Power BI Visualization

Objective

This chapter

- Understanding Column Chart
- Understanding Line Chart
- Implementation of Conditional Formatting
- Implementation of Formatting techniques.

Power BI Visualization

Power BI Visualization is a way to represent data graphically using different visual elements such as charts, graphs, tables, maps, and other visual elements. These visualizations help to quickly understand and analyse data and extract insights.

Power BI provides a wide range of visualizations that can be used to create interactive dashboards and reports. These visualizations can be customized and configured to meet specific business needs. The visualizations are also interactive, allowing users to explore and analyse data in real-time.

Some common types of visualizations in Power BI include column charts, bar charts, line charts, pie charts, scatter plots, maps, tables, and gauges. These visualizations can be combined in a single report to provide a complete picture of the data.

In addition to basic visualizations, Power BI also offers more advanced features such as drill-down, cross-filtering, and dynamic formatting. These features allow users to interact with the data and gain deeper insights.

Overall, Power BI visualizations are a powerful tool for data analysis and reporting, helping users to make informed decisions and drive business success.

Why is Data visualization important?

1. Data visualization provides a quick and effective way to communicate information.
2. The ability to absorb information quickly, improve insights and make faster decisions;
3. An increased understanding of the next steps that must be taken to improve the organization;
4. An improved ability to maintain the audience's interest with information they can understand;
5. An easy distribution of information that increases the opportunity to share insights with everyone involved;
6. An increased ability to act on findings quickly and, therefore, achieve success with greater speed and less mistakes.

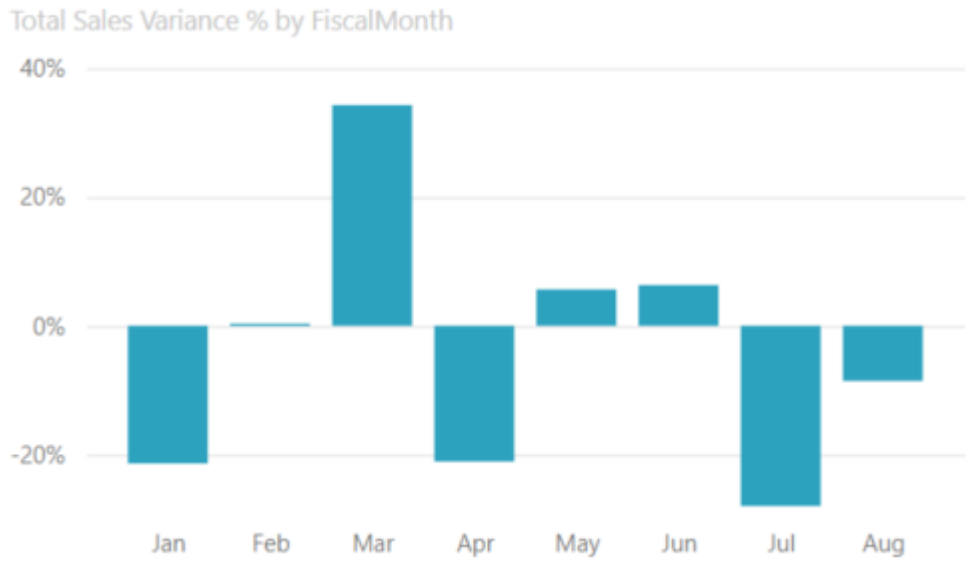
Visualizations in Power BI

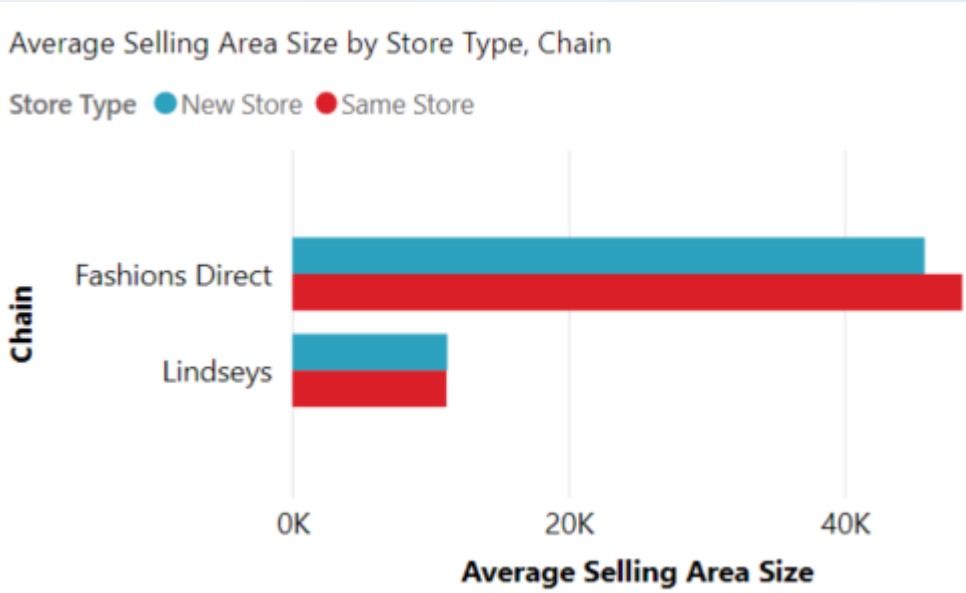
All of these visualizations can be added to Power BI reports, specified in Q&A, and pinned to dashboards.

Area charts: Basic (Layered) and Stacked

The basic area chart is based on the line chart with the area between the axis and line filled in. Area charts emphasize the magnitude of change over time, and can be used to draw attention to the total value across a trend. For example, data that represents profit over time can be plotted in an area chart to emphasize the total profit.

Bar and column charts

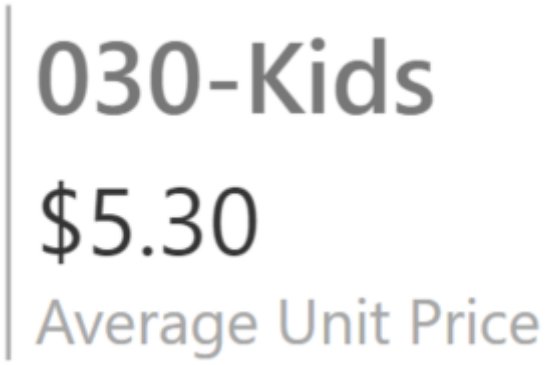




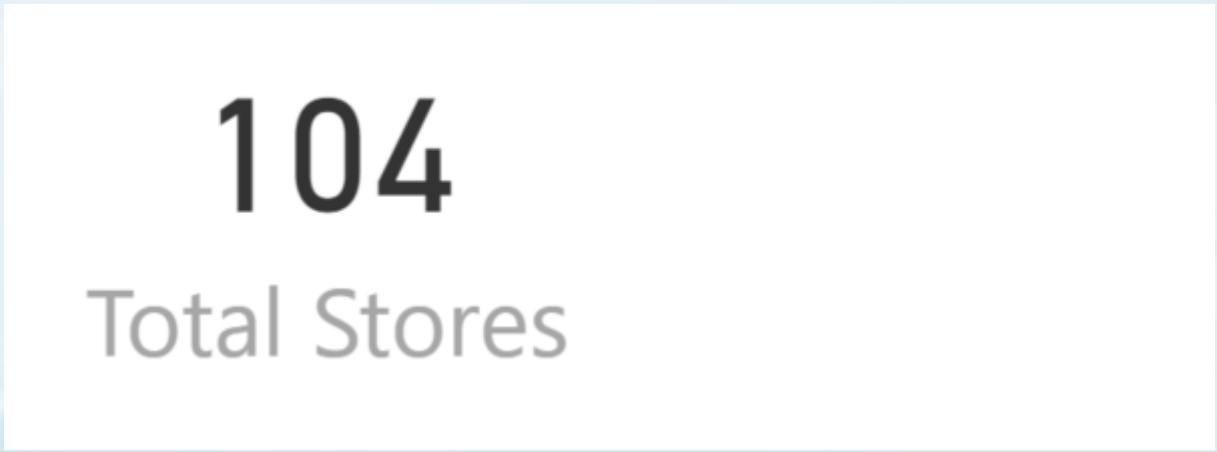
Bar charts are the standard for looking at a specific value across different categories.

Cards

Multi row



Multi row cards display one or more data points, one per row.



Single number

Single number cards display a single fact, a single data point. Sometimes a single number is the most important thing you want to track in your Power BI dashboard or report, such as total sales, market share year over year, or total opportunities.

Combo charts

A combo chart combines a column chart and a line chart. Combining the two charts into one lets you make a quicker comparison of the data. Combo charts can have one or two Y axes, so be sure to look closely.

Combo charts are a great choice:

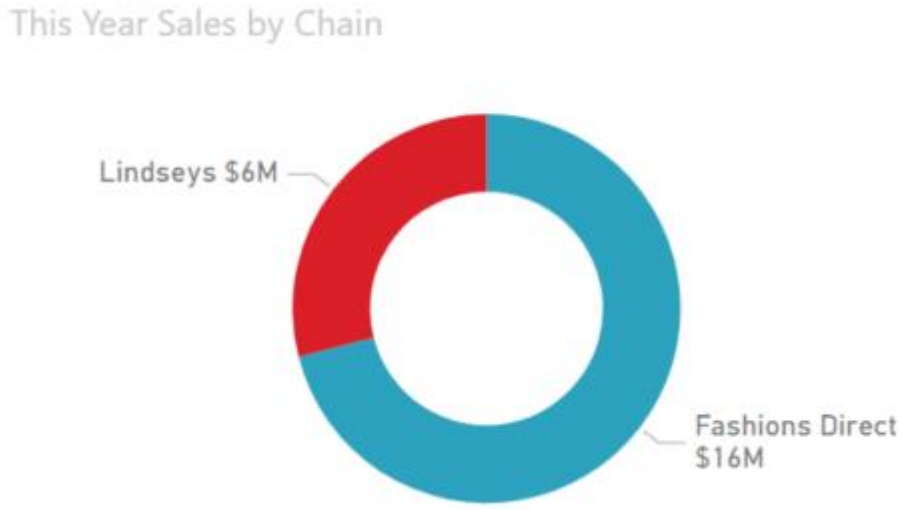
- When you have a line chart and a column chart with the same X axis.
- To compare multiple measures with different value ranges.
- To illustrate the correlation between two measures in one visual.

- To check whether one measure meets the target which is defined by another measure.
- To conserve canvas space.

Decomposition tree

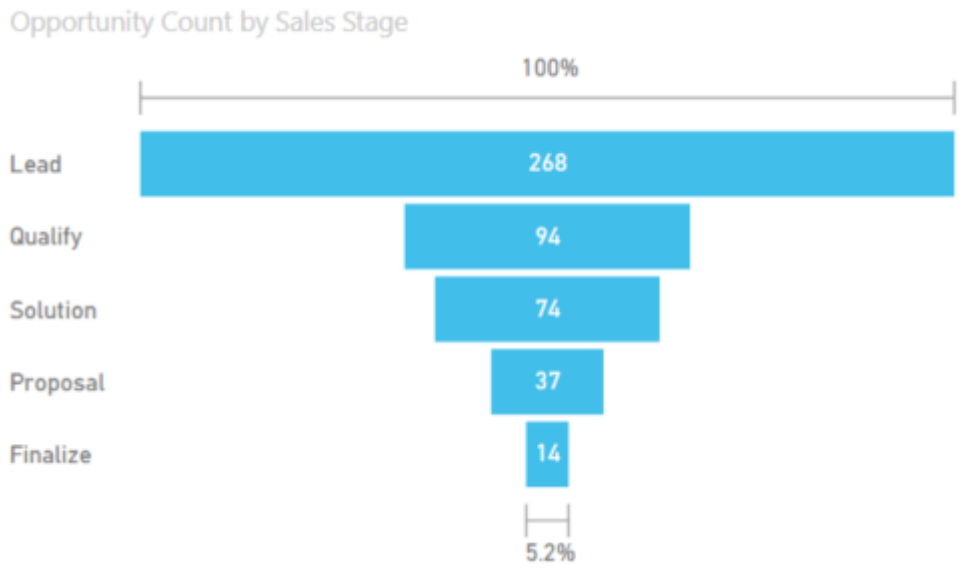
The decomposition tree visual lets you visualize data across multiple dimensions. It automatically aggregates data and enables drilling down into your dimensions in any order. It is also an artificial intelligence (AI) visualization, so you can ask it to find the next dimension to drill down into based on certain criteria. This makes it a valuable tool for ad hoc exploration and conducting root cause analysis.

Doughnut charts



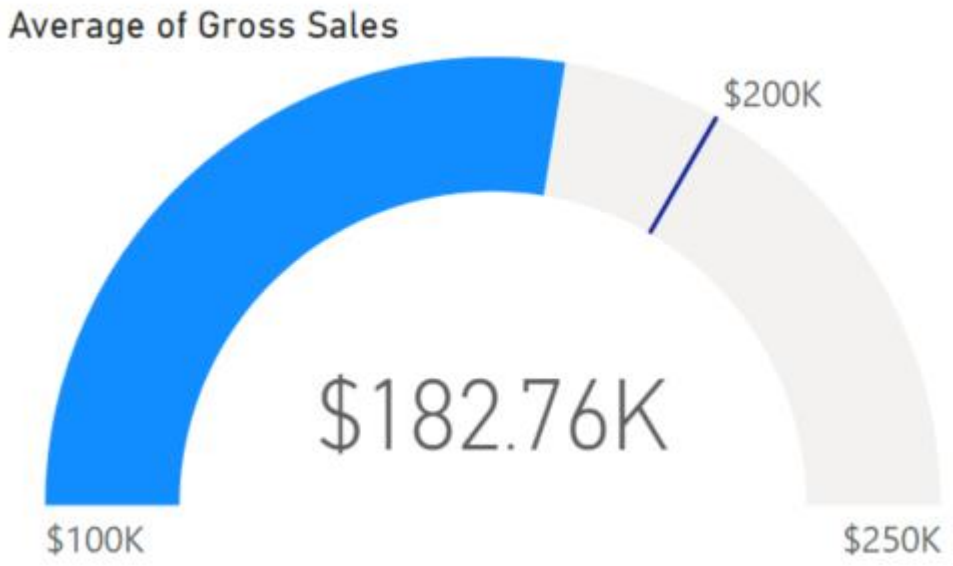
Doughnut charts are similar to pie charts. They show the relationship of parts to a whole. The only difference is that the centre is blank and allows space for a label or icon.

Funnel charts



Funnels help visualize a process that has stages, and items flow sequentially from one stage to the next. One example is a sales process that starts with leads and ends with purchase fulfilment.

For example, a sales funnel that tracks customers through stages: Lead > Qualified Lead > Prospect > Contract > Close. At a glance, the shape of the funnel conveys the health of the process you're tracking. Each funnel stage represents a percentage of the total. So, in most cases, a funnel chart is shaped like a funnel -- with the first stage being the largest, and each subsequent stage smaller than its predecessor. A pear-shaped funnel is also useful -- it can identify a problem in the process. But typically, the first stage, the "intake" stage, is the largest.

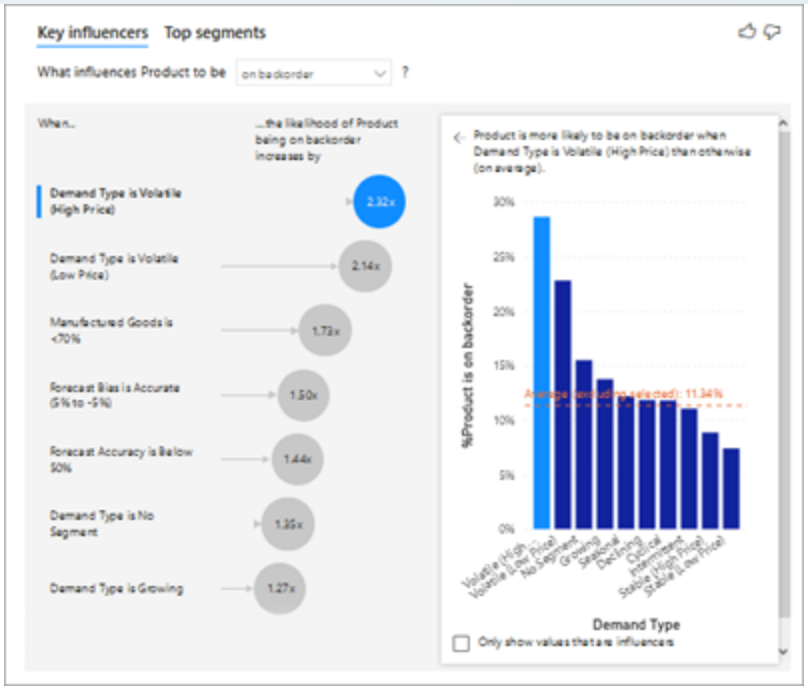


Gauge charts

A radial gauge chart has a circular arc and displays a single value that measures progress toward a goal. The goal, or target value, is represented by the line (needle). Progress toward that goal is represented by the shading. And the value that represents that progress is shown in bold inside the arc. All possible values are spread evenly along the arc, from the minimum (left-most value) to the maximum (right-most value).

Radial gauges are a great choice to:

- Show progress toward a goal.
- Represent a percentile measure, like a KPI.
- Show the health of a single measure.
- Display information that can be quickly scanned and understood.



Key influencers chart

A key influencer chart displays the major contributors to a selected result or value.

Key influencers are a great choice to help you understand the factors that influence a key metric. For example, *what influences customers to place a second order* or *why were sales so high last June*.

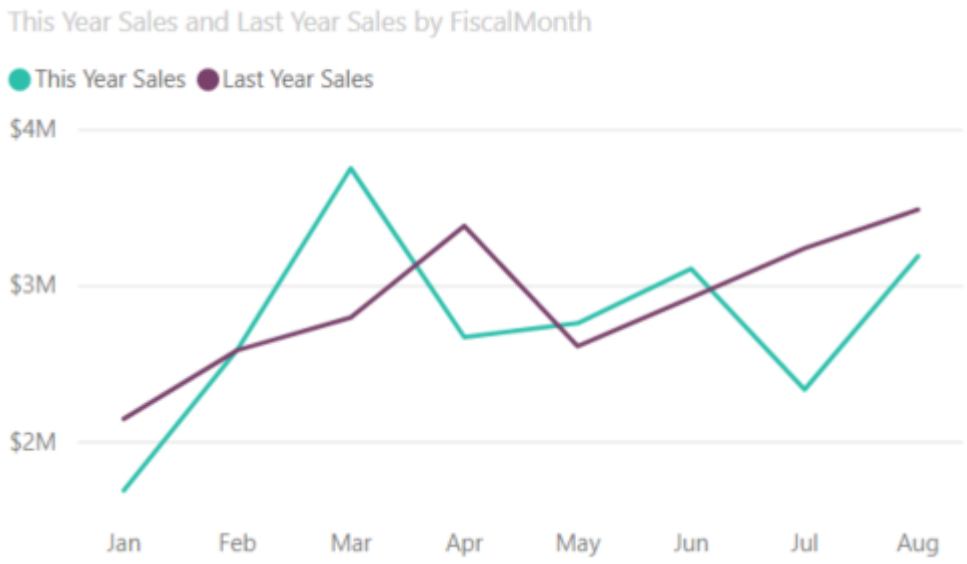
KPIs

A Key Performance Indicator (KPI) is a visual cue that communicates the amount of progress made toward a measurable goal.

KPIs are a great choice:

- To measure progress (what am I ahead or behind on?).
- To measure distance to a metric (how far ahead or behind am I?).

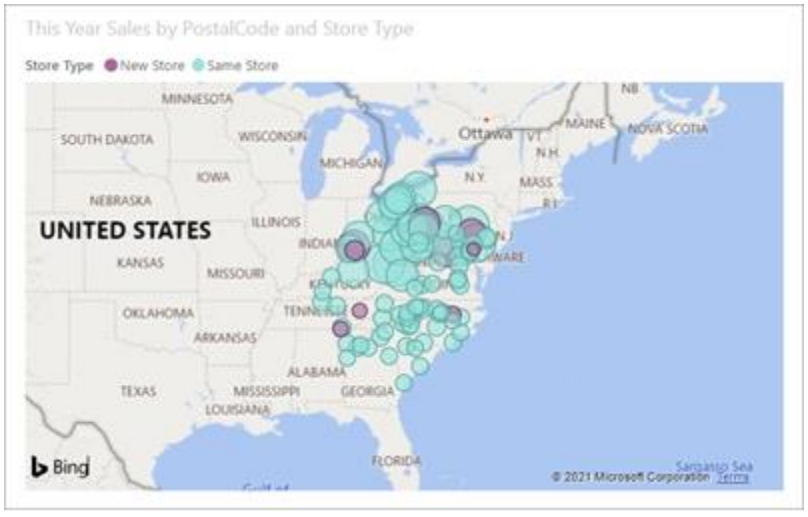
Line charts



Line charts emphasize the overall shape of an entire series of values, usually over time.

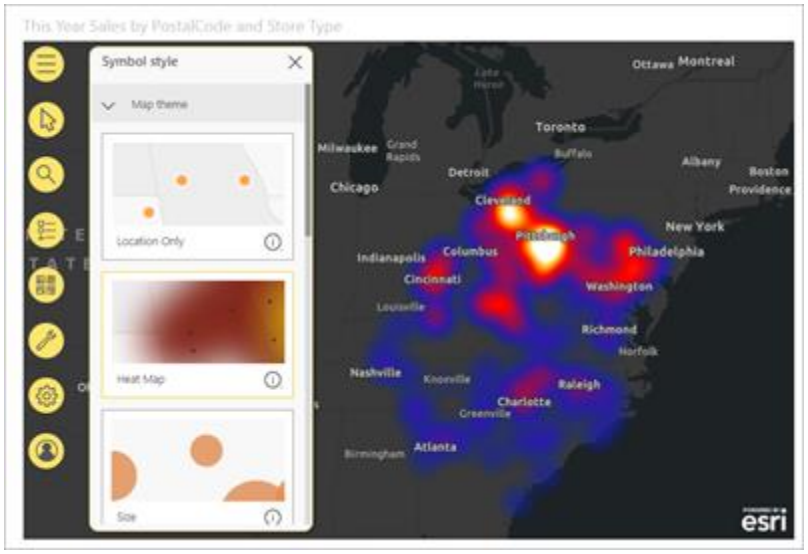
Maps

Basic map



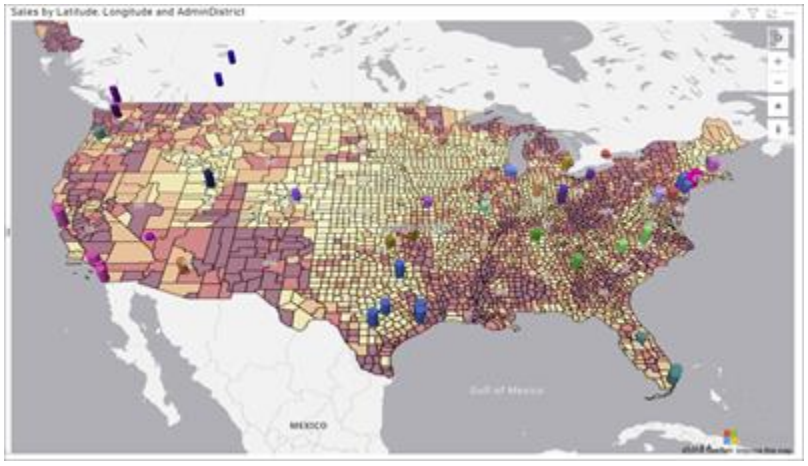
Use a basic map to associate both categorical and quantitative information with spatial locations.

ArcGIS map



The combination of ArcGIS maps and Power BI takes mapping beyond the presentation of points on a map to a whole new level. The available options for base maps, location types, themes, symbol styles, and reference layers creates gorgeous informative map visuals. The combination of authoritative data layers (such as census data) on a map with spatial analysis conveys a deeper understanding of the data in your visual.

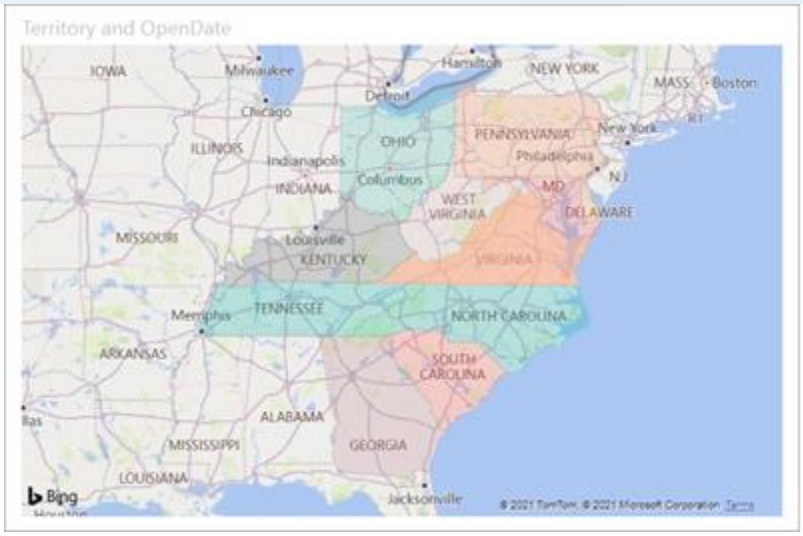
Azure map



Tip

Used to associate both categorical and quantitative information with spatial locations.

Filled map (Choropleth)

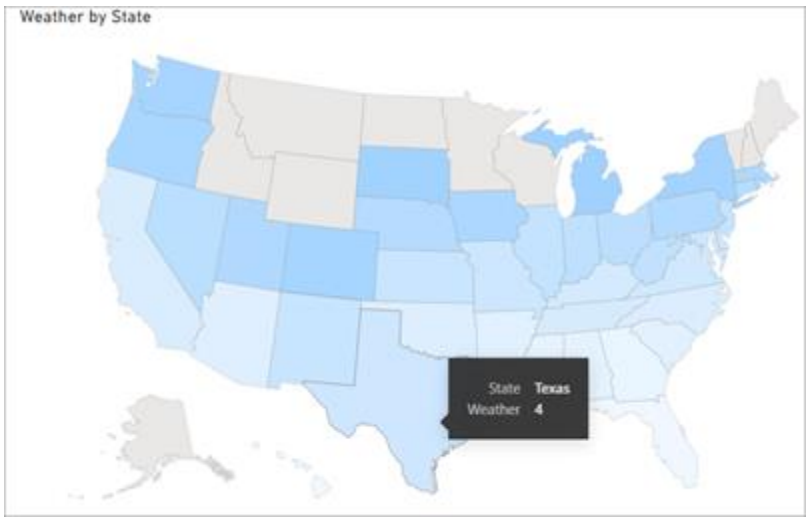


A filled map uses shading or tinting or patterns to display how a value differs in proportion across a geography or region. Quickly display these relative differences with shading that ranges from light (less-frequent/lower) to dark (more-frequent/more).

Tip

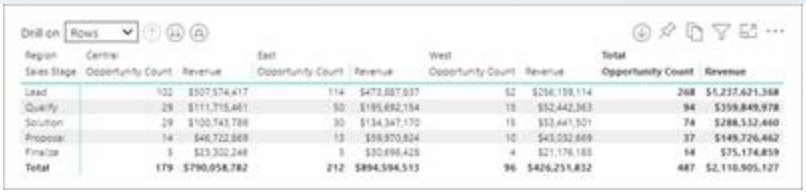
The more intense the colour, the larger the value.

Shape map



Shape maps compare regions on a map using colour. A shape map can't show precise geographical locations of data points on a map. Instead, its main purpose is to show relative comparisons of regions on a map by colouring them differently.

Matrix

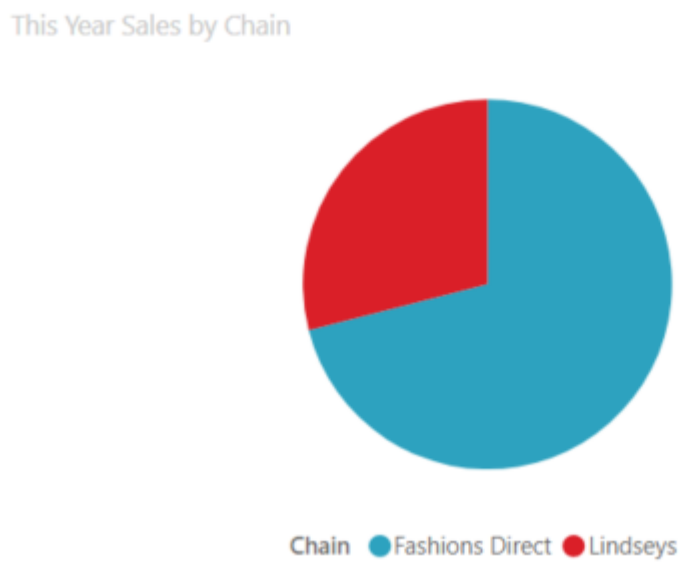


The matrix visual is a type of table visual (see Tables in this article) that supports a stepped layout. A table supports two dimensions, but a matrix makes it easier to display data meaningfully across multiple dimensions. Often, report designers include matrixes in reports and dashboards to allow users to select one or more element (rows, columns, cells) in the matrix to cross-highlight other visuals on a report page.

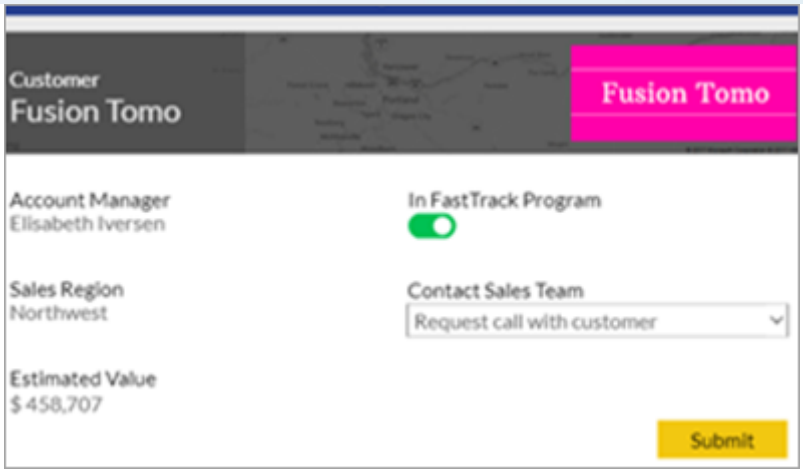
Tip

The matrix automatically aggregates the data and enables drilling down into the data.

Pie charts



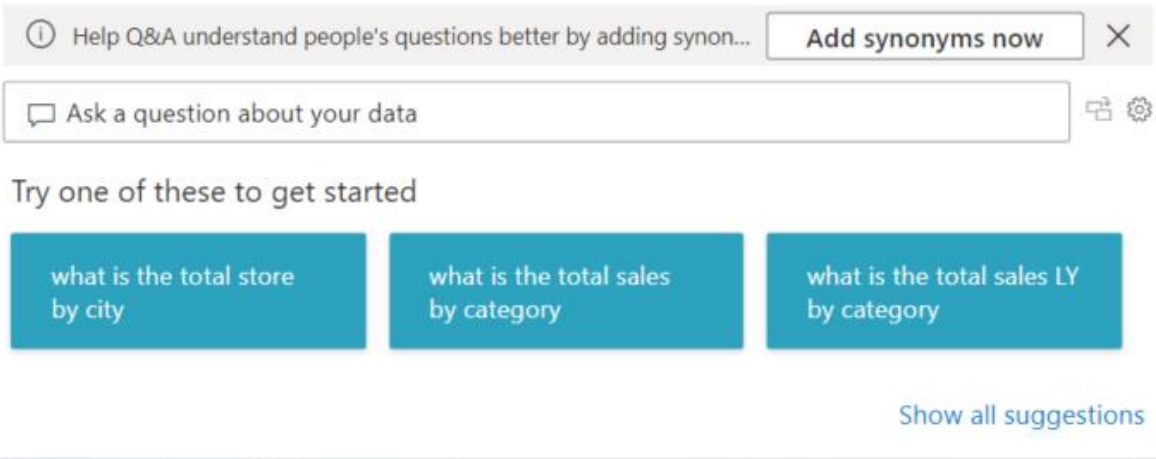
Pie charts show the relationship of parts to a whole.



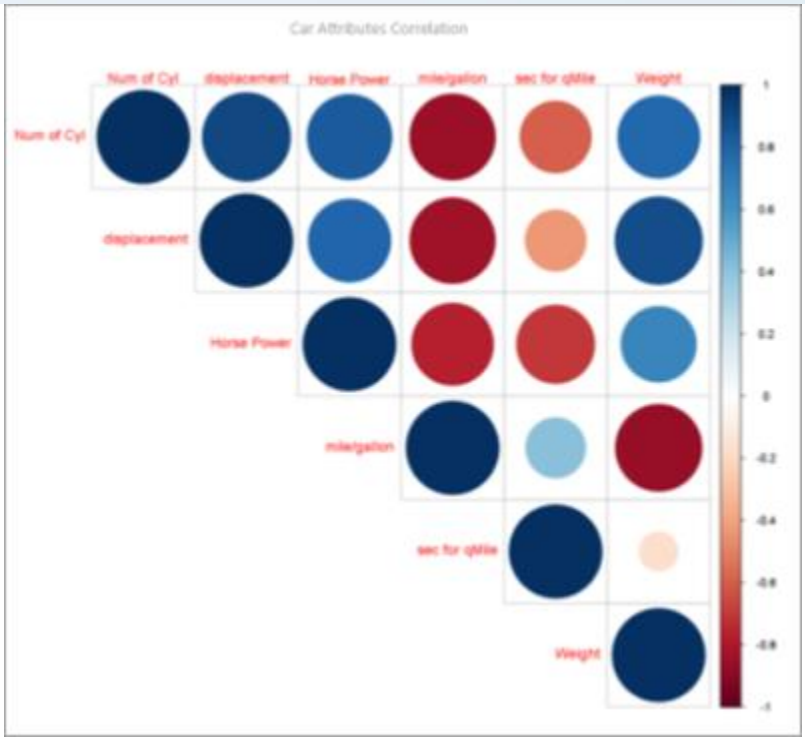
Power Apps visual

Report designers can create a Power App and embed it into a Power BI report as a visual. Consumers can interact with that visual within the Power BI report.

Q&A visual



The Q&A visual lets you ask questions about your data using natural language.

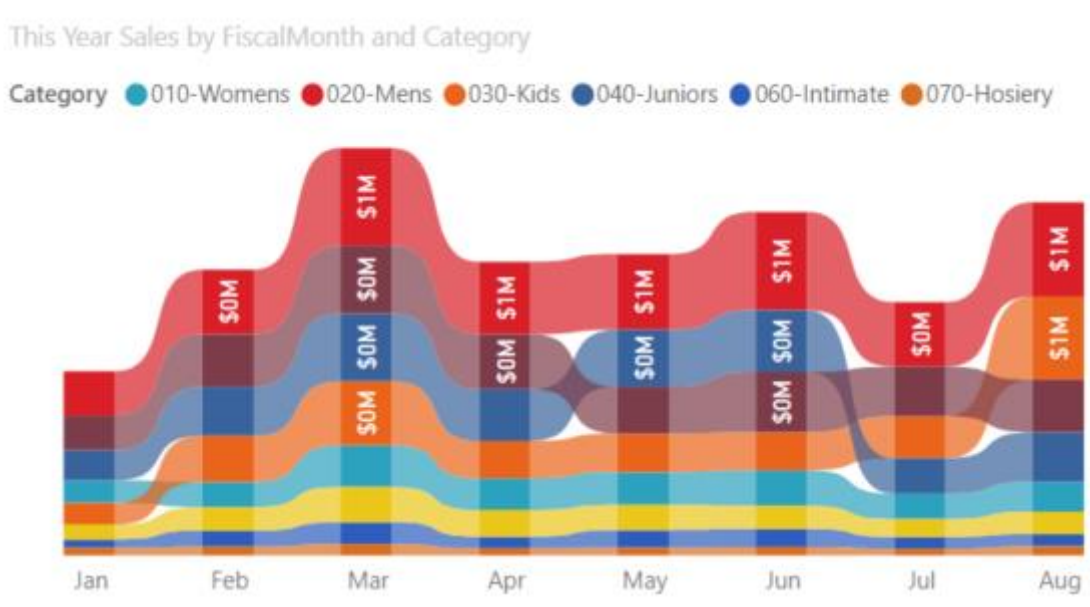


R script visuals

Tip

Visuals created with R scripts, commonly called *R visuals*, can present advanced data shaping and analytics such as forecasting, using the rich analytics and visualization power of R. R visuals can be created in Power BI Desktop and published to the Power BI service.

Ribbon chart

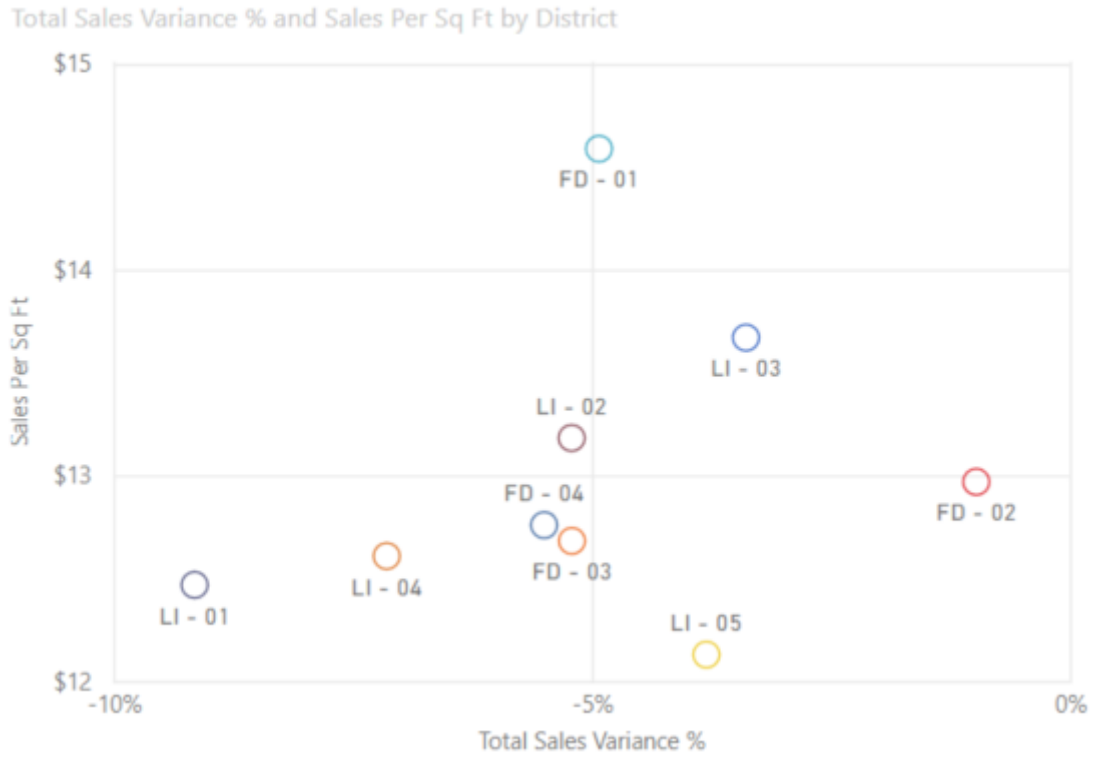


Ribbon charts show which data category has the highest rank (largest value). Ribbon charts are effective at showing rank change, with the highest range (value) always displayed on top for each time period.

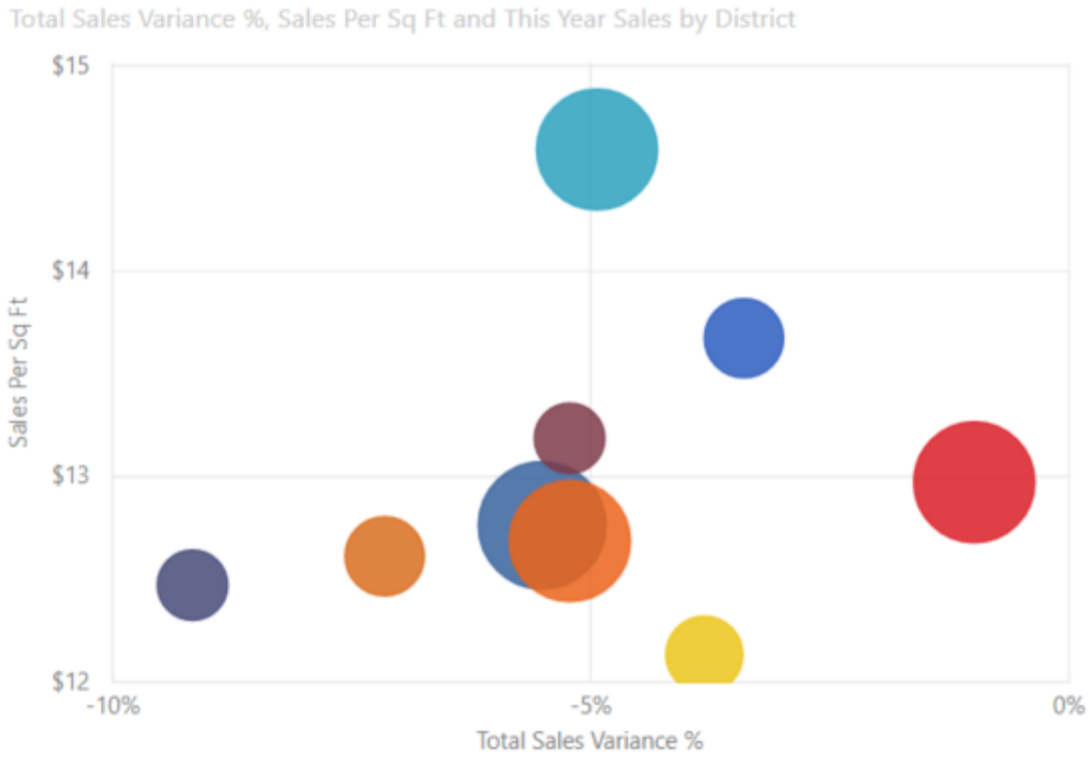
Scatter

Scatter, bubble, and dot plot chart

A scatter chart always has two value axes to show one set of numerical data along a horizontal axis and another set of numerical values along a vertical axis. The chart displays points at the intersection of an x and y numerical value, combining these values into single data points. These data points may be distributed evenly or unevenly across the horizontal axis, depending on the data.

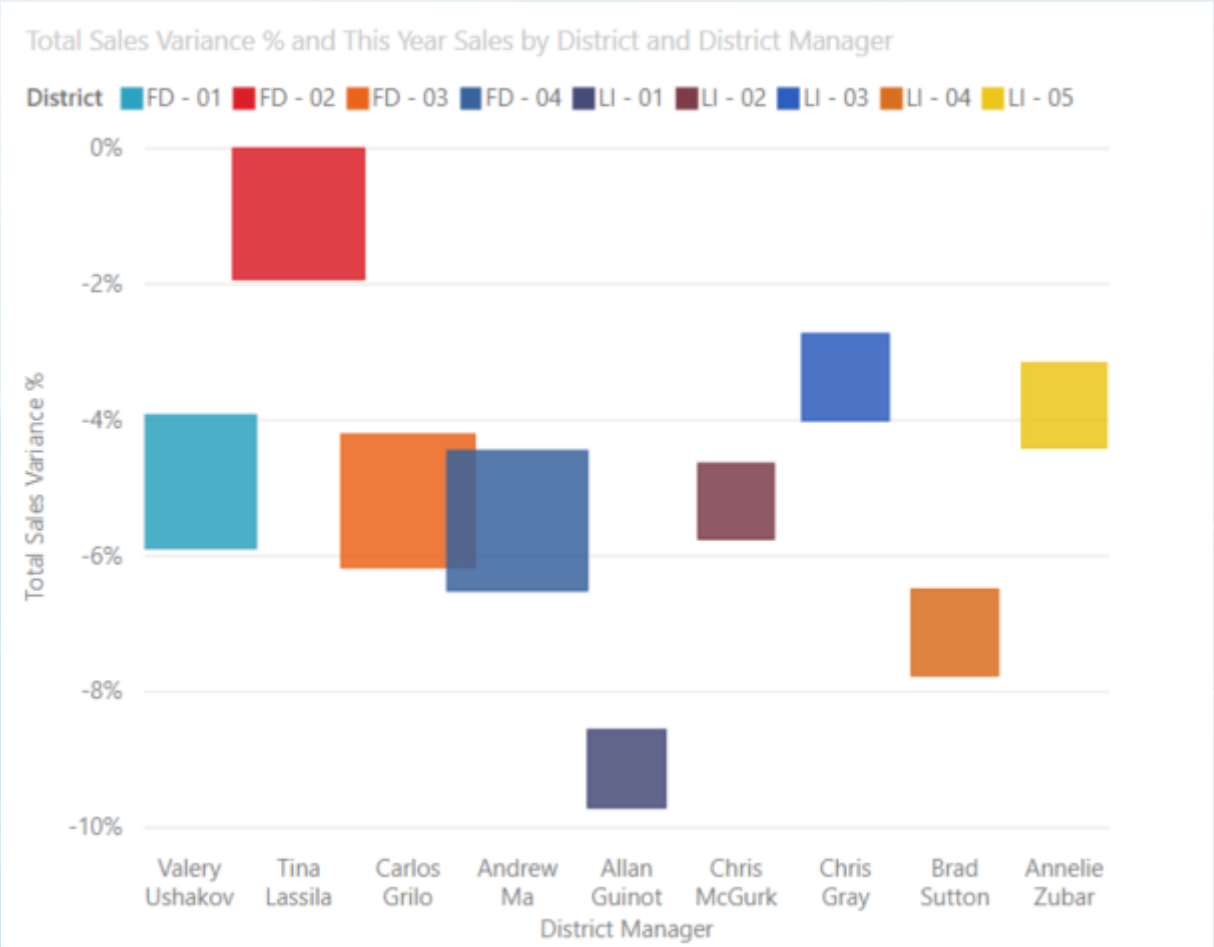


A bubble chart replaces data points with bubbles, with the bubble size representing an additional dimension of the data.

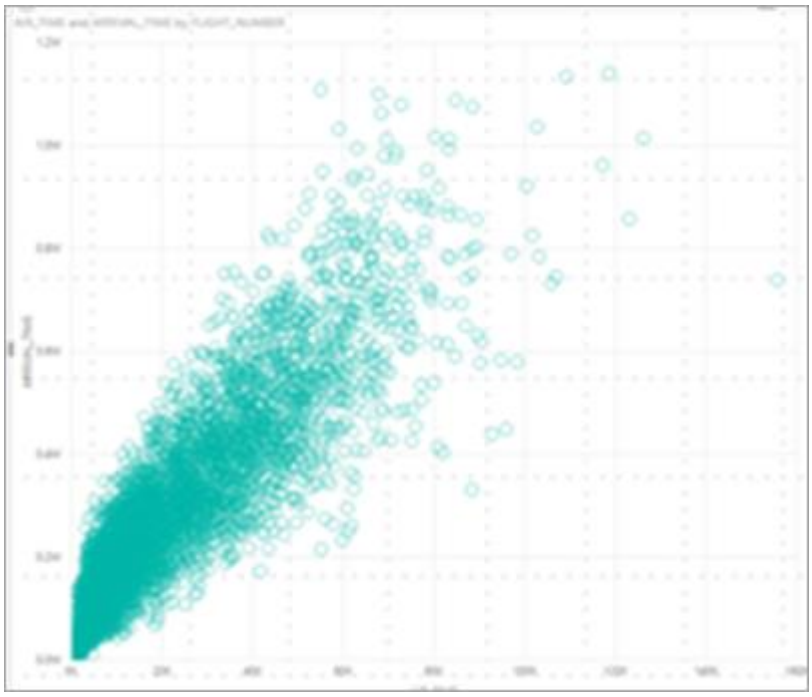


Both scatter and bubble charts can also have a play axis, which can show changes over time.

A dot plot chart is similar to a bubble chart and scatter chart except that it can plot numerical or categorical data along the X axis. This example happens to use squares instead of circles and plots sales along the X axis.



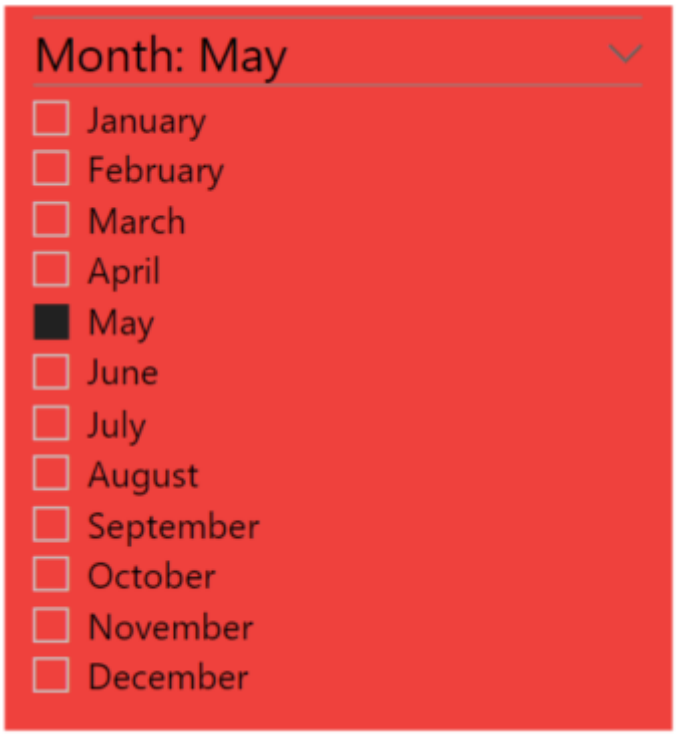
Scatter-high density



By definition, high-density data is sampled to create visuals reasonably quickly that are responsive to interactivity. High-density sampling uses an algorithm that eliminates overlapping points, and ensures that all points in the data set are represented in the visual. It doesn't just plot a representative sample of the data.

This ensures the best combination of responsiveness, representation, and clear preservation of important points in the overall data set.

Slicers

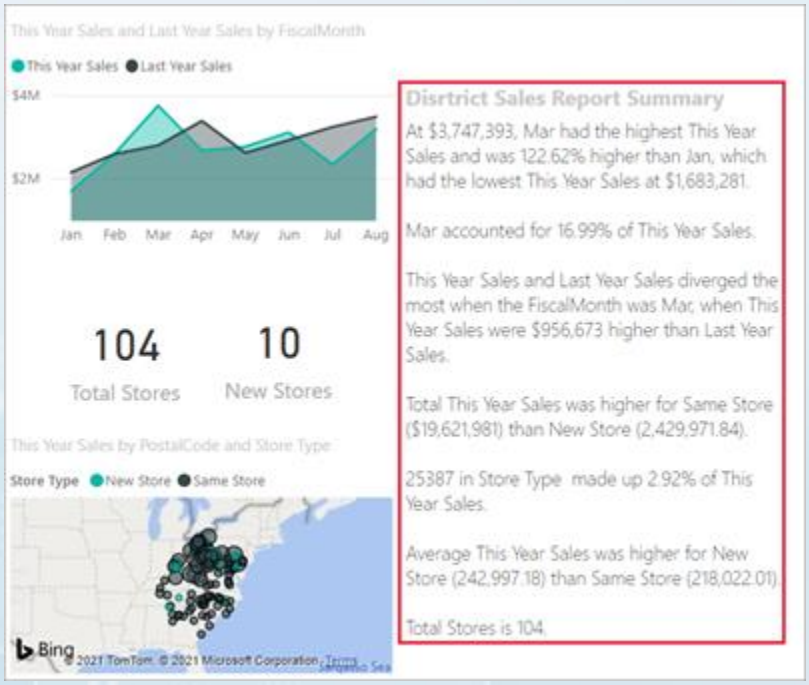


A slicer is a standalone chart that can be used to filter the other visuals on the page. Slicers come in many different formats (category, range, date, etc.) and can be formatted to allow selection of only one, many, or all of the available values.

Slicers are a great choice to:

- Display commonly used or important filters on the report canvas for easier access.
- Make it easier to see the current filtered state without having to open a drop-down list.
- Filter by columns that are unneeded and hidden in the data tables.
- Create more focused reports by putting slicers next to important visuals.

Smart narrative



The Smart narrative adds text to reports to point out trends, key takeaways, and add explanations and context. The text helps users to understand the data and identify the important findings quickly.

Standalone images

A standalone image is a graphic that has been added to a report or dashboard.

Tables

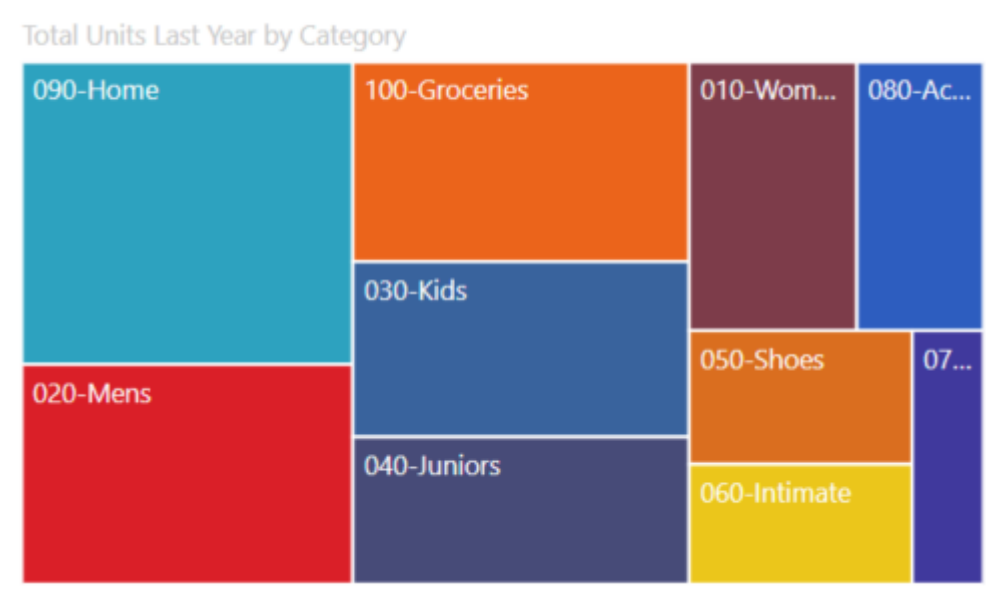
Category	This Year Sales Status	Average Unit Price	Last Year Sales	This Year Sales	This Year Sales Goal
080-Accessories		$4.84	$1,273,096	$1,379,259	$1,273,096
090-Home		$3.93	$2,913,647	$3,053,326	$2,913,647
100-Groceries		$1.47	$810,176	$829,776	$810,176
020-Mens		$7.12	$4,453,133	$4,452,421	$4,453,133
030-Kids		$5.30	$2,726,692	$2,705,490	$2,726,692
050-Shoes		$13.84	$3,640,471	$3,574,900	$3,640,471
010-Womens		$7.30	$2,680,662	$1,787,958	$2,680,662
040-Juniors		$7.00	$3,105,550	$2,930,385	$3,105,550
060-Intimate		$4.28	$955,370	$852,329	$955,370
070-Hosiery		$3.69	$573,604	$486,106	$573,604
Total		**$5.49**	**$23,132,601**	**$22,051,952**	**$23,132,601**

A table is a grid that contains related data in a logical series of rows and columns. It may also contain headers and a row for totals. Tables work well with quantitative comparisons where you are looking at many values for a single category. For example, this table displays five different measures for Category.

Tables are a great choice:

- To see and compare detailed data and exact values (instead of visual representations).
- To display data in a tabular format.
- To display numerical data by categories.

Treemaps

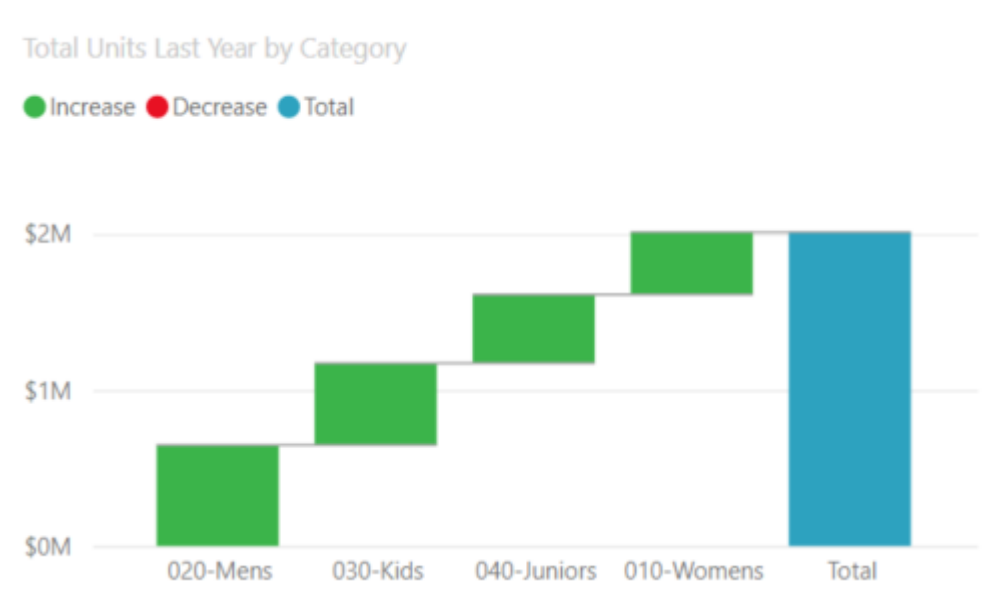


Treemaps are charts of colored rectangles, with size representing value. They can be hierarchical, with rectangles nested within the main rectangles. The space inside each rectangle is allocated based on the value being measured. And the rectangles are arranged in size from top left (largest) to bottom right (smallest).

Treemaps are a great choice:

- To display large amounts of hierarchical data.
- When a bar chart can't effectively handle the large number of values.
- To show the proportions between each part and the whole.
- To show the pattern of the distribution of the measure across each level of categories in the hierarchy.
- To show attributes using size and colour coding.
- To spot patterns, outliers, most-important contributors, and exceptions.

Waterfall charts



A waterfall chart shows a running total as values are added or subtracted. It's useful for understanding how an initial value (for example, net income) is affected by a series of positive and negative changes.

The columns are colour coded so you can quickly tell increases and decreases. The initial and the final value columns often start on the horizontal axis, while the intermediate values are floating columns. Because of this "look", waterfall charts are also called bridge charts.

Waterfall charts are a great choice:

- When you have changes for the measure across time or across different categories.
- To audit the major changes contributing to the total value.
- To plot your company's annual profit by showing various sources of revenue and arrive at the total profit (or loss).
- To illustrate the beginning and the ending headcount for your company in a year.
- To visualize how much money you make and spend each month, and the running balance for your account.

Implementation of Conditional formatting

Conditional formatting is a powerful feature in Power BI that allows you to format your data based on specific criteria.

Here's how to implement conditional formatting in Power BI:

1. Select the visual that you want to apply conditional formatting to.
2. Go to the "Visualizations" pane on the right side of the screen.
3. Click on "Conditional formatting" at the top of the pane.
4. Choose the type of formatting you want to apply (e.g., background color, font color, data bars, etc.).
5. Select the field you want to apply the formatting to.
6. Choose the criteria that will trigger the formatting (e.g., greater than, less than, equal to, etc.).
7. Set the formatting options (e.g., the color, fill, or border style).
8. Repeat steps 5-7 for each condition you want to apply.
9. Click "OK" to save your formatting settings.

There are several formatting techniques you can use in Power BI, such as:

- **Data bars**: These are horizontal bars that show the value of a measure relative to other values in the same category.
- **Color scales**: These assign a color gradient to a measure based on its value relative to other values in the same category.
- **Icons:** These use symbols (e.g., arrows, check marks, X's) to visually represent a measure's value relative to a threshold.
- **Rules:** These allow you to apply specific formatting to data that meets certain criteria (e.g., highlight all values over a certain amount in red).
- **Field value formatting:** This allows you to format specific values within a field (e.g. highlight a particular product or customer).

To apply these formatting techniques, follow the same steps as above, but select the specific type of formatting you want to use from the "Conditional formatting" pane.

Here are some examples of common conditional formatting rules:

- Highlight values that exceed a certain threshold
- Highlight the top or bottom values in a column or row

- Colour-code cells based on a specific value or range of values
- Apply data bars to visualize the relative size of values in a column or row

In addition to these basic rules, Power BI also supports more advanced conditional formatting options, such as colour scales and icon sets. These options can help to further emphasize important data and provide a more detailed analysis of the data.

Overall, conditional formatting is a powerful tool in Power BI that can help to make data more visually appealing and easier to analyse, leading to better insights and decision-making.

Implementation of Formatting techniques

Formatting techniques in Power BI allow users to customize the appearance of their reports and dashboards to better communicate insights and make data more visually appealing.

Power BI allows for several formatting techniques to be implemented on various visuals and components. Some of the formatting techniques that can be implemented in Power BI are:

Data labels and tooltips: Data labels and tooltips help in providing additional information about the data points in the visuals. To implement this, select the visual and go to the 'Visualizations' pane. Under the 'Data label' option, select 'On' or 'Auto'. Similarly, under the 'Tooltip' option, select 'On' or 'Auto'.

Conditional formatting: Conditional formatting helps in highlighting specific data points based on certain conditions. To implement this, select the visual and go to the 'Visualizations' pane. Under the 'Conditional formatting' option, select the type of formatting you want to apply, such as color scales or data bars. Then, specify the rules and conditions for the formatting.

Background and foreground colors: Background and foreground colors can be used to change the colors of the visuals and components. To implement this, select the visual or component and go to the 'Format' pane. Under the 'Background' or 'Foreground' options, select the color you want to apply.

Borders and lines: Borders and lines can be used to highlight certain areas or boundaries. To implement this, select the visual or component and go to the 'Format' pane. Under the 'Border' or 'Line' options, select the type and color of the border or line you want to apply.

Font and text formatting: Font and text formatting can be used to change the style, size, and color of the text. To implement this, select the visual or component and go to the 'Format' pane. Under the 'Font' or 'Text box' options, select the font, size, and color you want to apply.

These are some of the formatting techniques that can be implemented in Power BI to enhance the visual appeal and clarity of the data.