs, one positioned above the other. The top graph is the controller, and contains a slider. The bottom graph is the primary graph. You use the slider on the controller to select some portion of the controller, which determines the range of data visible in the primary graph.

It allows users to see a high level trend of one or more metrics and a detailed view by varying the window of the visible data. For e.g., Revenue trend by Date.

Functions

Comparison Patterns Data Over Time

Report Objects Required

1 Dimensions 1 Measures

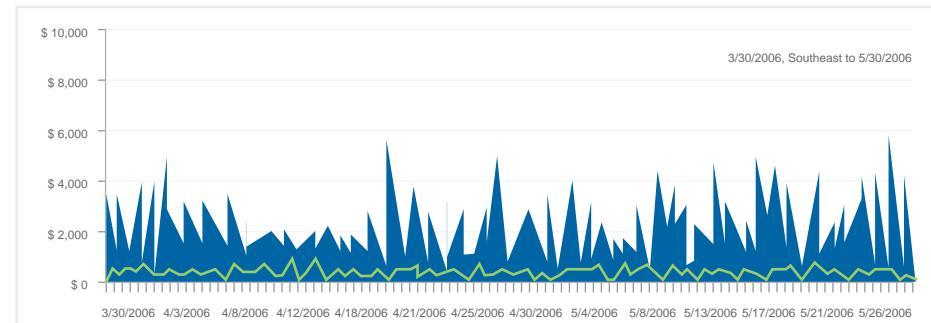
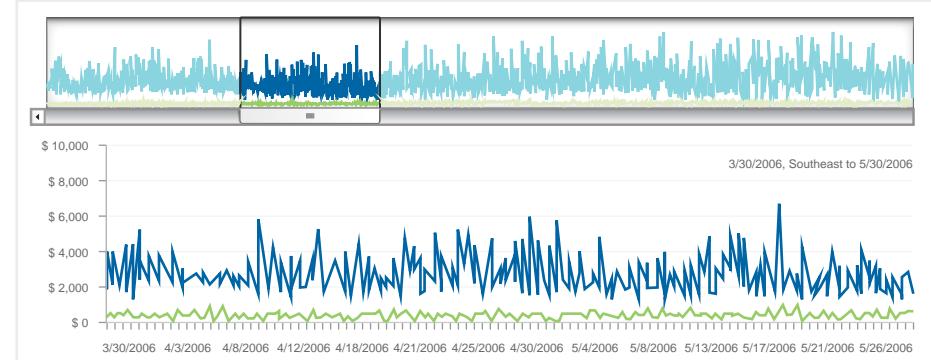
Alternative / Related Visualizations



Bar Chart

Advanced Visualization > **Time Series**

Vertical Bar Chart





MAPS

When to use Maps

A Map allows users to visualize the data so they can identify and analyze relationships, patterns, and trends in their data. Some of the functionalities available are:

- Displaying areas, points, and data that are color-coded based on metric values
- Using image markers, bubble markers, density maps, or color-coded areas to visualize data on the map
- Zooming/panning on the map and data
- Displaying an Information window with additional data for a marker or area
- Providing the ability to customize the Information window, such as providing additional details or metric information, including demographic content from the mapping service
- Drilling up to summary levels of data and down to detailed levels of data

Report Objects Required

1 Dimensions

1 Measures

Advanced Visualization > Maps

Pin Map



Variations





HEAT MAP

When to use a Heat Map

A Heat Map presents a combination of colored rectangles, each representing an attribute element, that allow you to quickly grasp the state and impact of a large number of variables. Heat Maps are often used in the financial services industry to review the status of a portfolio. The rectangles contain varieties and shadings of colors, that emphasize on the status of various components. In a Heat Map, the size of each rectangle represents its relative weight and the color represents the relative change in the value of that rectangle. You can hover over each rectangle to see which attribute element the rectangle represents; and its metric values.

Functions

[Comparison](#)
[Patterns](#)

Report Objects Required

[1 Dimensions](#)
[2 Measures](#)

Alternative / Related Visualizations

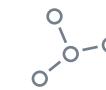


Dual-Axis Combination Chart



Weighted List

Dallas, TX
CHARLESTON, WV
Las Vegas, NV
Fresno, CA
Salt Lake City, UT
Los Angeles, CA
Dallas

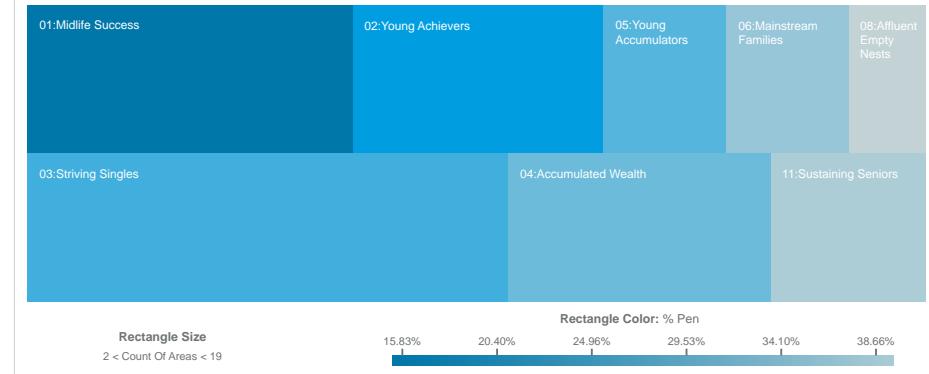


Network

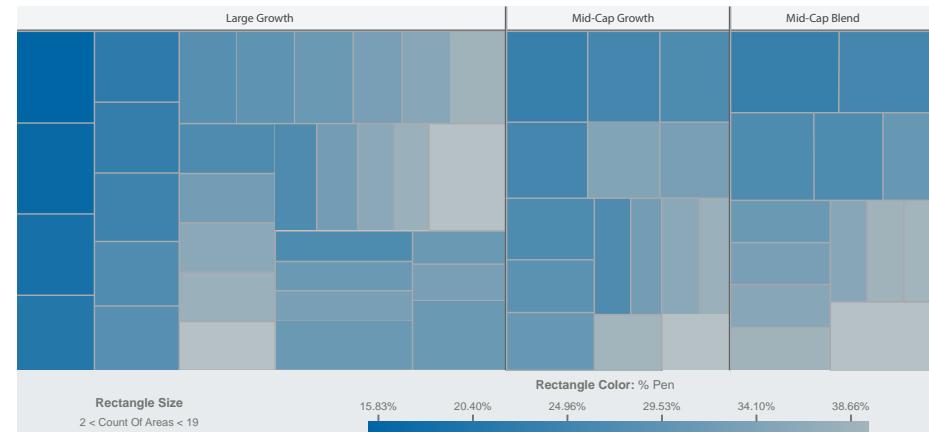
Advanced Visualization > **Heat Map**

Heat Map

Report Header



Variations





BUBBLE GRID

When to use a Bubble Grid

The Bubble Grid conveys information that helps an analyst identify important trends or anomalies in data, relative to the total contribution of accompanying data. Metric values are plotted as bubbles of different colors and sizes; the colors and sizes of the bubbles represent the values of two distinct metrics on the Grid/Graph that contains the widget. Each bubble is generated at the intersection of two different attribute elements.

The Bubble Grid is most beneficial when used to perform analyses involving key business ratios, such as the number of customers in a store vs. the revenue generated per customer.

Functions

Comparison Patterns Data Over Time

Report Objects Required

2 Dimensions 2 Measures

Alternative / Related Visualizations



Scatter Plot



Weighted List

Dallas, TX
CHARLESTON, WV
Las Vegas, NV
Fresno, CA
Salt Lake City, UT
Los Angeles, CA
Dallas

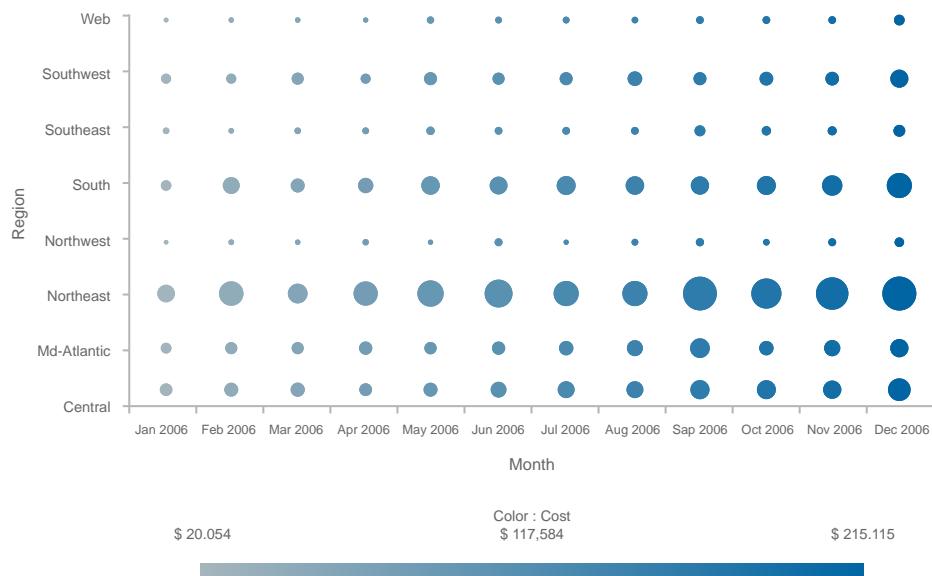
Data Cloud



Heat Map

Advanced Visualization > **Bubble Grid**

Bubble Grid





FUNNEL

When to use a Funnel

A Funnel helps to quickly analyze various trends across several metric values. It is a variation of a stacked percent bar chart that displays data that adds up to 100%. Therefore, it can allow analysts to visualize the percent contribution of sales data. It can also show the stages in a sales process and reveal the amount of potential revenue for each stage. When the visualization is used to analyze a sales process, analysts can use the widget to drill down to key metrics such as deal size, profit potential, and probability of closing.

The size of the area is determined by the series value as a percentage of the total of all values.

Functions

Comparison

Relationships

Proportions

Report Objects Required

1 Dimensions

1 Measures

Alternative / Related Visualizations



Cylinder



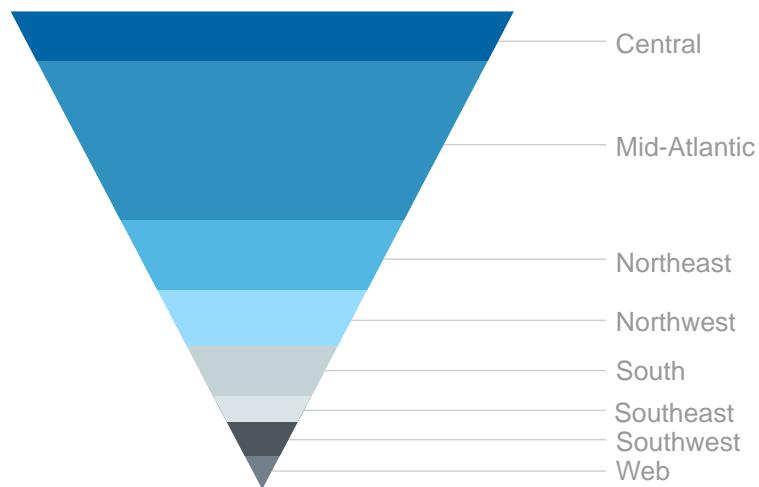
Stacked
Bar Chart



Pie Chart

Advanced Visualization > **Funnel**

Funnel





GRAPH MATRIX

When to use a Graph Matrix

The Graph Matrix visualization is a powerful, interactive visualization. It allows users to display their data using a variety of graph styles - such as the line graph, bubble graph, or a grid, then customize it to suit users' needs. Users can compare trends of metrics by two non-time attributes.

Functions

Comparison

Relationships

Report Objects Required

2 Dimensions

1 Measures

Alternative / Related Visualizations



Bar Chart



Line Chart



Area Chart



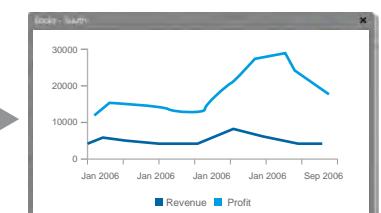
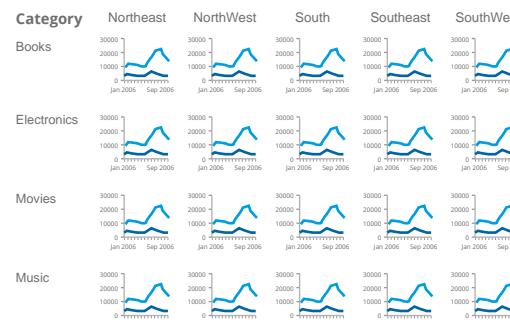
Microchart

Advanced Visualization > **Graph Matrix**

Graph Matrix



Region



LIPSTICK CHART

When to use a Lipstick Chart

The Lipstick chart provides different methods of viewing data. For each x-axis value, the gray bar illustrates the actual recorded value. The expected value is represented by the red and green bars.

When the expected value exceeds the actual value, a red bar is placed on top of the actual value bar, extending above the grey bar for the value difference between expected and actual values. If the actual value exceeds the expected value, the green bar is displayed on top of the actual value bar, marking the difference between the expected and actual values.

Functions

Comparison Relationships

Report Objects Required

1 Dimensions 2 Measures

Alternative / Related Visualizations



Bar
Chart



Line
Chart



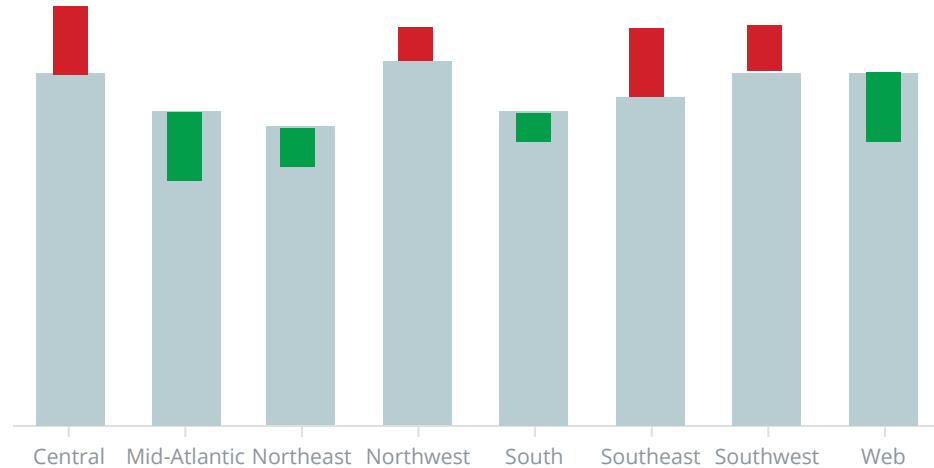
Area
Chart



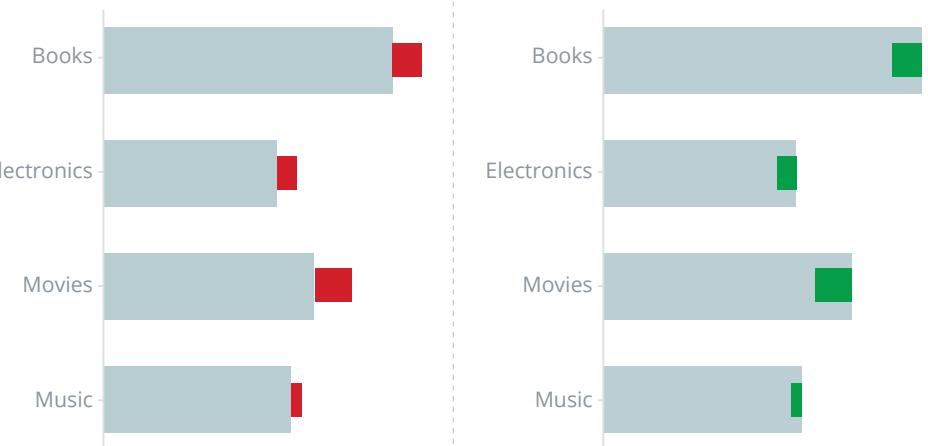
Microchart

Advanced Visualization > **Lipstick Chart**

Lipstick Chart



Variations



MICRO CHARTS

When to use a Micro Chart

Micro chart visualizations gives the trend of a metric at a glance without having to know many additional details. The bar, sparkline, and bullet microcharts used in the microcharts convey information that an analyst can understand just by looking at the chart once.

It consists of compact representations of data that allow analysts to quickly visualize trends in data. It conveys information so that a user can, at a glance, determine the trend of a metric over time or how a metric is performing compared to forecasted figures.

Functions

Comparison

Relationships

Report Objects Required

1 Dimensions

2 Measures

Advanced Visualization > Micro Charts

Micro Charts

Keyword Group

Trend

Package 1



Package 2



Package 3



Package 4



Package 5



Keyword Group

Trend

Package 1



Package 2



Package 3



Package 4



Package 5



Keyword Group

Bullet

Package 1



Package 2



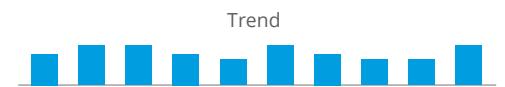
Package 3



Package 4



Package 5



Call Center

Monthly Profits

Trends

Gross Revenue vs Cost

Milwaukee



Fargo



Washington



Charleston



Boston





NETWORK VISUALIZATION

When to use a Network Visualization

The Network Visualization allows you to quickly and easily identify relationships between related items and clusters, such as when visualizing a social network or when displaying a market basket analysis.

Functions

Relationships

Report Objects Required

2 Dimensions

2 Measures

Alternative / Related Visualizations



Scatter Plot



Heat Map

Advanced Visualization > Network Visualization

Network Visualization

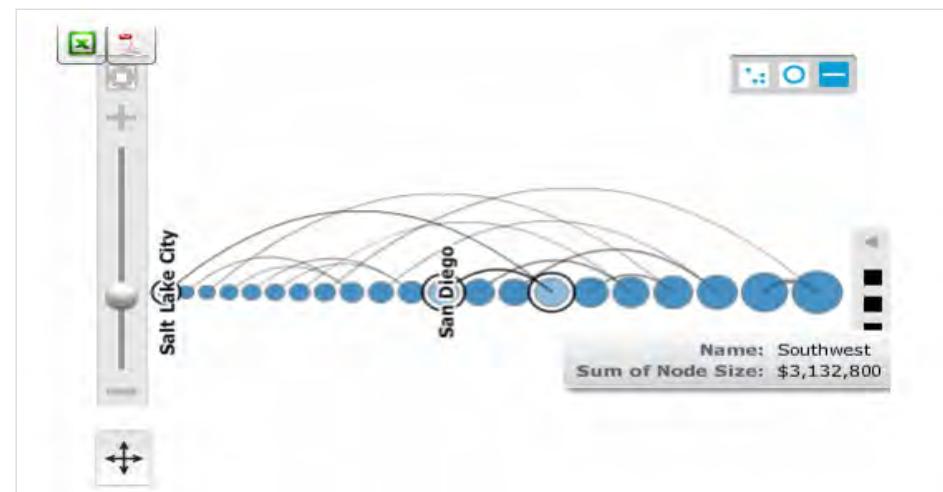
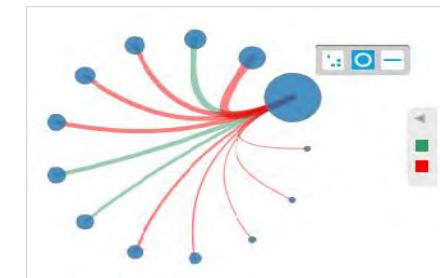
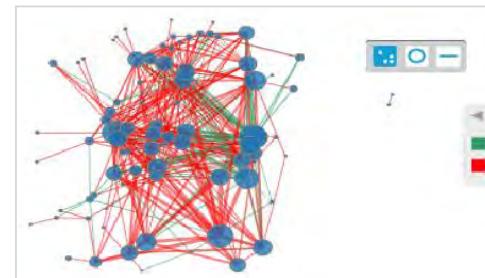




IMAGE LAYOUT

When to use an Image Layout

An Image Layout allows the user to display the data as colored geographical regions or as map markers on the map & then change display options such as the color of regions on the map, to allow the user to quickly grasp relationships between different locations.

For example, you can display a map of the United States, with a bubble marker displayed over each state.

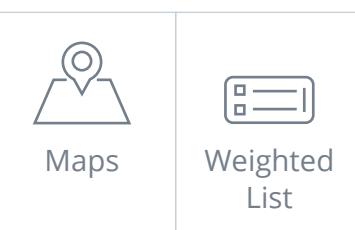
Functions

Comparison Patterns Data Over Time

Report Objects Required

1 Dimensions 1 Measures

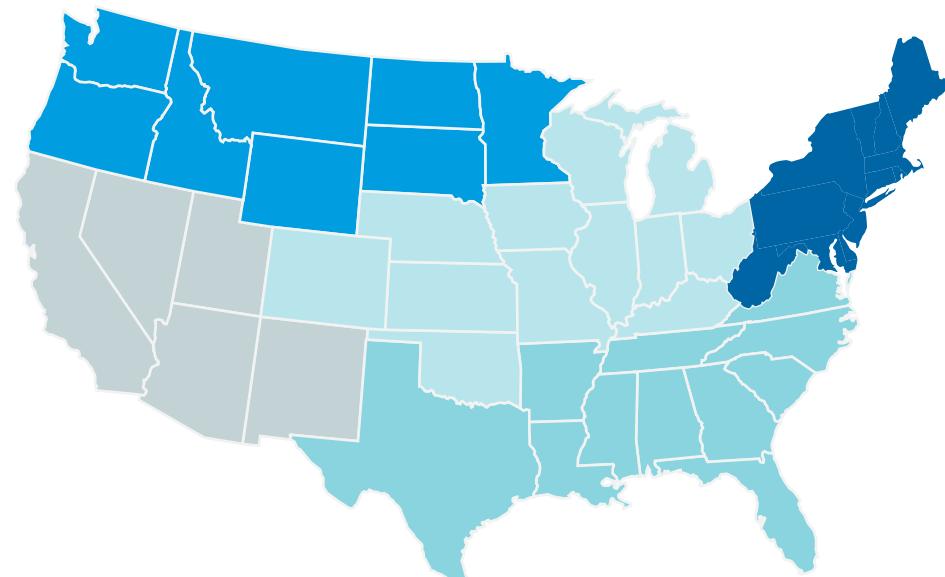
Alternative / Related Visualizations



Available in - MicroStrategy Mobile

Advanced Visualization > **Image Layout**

Image Layout





MEDIA

When to use Media

Media allows you to present information through a variety of channels such as video, audio, images, or website content on your dashboard. Users can include media to provide background information about data or instructions on how to use the dashboard. Users can also use Media to enhance the look and feel of a dashboard.

Advanced Visualization > **Media**

Media





DATA CLOUD

When to use a Data Cloud

A Data Cloud displays attribute elements in various sizes to depict the differences in metric values between the elements. This type of visualization is similar to a Heat Map in that they both allow an analyst to quickly identify the most significant, positive, or negative contributions.

A Data Cloud widget is basically a list of attribute elements. The first metric on the template determines the font size for the attribute elements. A bigger font for an element indicates a larger metric value.

Functions

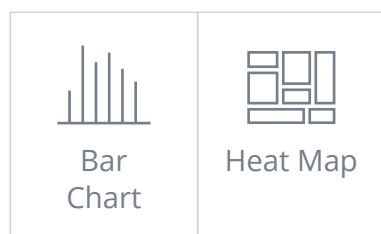
Comparison

Report Objects Required

1 Dimensions

2 Measures

Alternative / Related Visualizations



Available in - MicroStrategy Web & Mobile, Dossier, Tableau, Qlikview

Advanced Visualization > **Data Cloud**

Data Cloud

Las Vegas, NV Fresno, CA CHARLESTON, WV
Salt Lake City, UT Los Angeles, CA Long Beach, CA
Houston E, TX Dallas, TX New Orleans, LA Raleigh, NC
Nashville, TN Johnson City, TN Houston, TX Jackson, MS
Louisville, KY Cincinnati, OH Lexington, KY Columbus, OH
CLEVELAND, OH Detroit, MI BIRMINGHAM, AL Memphis, TN
Atlanta N, Ga Naperville, IL Toledo, OH Indianapolis, IN Dallas, TX Grand Rapids, MI
Jacksonville, FL West Palm Beach, FL Atlanta S, GA Savannah, GA Mobile, AL Orlando, FL
Scranton, PA Philadelphia E, PA ALTOONA, PA BUFFALO, NY PITTSBURGH, PA Flint, MI Raleigh, NC
HARTFORD, CT Providence, RI Bangor, ME Burlington, VT Springfield, MA NEW YORK, NY READING, PA Flint, MI



Visualization Comparison table

Standard Visualizations

Advanced Visualizations



STANDARD VISUALIZATIONS COMPARISON TABLE

Visualizations

MicroStrategy Version : 11 | Tableau Version : 2019.3 | Qlikview Version : 12.20

Standard Visualization	MSTR Web	MSTR Mobile	Dossier	Tableau	Qlikview	Power BI
Bar Chart	✓	✓	✓	✓	✓	✓
Deviation Bar Chart	✓	✓	✓	✓	✓	✓
Dual Axis Bar Chart	✓	✓	✓	✓	✓	✓
Stacked Bar Chart	✓	✓	✓	✓	✓	✓
Line Chart	✓	✓	✓	✓	✓	✓
Pie Chart	✓	✓	✓	✓	✓	✓
Bubble Chart	✓	✓	✓	✓	✓	✓
Scatter Plot	✓	✓	✗	✓	✓	✓
Area Chart	✓	✓	✓	✓	✓	✓
Box Plot	✓	✓	✓	✓	✓	✓
Gantt Chart	✓	✓	✗	✓	✓	✓
HiLow Stock / Candlestick	✓	✓	✗	✓	✓	✓
Histogram	✓	✓	✓	✓	✓	✓
Pareto Chart	✓	✓	✗	✓	✓	✓
Radar Chart	✓	✓	✗	✓	✓	✓



ADVANCE VISUALIZATIONS COMPARISON TABLE

Visualizations

MicroStrategy Version : 11 | Tableau Version : 2019.3

Advance Visualization	MSTR Web	MSTR Mobile	Dossier	Tableau	Qlikview	Power BI
Waterfall	✗	✗	✓	✓	✓	✓
Gauges	✓	✓	✗	✓	✓	✓
Time Series	✗	✓	✗	✓	✗	✓
Maps	✓	✓	✓	✓	✓	✓
Heat Map	✓	✓	✓	✓	✓	✓
Bubble Grid	✗	✗	✗	✓	✗	✓
Funnel	✓	✓	✗	✓	✓	✓
Interactive Stacked Graph	✗	✗	✗	✓	✗	✓
Interactive Bubble Graph	✗	✗	✗	✓	✓	✓
Graph Matrix	✓	✓	✗	✓	✓	✓
Lipstick Chart	✓	✓	✗	✓	✓	✗
Micro Charts	✓	✓	✗	✗	✓	✗
Network Visualization	✓	✓	✓	✓	✓	✓
Image Layout	✗	✓	✗	✗	✓	✓
Fish eye Selector	✗	✗	✗	✗	✗	✓



ADVANCE VISUALIZATIONS COMPARISON TABLE

Visualizations

MicroStrategy Version : 11 | Tableau Version : 2019.3

Advance Visualization	MSTR Web	MSTR Mobile	Dossier	Tableau	Qlikview	Power BI
Media	✓	✓	✓	✓	✓	✓
Data Cloud	✓	✓	✓	✓	✓	✓
Weighted List	✗	✗	✗	✓	✗	✓
RSS Reader	✗	✓	✗	✗	✗	✗
Cylinder	✗	✗	✗	✓	✓	✓
Thermometer	✗	✗	✗	✓	✓	✓
Timeline	✓	✓	✗	✓	✓	✓
Sequence sunburst	✓	✗	✓	✓	✓	✓
Google timeline	✓	✓	✓	✓	✗	✓
KPI Widget	✓	✓	✓	✓	✓	✓
Survey	✓	✓	✗	✓	✗	✓
Date Selection	✓	✓	✗	✓	✓	✓
Interactive Grid	✗	✓	✗	✗	✓	✓
Sankey	✗	✗	✓	✓	✗	✓

INFOCEPTS

S T A Y M O D E R N

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