



Which chart or graph is right for you?

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You've got data and you've got questions. You know there's a chart or graph out there that will find the answer you're looking for, but it's not always easy knowing which one is best without some trial and error.

This paper pairs appropriate charts with the type of data you're analyzing and questions you want to answer. But it won't stop there.

Stranding your data in isolated, static graphs limits the number and depth of questions you can answer. Let your analysis become your organization's centerpiece by using it to fuel exploration. Combine related charts. Add a map. Provide filters to dig deeper. The impact? Immediate business insight and answers to questions that actually drive decisions.

So, which chart is right for you? Transforming data into an effective visualization (any kind of chart or graph) or dashboard is the first step towards making your data make an impact. Here are some best practices for conducting meaningful visual analysis:

Bar chart

Bar charts are one of the most common data visualizations. With them, you can quickly highlight differences between categories, clearly show trends and outliers, and reveal historical highs and lows at a glance. Bar charts are especially effective when you have data that can be split into multiple categories.

Use bar charts to:

- Compare data across categories. Bar charts are best suited for data that can be split into several groups. For example, volume of shirts in different sizes, website traffic by referrer, and percent of spending by department.

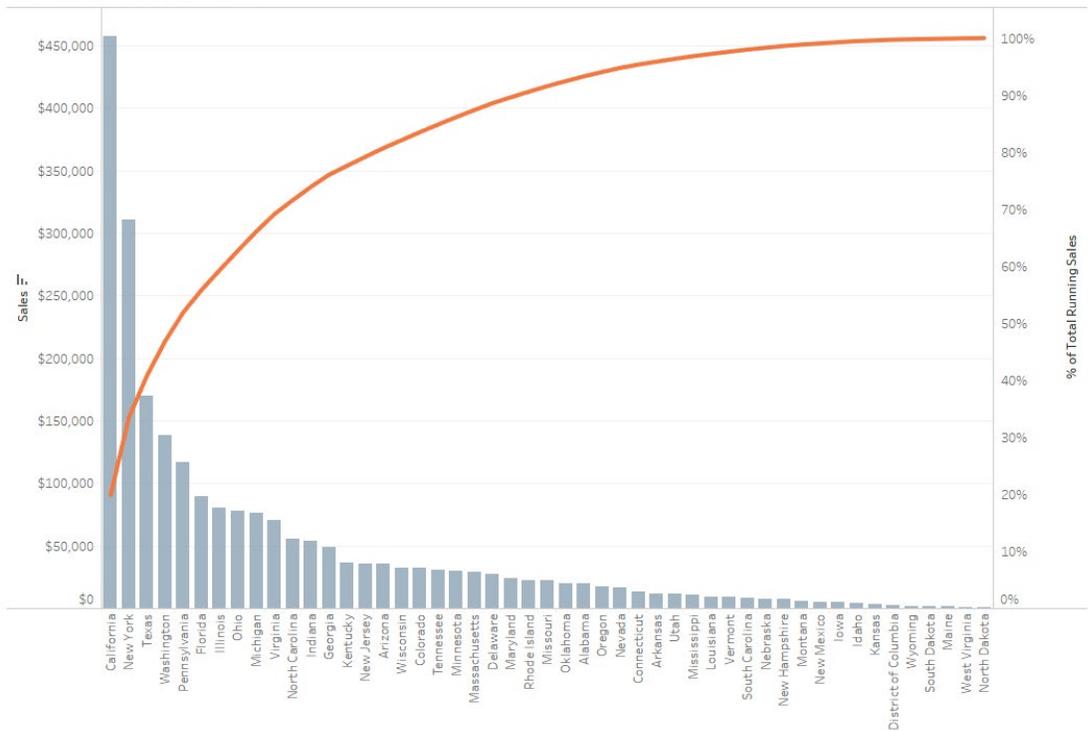
Tips:

- Include multiple bar charts on a dashboard. Comparing several bar charts at the same time is much easier than trying to spot patterns across multiple slides.
- Add color to bars for more impact. Color adds a quick, visual identifier that makes deep comparisons easy.
- Use stacked bars or side-by-side bars. Stacked and side-by-side bar charts let you break down your data even further, giving more depth to your analysis.
- Combine bar charts with maps. Maps are a powerful and intuitive way to visualize data. Using a map as a filter lets viewers drill down and find detailed answers.
- Put bars on both sides of an axis. Plotting positive and negative data points along the same axis makes trends and outliers stand out.
- Try Pareto analysis by combining bar charts with table calculations. Use table calculations to create a Pareto chart, showing the accumulation of multiple categories.

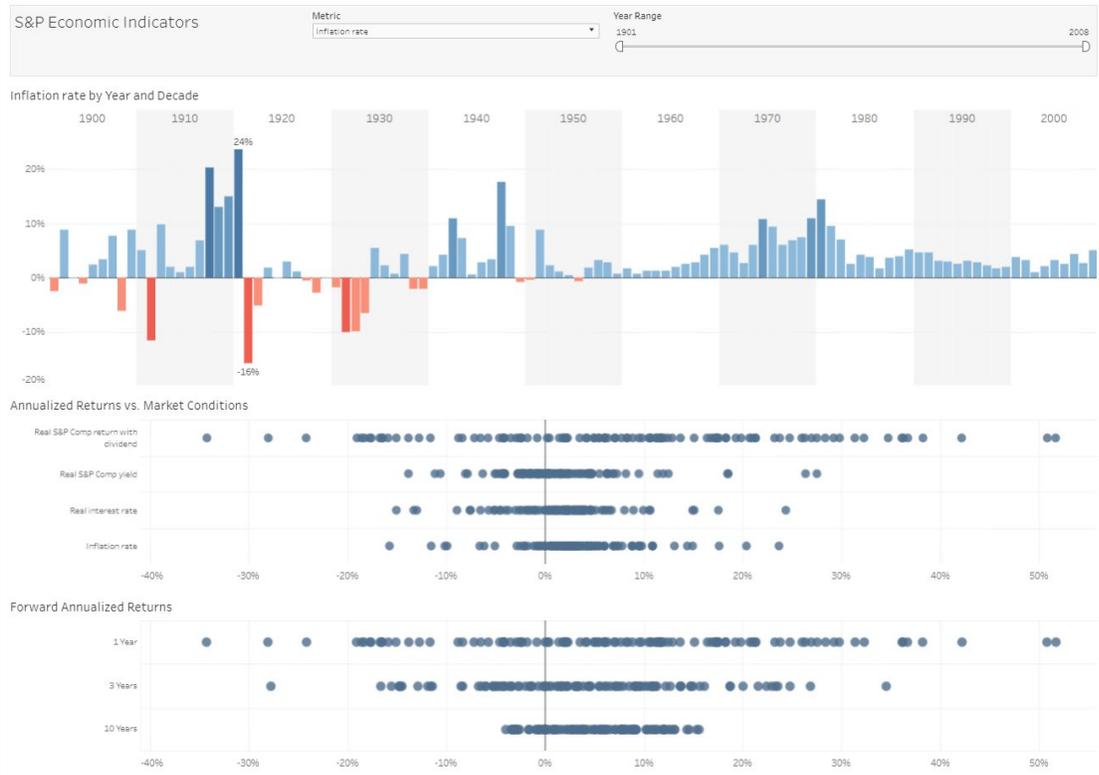
“Tableau is one of the best tools out there for creating really powerful and insightful visuals. We’re using it for analytics that require great data visuals to help us tell the stories we’re trying to tell to our executive management team.”

Dana Zuber, Vice President
Strategic Planning
Manager

States by Percent of Sales



This Pareto chart shows that roughly 20% of all sales are coming from the state of California.



In this example, the bar chart quickly shows when inflation rates rose and dropped. In the first half of the century, the drops were more dramatic than in more recent history.

Line chart

The line chart, or line graph, is another familiar method for displaying data. It connects several distinct data points, presenting them as one continuous evolution. The result is a simple, straightforward way to visualize changes in one value relative to another.

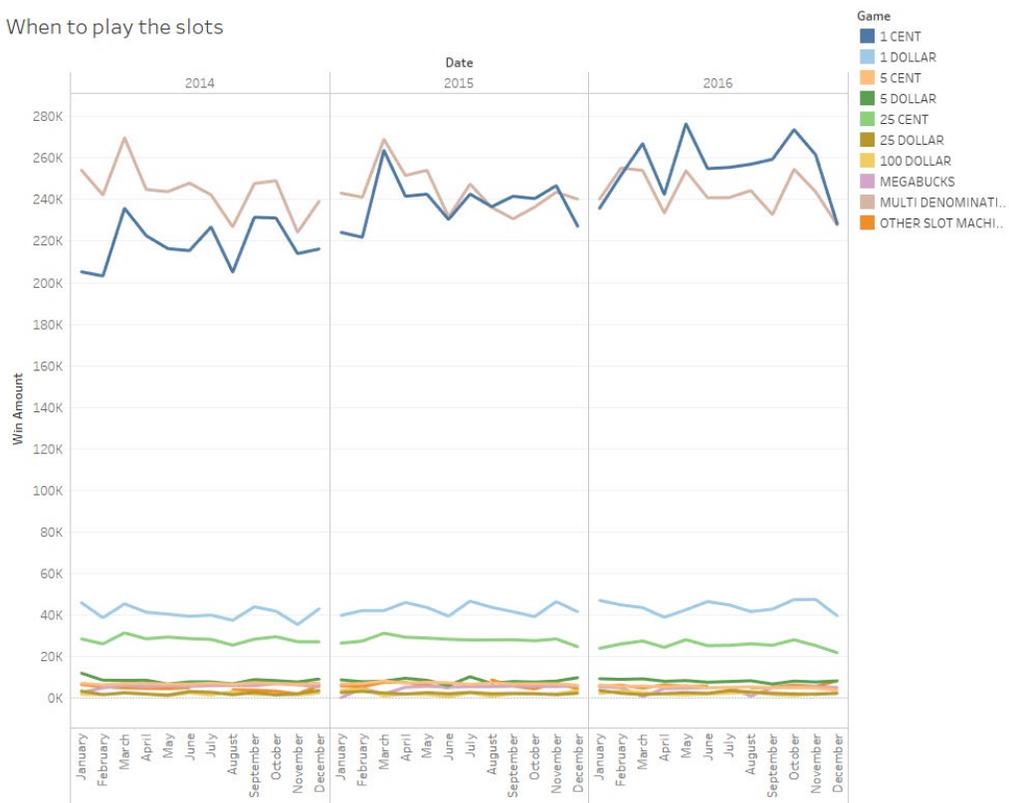
Use line charts to:

- View trends in data, usually over time. Line charts are most often used to show a value evolving over time, but they aren't limited to that. Any dimension—like date types, time intervals, and other ordinal data—can be used as the horizontal axis. For example, stock price change over five years, website page views during a month, and revenue growth by quarter.

Tips:

- Combine a line graph with bar charts. Bar and line charts go well together. Showing two kinds of information on the same axis adds powerful context to your data.
- Shade the area under lines. Shading the area under line charts provides an immediate visual cue of quantity, and can improve the look and feel of your graph. When your graph includes multiple lines, use multiple colors to inform the viewer of each line's relative contribution to the whole.

When to play the slots



This line chart shows which slot machines have the largest winning amount while also showing the seasonality.

Pie chart

Pie charts are powerful for adding detail to other visualizations. Alone, a pie chart doesn't give the viewer a way to quickly and accurately compare information. Since the viewer has to create context on their own, key points from your data are missed. Instead of making a pie chart the focus of your dashboard, try using them to drill down on other visualizations. This approach uses the pie chart's simplicity to add information, without distracting from the larger picture.

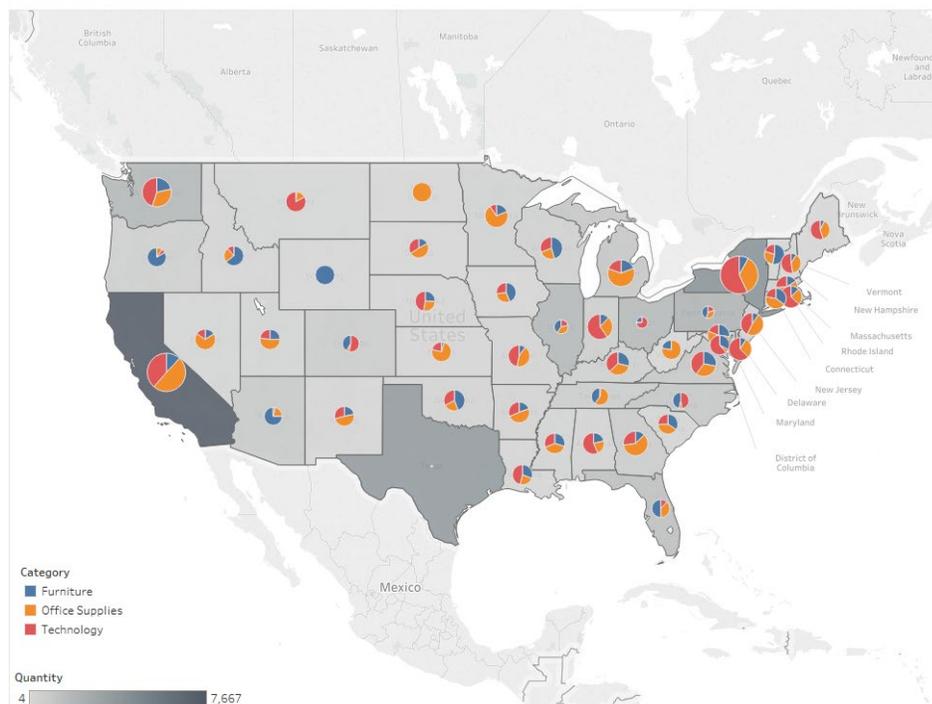
When to use pie charts:

- Alongside other charts. A pie chart is most impactful when used to add information to other types of charts and graphs.
- Drill down on other visualizations. This approach uses the pie chart's simplicity to add information and context, without distracting from the larger picture.

Tips:

- Limit the number of pie wedges. If you have too many proportions to compare, the viewer may have trouble getting meaning from the chart. Similarly, limit dashboards to a small total number of pie charts.
- Overlay pies on maps. Pie charts can further break down geographical trends in your data, creating a compelling visualization.

Profit by Category



Adding the pie charts to the map allows the viewer to quickly see how particular states are profiting from different product categories.

Map

Maps are a no-brainer for visualizing any kind of location information, whether it's postal codes, state abbreviations, country names, or your own custom geocoding. Maps highlight geographic trends in a format everyone knows and understands.

Use maps to:

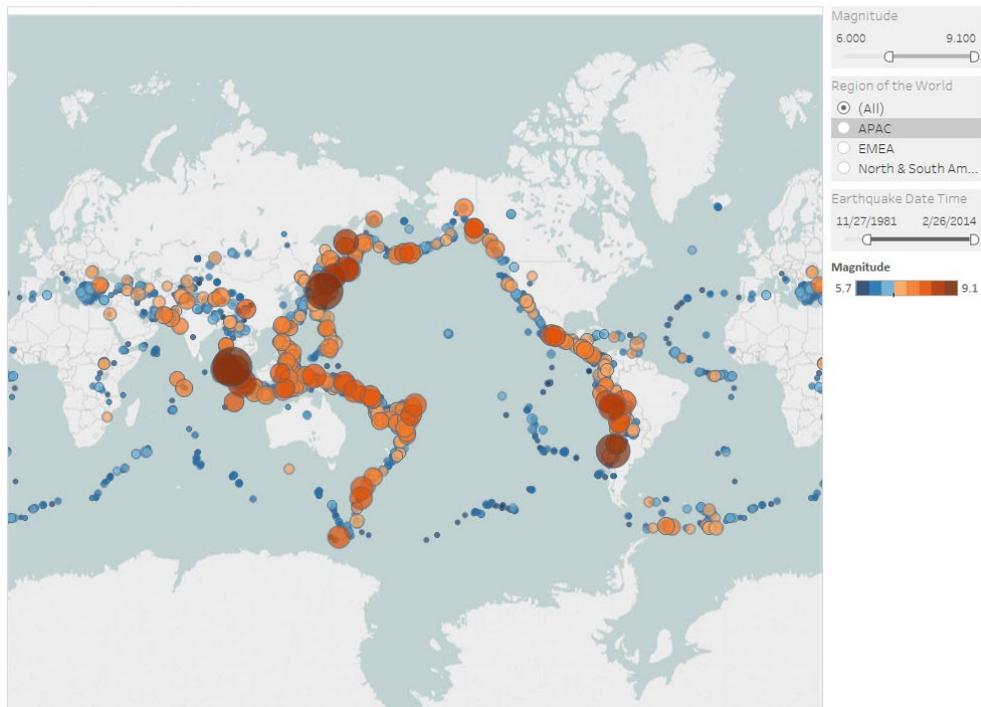
- Display geocoded data. If you have geographic information associated with your data, maps are a simple and compelling way to show how location correlates with trends in your data. For example, insurance claims by state, product export destinations by country, car accidents by zip code, and custom sales territories.

Also consider:

- Use a map as a filter for other types of charts, graphs, and tables. A map provides an intuitive way to drill down in to your data. Viewers can see large trends at a glance, and use filter actions to quickly investigate even further.
- Layer data points on top of maps. Marks can be overlaid on a map to show individual data points with more precision. Try varying their size to add more visual detail to your analysis.

Read [Maps: The Power of Where](#) learn how using maps effectively helps drive better business decisions.

Earthquake magnitudes around the world



By layering the magnitude of an earthquake on top of the map, the viewer can see where most bigger earthquake occur.

Scatter plot

Scatter plots are an effective way to give you a sense of trends, concentrations, and outliers that facilitate deeper investigations of your data. A scatter plot presents lots of distinct data points on a single chart. The chart can then be enhanced with analytics like cluster analysis or trend lines.

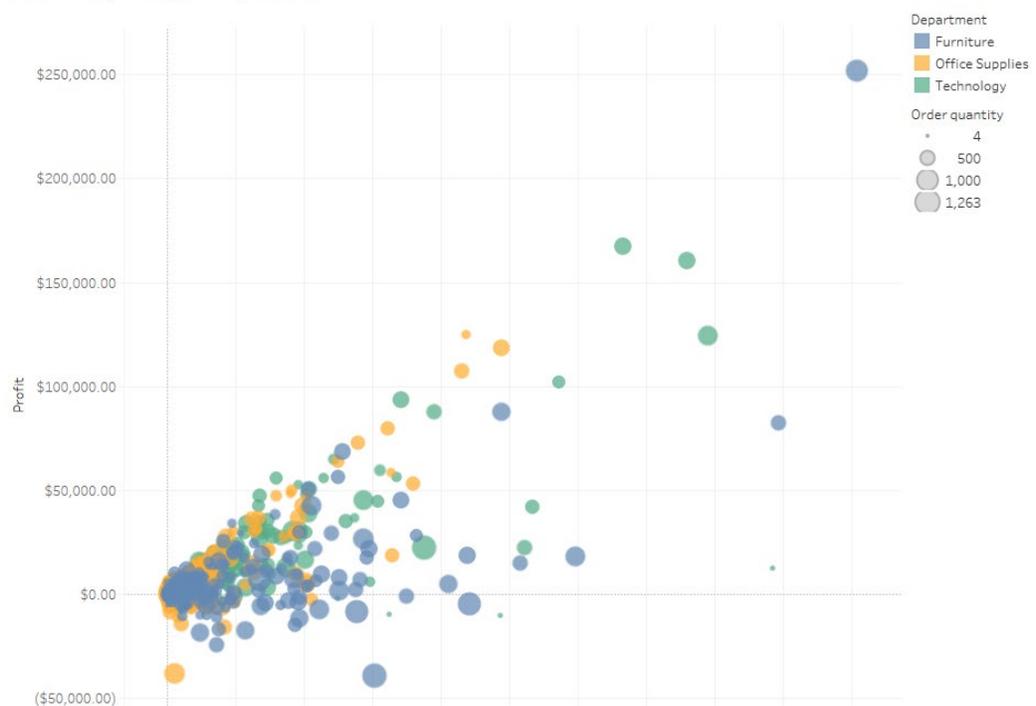
Use scatter plots to:

- Investigate the relationship between different variables. Scatter plots are used to show if one variable is a good predictor of another, or if they tend to change independently. This type of chart easily lends itself to many types of analysis. For example, male versus female likelihood of having lung cancer at different ages, technology early adopters' and laggards' purchase patterns of smart phones, and shipping costs of different product categories to different regions.

Tips:

- Use cluster analysis to identify segments. Cluster analysis groups data points into distinct segments, based on the variables you select.
- Use highlight actions. By adding a highlight action to your scatter plots, quickly see which points have attributes in common, without losing sight of the rest of the dataset.
- Use custom mark types. Custom marks add a quick visual cue to your chart, clearly distinguishing different groups of points.

Sales and profit per department



Gantt chart

Gantt charts are purpose-built for illustrating the start and finish dates of steps in a process or project. A Gantt chart shows steps that need to be completed before others can begin, or which resources are overcommitted.

Gantt charts aren't limited to projects, though: Represent any time series data with this chart type. Try using a Gantt chart to show how a multi-step process has performed over time. Color can be used to show which steps are under- or over performing.

Use Gantt charts to:

- Display a project schedule. A Gantt chart can easily illustrate key deliverables, owners, and deadlines.
- Show changes in use or activity over time. Time series data is presented in a natural, easy to understand format on a Gantt chart. For example, duration of a machine's use, or availability of players on a team.

Tips:

- Add color. Changing the color of the bars within the Gantt chart quickly informs viewers about key aspects of the variable.
- Combine maps and other chart types with Gantt charts. Including Gantt charts in a dashboard with other chart types



Using this gantt chart, the team knows which pieces of content are on schedule and which are running late.

Bubble chart

Although bubbles aren't technically their own type of visualization, using them as a technique adds great detail to scatter plots or maps. Varying the size and color of circles creates visually compelling charts that present large volumes of data at once.

Use bubble charts to:

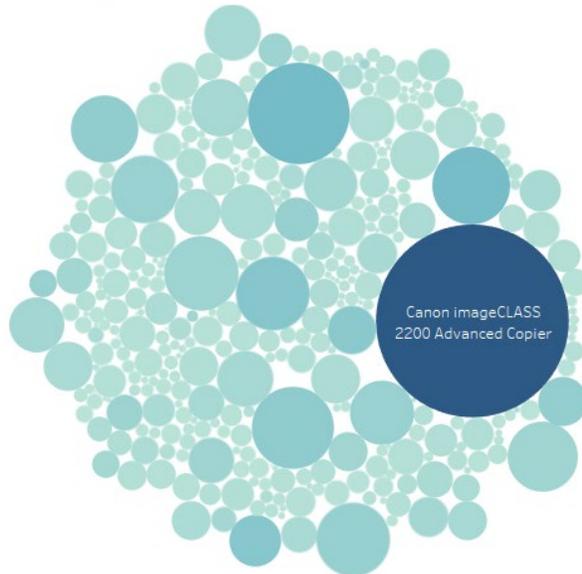
- Show the relationship between three or more measures. Bubbles can add more detail to the traditional two axis chart, highlighting the relationship between three or more variables, without overwhelming the viewer.

Tips:

- Add color. Color can add more dimension to a bubble chart, while creating an attractive visual “pop.”
- Overlay bubbles on maps. Bubbles quickly inform a viewer about relative concentration of data. Using these as an overlay puts geographically-related data in context quickly for the viewer.

Product Performance

Sales and profit of products



Sales of *Canon imageCLASS 2200 Advanced Copier* over time



In this example, the bubble chart can be used as a filter for the line chart to better understand how sales for a particular product have performed over time.

Histogram chart

Histograms show how your data is distributed across distinct groups. By grouping your data into specific categories (also known as “bins”), then plotting the number of records in a category as a vertical bar, you can quickly see which bins the majority of your data falls in.

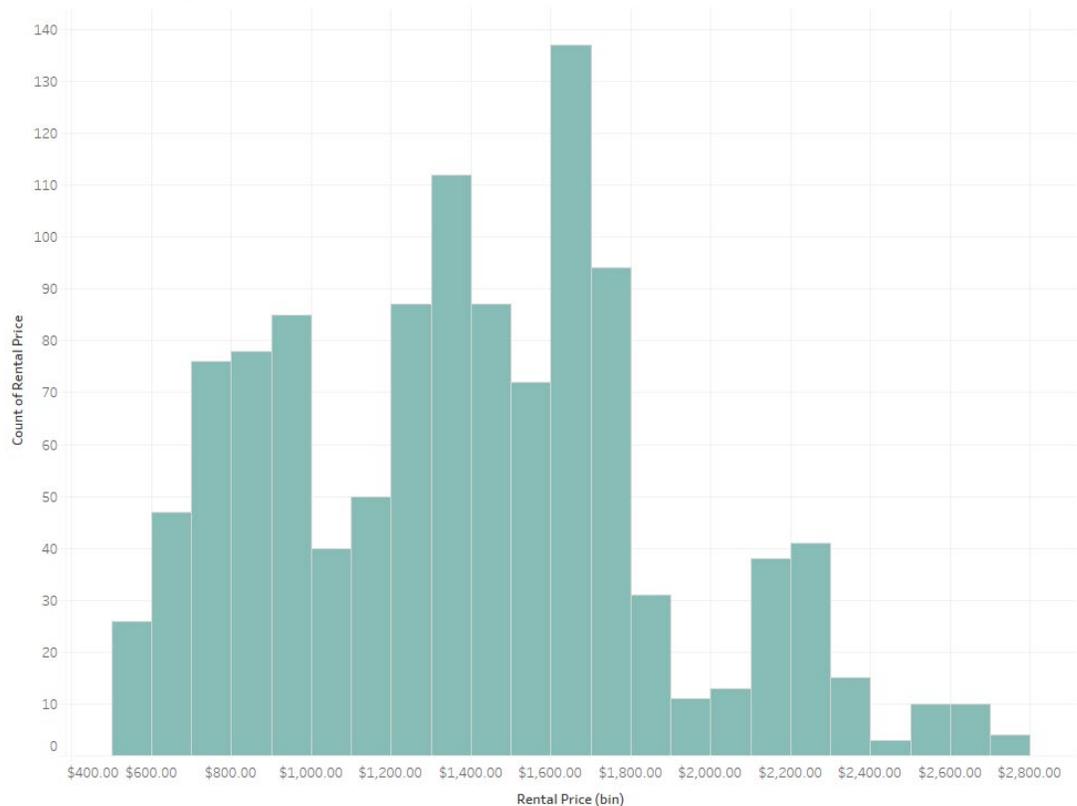
Use histograms to:

- Understand the distribution of your data. The histogram is your best option for visualizing how data falls into categories. For example, number of customers by company size, student performance on an exam, and frequency of a product defect.

Tips:

- Test different groupings of data. Creating a variety of histograms can help to determine the most useful groupings of data.
- Add color to break bins down. Apply color to bars representing each group to show a second set of categories on the same chart.

Rental Price Ranges in the US



The histogram gives a breakdown of the distribution of rental prices throughout the United States.

Bullet chart

Bullet charts show progress against a goal by comparing measures. At its core, a bullet graph is a variation of a bar chart. Designed to replace dashboard gauges, meters, and thermometers, a bullet chart shows more information while using less space.

Use bullet charts to:

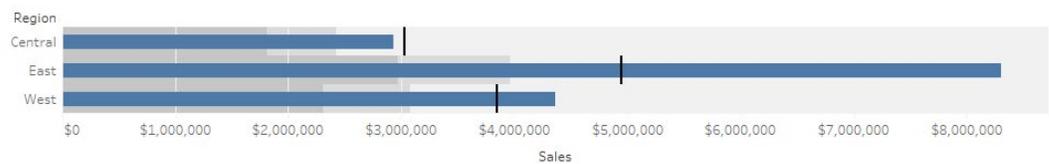
- Quickly compare a metric to a goal. A bullet chart shows how a metric is doing at a single point in time. Because it doesn't display history, this chart is best suited for quick "how are we doing" dashboards, rather than deep analysis.

Tips:

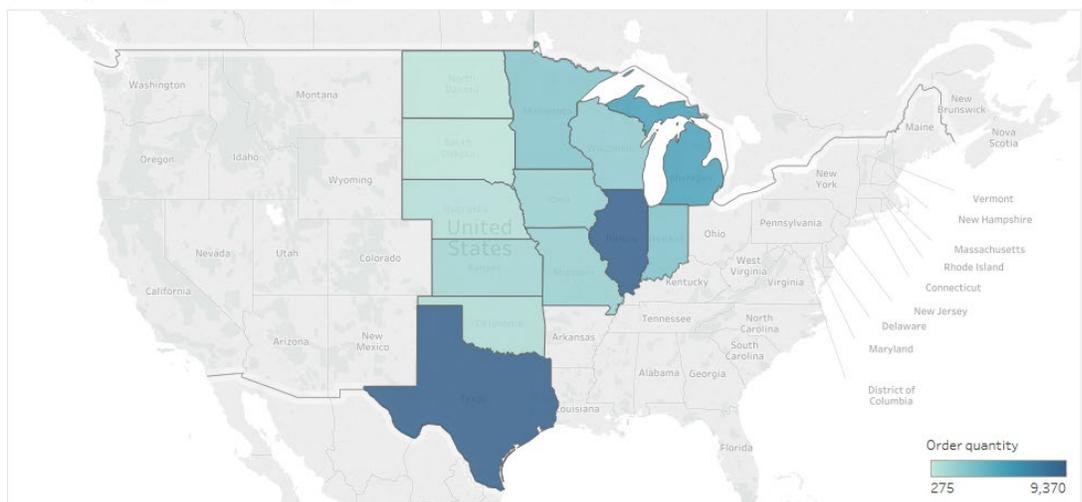
- Use color to illustrate achievement thresholds. Including color as a backdrop gives the viewer another reference to better understand how performance is measured against goals.
- Add bullets to dashboards for summary insights. Combining bullets with other chart types into a dashboard supports productive discussions about where attention is needed to accomplish objectives.

Regional Sales Targets

Sales vs. quota by region



Order quantity in the Central region



In this dashboard, the viewer can see the Central region has not yet hit quota. By using the bullet graph as a filter for the map, it becomes apparent where there is more opportunity to sell.

Heat maps

Heat maps are a great way to compare data across two or more categories using color. Patterns guide viewers around the chart, quickly showing them where the intersection of categories is strongest and weakest.

Use heat maps to:

- Compare categorical data using color. Heat maps are best for presenting data sets with lots of categories. This chart type can pack hundreds of comparisons into a small area, and still be easy to understand at a glance. For example, sales quota assessment, actual spending vs. budget, and performance spectrum (great/good/poor).

Tips:

- Vary the size of squares. Changing the size of the squares adds significance to the heat map's visual analysis. For example, shrinking a square creates whitespace around it, de-emphasizing it and directing the viewer's eye elsewhere.

To discover more tips for optimizing your dashboard layout, read [The Do's and Don'ts of Dashboards](#).

“A heat map, which would take 40 man hours before Tableau, now takes us less than a day. That’s a reduction of almost 80 percent.”

*Rakesh Rallapalli
Practice Lead, Business Analytics
CRIF High Mark Information Services*

Which product categories are selling each month?



The heatmap gives the viewer a quick summary of how different product categories are performing compared to each other per month.

Highlight table

Highlight tables take heat maps one step further. In addition to showing how data intersects by using color, highlight tables display number by cell, providing additional detail.

Use highlight tables to:

- Draw attention to detailed information. A highlight table uses color to grab the viewer's attention, while still presenting precise figures. For example, segmentation analysis of target market, product adoption across regions, and sales leads by individual rep.

Tips:

- Combine highlight tables with other chart types: Buttressing a line chart with a highlight table, for example, lets a viewer keep overall data trends in mind while drilling down into specific cross sections of interest.

Population: Highlight table

City	Year											F
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
New York city	8,017,608	8,059,813	8,072,000	8,068,073	8,043,366	8,013,368	7,993,906	8,013,775	8,068,195	8,131,574	8,184,899	
Los Angeles	3,701,062	3,733,328	3,762,432	3,784,279	3,792,650	3,788,197	3,767,960	3,751,872	3,763,566	3,781,938	3,797,162	
Chicago	2,891,582	2,874,477	2,847,266	2,819,117	2,786,291	2,752,523	2,720,181	2,703,991	2,697,359	2,697,006	2,698,838	
Houston	1,974,324	1,979,589	1,990,408	1,992,464	1,991,817	1,995,773	2,038,721	2,044,612	2,060,477	2,087,334	2,108,946	
Philadelphia	1,514,563	1,505,455	1,498,493	1,493,802	1,492,882	1,490,861	1,488,710	1,493,309	1,499,731	1,514,694	1,528,306	
Phoenix	1,326,682	1,342,908	1,357,196	1,368,806	1,386,945	1,417,720	1,441,241	1,450,901	1,456,729	1,452,679	1,449,511	
San Antonio	1,153,843	1,161,680	1,175,718	1,185,891	1,202,840	1,217,575	1,245,274	1,270,187	1,291,232	1,310,266	1,334,405	
San Diego	1,227,854	1,242,230	1,251,808	1,254,603	1,256,969	1,257,278	1,257,625	1,266,198	1,282,692	1,295,591	1,311,880	
Dallas	1,188,168	1,196,974	1,190,681	1,181,976	1,174,231	1,171,519	1,177,916	1,179,667	1,183,805	1,192,653	1,202,719	
Jacksonville	736,076	746,970	756,882	766,090	776,567	785,605	798,623	807,669	812,430	817,121	823,316	
Indianapolis	782,760	787,039	787,420	789,466	791,038	793,606	798,247	802,751	808,013	815,982	821,793	
San Francisco	777,885	780,865	772,723	766,160	761,325	763,016	768,650	778,673	791,152	801,922	805,463	
Austin	675,775	691,119	688,644	690,293	696,973	708,423	730,373	749,641	764,945	780,172	796,526	
Columbus	714,905	723,364	728,476	734,215	738,386	743,511	751,685	760,224	770,530	780,950	788,724	
Fort Worth	547,484	566,402	585,542	602,759	619,117	637,139	662,346	685,762	706,526	727,257	744,728	
Charlotte	577,676	591,176	601,869	613,674	626,629	645,100	669,217	691,568	709,593	724,333	734,443	
Detroit	946,240	927,136	905,996	884,411	861,186	837,407	811,922	784,998	756,383	731,155	711,690	
El Paso	568,224	572,521	576,719	582,199	590,713	597,634	609,650	616,846	626,920	639,017	652,129	
Memphis	688,137	682,522	678,477	675,101	670,802	666,952	665,512	659,816	653,107	648,051	647,850	
Baltimore	649,086	640,733	634,115	629,033	624,222	621,560	621,109	620,306	620,184	620,509	620,583	
Boston	591,844	598,208	599,301	595,864	591,166	587,260	587,816	593,136	600,685	612,669	618,695	
Seattle	563,434	567,169	566,945	566,751	568,719	573,336	580,609	586,956	593,588	604,189	610,728	
Washington DC	572,046	574,504	573,158	568,502	567,754	567,136	570,681	574,404	580,236	592,228	604,453	
Denver	555,651	561,976	556,790	552,588	550,756	551,691	556,895	564,395	575,721	589,011	604,414	
Nashville	546,180	549,869	550,041	553,081	558,752	565,346	572,934	580,162	587,567	595,682	602,613	
Milwaukee	596,382	595,396	595,181	594,303	592,008	588,565	586,395	586,445	587,858	592,180	595,588	
Portland	529,845	535,755	540,833	542,496	536,636	538,053	544,669	555,306	566,850	578,104	585,807	
Las Vegas	483,954	497,368	509,298	520,769	537,788	550,857	566,221	578,302	584,400	585,381	584,646	
Oklahoma City	507,011	512,224	519,405	525,008	530,508	537,870	546,595	554,280	561,926	572,448	582,231	
Albuquerque	451,261	457,627	468,551	478,028	489,868	502,924	514,723	524,090	531,451	539,215	547,569	
Tucson	486,372	488,463	492,802	495,194	499,583	505,902	513,333	517,450	520,054	520,418	521,104	
Fresno	430,801	436,525	444,960	453,763	460,601	466,179	471,748	477,659	484,443	490,262	496,154	
Sacramento	408,593	420,149	431,196	439,790	446,049	449,513	451,938	455,316	459,241	463,458	467,530	
Long Beach	461,978	464,856	467,330	468,897	468,781	467,090	463,445	460,328	460,643	461,782	462,813	
Kansas City	442,421	443,846	445,289	445,623	445,928	447,015	449,652	452,322	454,348	457,897	460,852	

The highlight table draws the eye to see the biggest percent changes in population per state.

Treemap

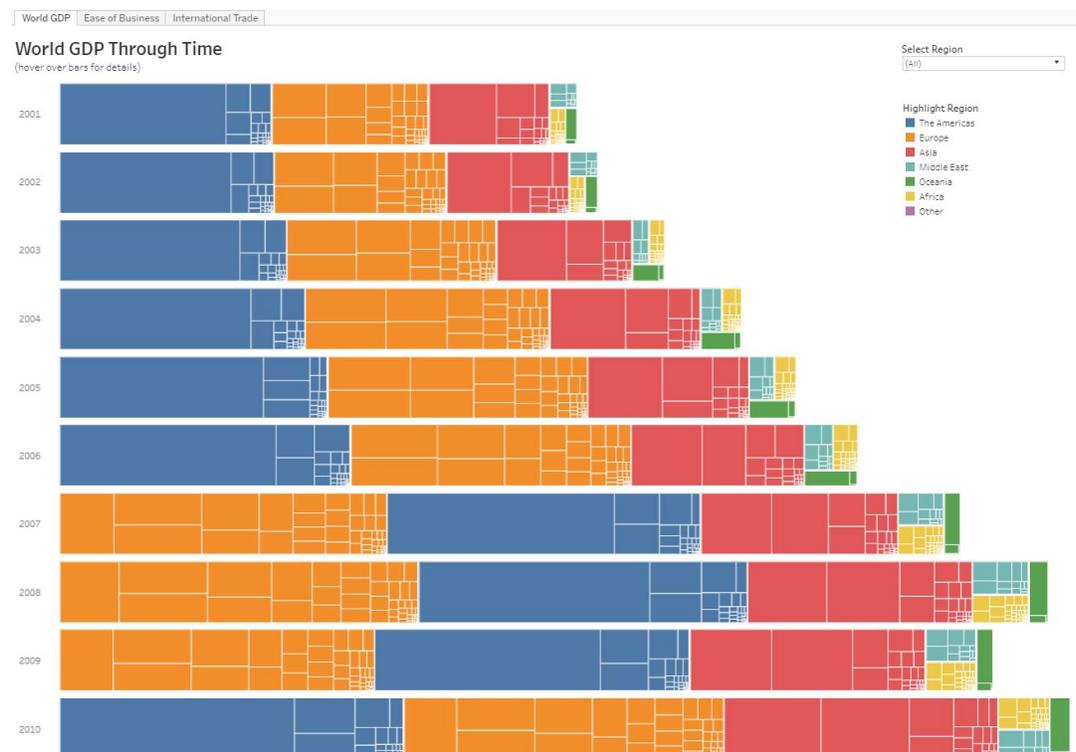
Treemaps relate different segments of your data to the whole. By nesting rectangles within others, treemaps show how individual data points fit in a hierarchy. As the name of the chart suggests, each rectangle is subdivided into smaller rectangles, or sub-branches, based on its proportion to the whole. They make efficient use of space to show percent total for each category.

Use treemaps to:

- Show data with multiple levels of categorization: When a dataset can be broken down in many different ways, a treemap might be the best way to show what categories most of the data falls in. For example, storage usage across computer machines, managing the number and priority of technical support cases, and comparing fiscal budgets between years.

Tips:

- Color the rectangles by category. Because heatmaps are such a dense chart type, color makes it easier for the viewer to distinguish one category from another.
- Combine treemaps with bar charts. Bar charts whose “fill” is a treemap are a visually impressive way to drill down into data. The bar chart lets the viewer quickly compare items through the bar’s length, while also showing the breakdown of categories within each bar.



The use of the treemap within each bar, let's the viewer see which regions had the highest GDP each year.

Box-and-whisker Plot

Box-and-whisker plots, or boxplots, are a common way to show distributions of data. The name refers to the two parts of the diagram: the box, which contains the median of the data along with the 1st and 3rd quartiles (25% greater and less than the median), and the whiskers, which typically represents data within 1.5 times the interquartile range (the difference between the 1st and 3rd quartiles). The whiskers can also be used to also show the maximum and minimum points within the data.

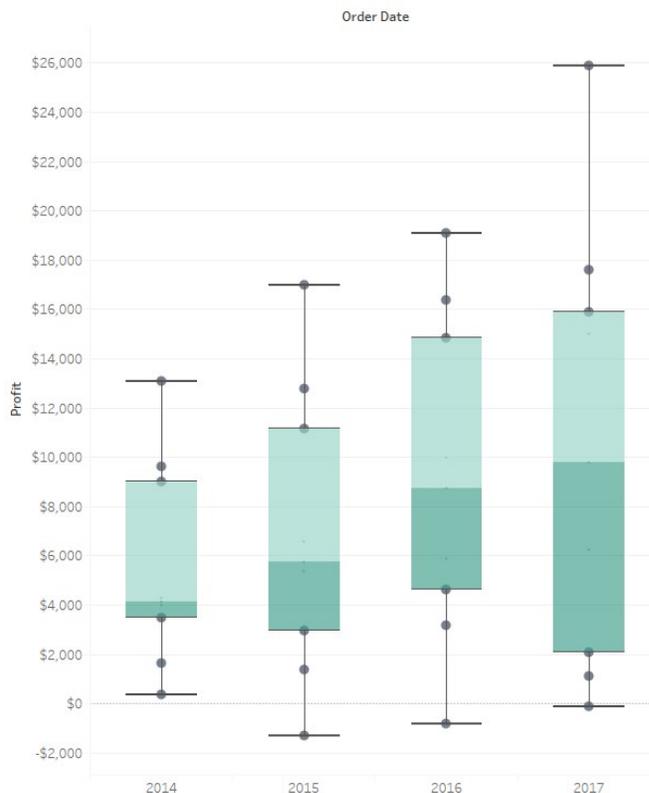
Use box-and-whisker plots to:

- Show the distribution of a data set: Use box-and-whisker diagrams to understand your data at a glance. See how data is skewed towards one end and identify outliers in your data. For example, comparing scores between sites, analyzing data before and after a process change, or examining data from duplicate machines manufacturing the same products.

Tips:

- Hide the points within the box. This helps a viewer focus on the outliers.
- Compare boxplots across categorical dimensions. Boxplots are great at allowing you to quickly compare distributions between data sets.

Profit distribution by year



In this example, the viewer can quickly see how the profit distribution has changed over time.

Candlestick Chart

Candlestick charts are commonly used for financial analysis, showing metrics about a financial instrument over a period of time. This chart type shows the open, close, high, and low values of an instrument over time, in an easy to understand format.

Use candlestick charts:

- Showing financial data: A candlestick chart is an advanced chart type, meant specifically for financial analysis. Though it may look like a box-and-whisker plot, these two charts do not have the same meaning.

Tips:

- Present multiple separate candlestick charts. Trying to layer too many data points on a single chart can be confusing and difficult to navigate. Creating clear distinctions helps the viewer to analyze the charts separately
- Use highlight actions to correlate data. Time-series data can be difficult to keep track of. Highlight actions allow a user to focus on a single date, while still seeing the historical information in the rest of the chart.



Candlestick charts enable you to perform price and volatility analysis in one view. In this example, track Coke or Pepsi's stock prices in one compact view.

About Tableau

Tableau helps people transform data into actionable insights that make an impact. Easily connect to data stored anywhere, in any format. Quickly perform ad hoc analyses that reveal hidden opportunities. Drag and drop to create interactive dashboards with advanced visual analytics. Then share across your organization and empower teammates to explore their perspective on data. From global enterprises to early-stage startups and small businesses, people everywhere use Tableau's analytics platform to see and understand their data.

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[The Do's and Don'ts of Dashboards](#)

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