

# Visualization techniques for different data types

Previously, you explored how to identify different types of data. You also learned that a data type is an attribute that describes a piece of data and that numerical data can help you measure and order data in reports, while categorical data can help you group data by labels or characteristics.

In this reading, you'll learn more about how to identify an appropriate data visualization technique for your data type and analysis goals.

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## How to choose a visualization

As a cloud data analyst, you'll often determine how to accurately visualize the data you're working with. Regardless of the type of data, you can always present it in a way that's both informative and engaging. Before you decide which type of visualization you want to use, consider:

- What are your analysis goals for the visualization?
- Are you visualizing numerical or categorical data?

## Determine your analysis goals

Before you create a visualization, you need to determine how you want to analyze your data, and what information you want the visualization to convey. Understanding the purpose of your visualization will help you decide which type of chart will achieve your goal.

This table lists five common types of visualizations, how each visualization analyzes data, and examples of charts or graphs that can be used for each visualization:

Type of visualization	Purpose	Examples
Single value	A query that generates one value that can be used in a visualization	<ul style="list-style-type: none"><li>• Averages</li><li>• Percent changes</li><li>• Totals</li></ul>

	Note: Single values are helpful for identifying values relating to key metrics or KPIs	
Comparison	Charts that compare two or more attribute values to each other	<ul style="list-style-type: none"> <li>• Bar charts</li> <li>• Column charts</li> <li>• Line charts</li> </ul>
Composition	Charts that compare individual parts to a whole	<ul style="list-style-type: none"> <li>• Pie charts</li> <li>• Stacked column charts</li> <li>• Bar charts</li> </ul>
Distribution	Charts that show how data is spread out or clustered together, and illustrate if two variables are correlated	<ul style="list-style-type: none"> <li>• Histograms</li> <li>• Box plots</li> <li>• Scatter plot</li> </ul>
Relationship	Charts that illustrate if and how two or more variables correlate to one another	<ul style="list-style-type: none"> <li>• Scatter plots</li> <li>• Bubble charts</li> </ul>

## Visualization decisions based on data type

The data type you're working with will help you identify what types of visualizations will accurately represent the data, and help you clearly communicate its meaning to stakeholders.

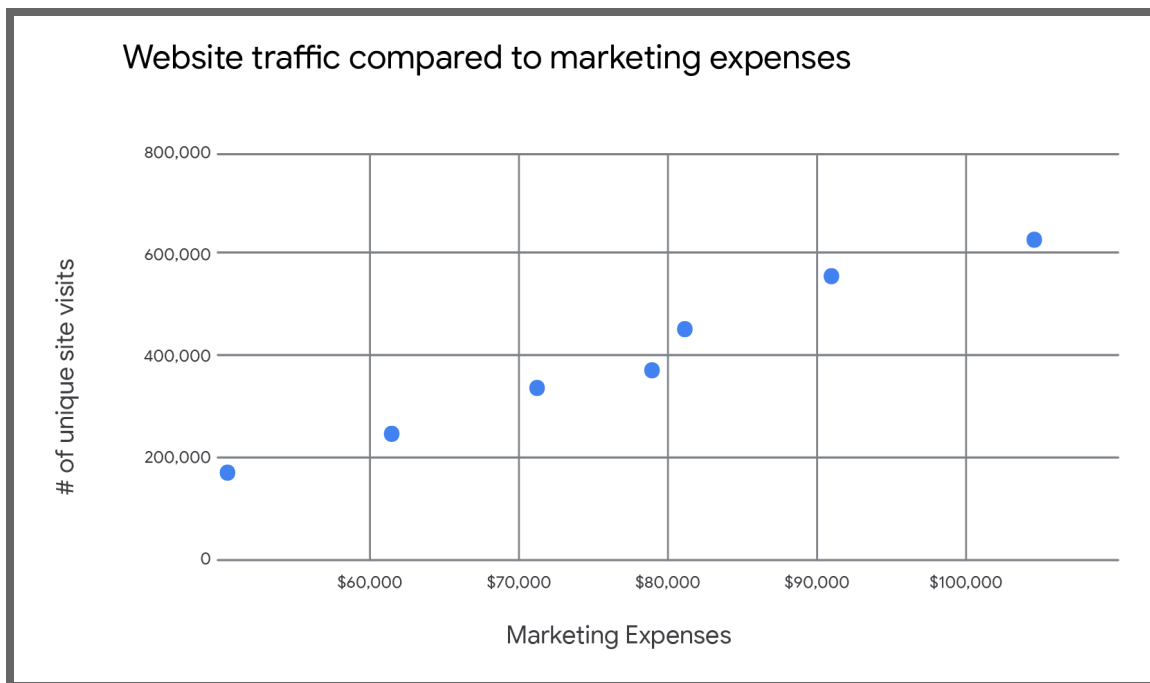
### Numerical data

Since numerical data is focused on number values, graph types that draw attention to, and accurately portray the numbers will best represent the data. For example, a line chart typically draws attention to the variable on the Y-axis, which is a numerical value. Similarly, a scatter plot allows analysts to plot where numbers from both the X and Y-axis intersect. Here are some visualization types that work well with numerical data:

Chart type	Description
Line chart	Demonstrates how a variable changes over time

Histogram	Demonstrates the distribution of data
Scatter plot	Demonstrates the relationship between two variables
Box plot	Demonstrates the distribution of data, including the median and outliers

This relationship visualization is an example of a scatter plot that compares two numerical variables. The chart highlights the relationship between how much a company spends on marketing expenses, and the number of customers visiting their website.

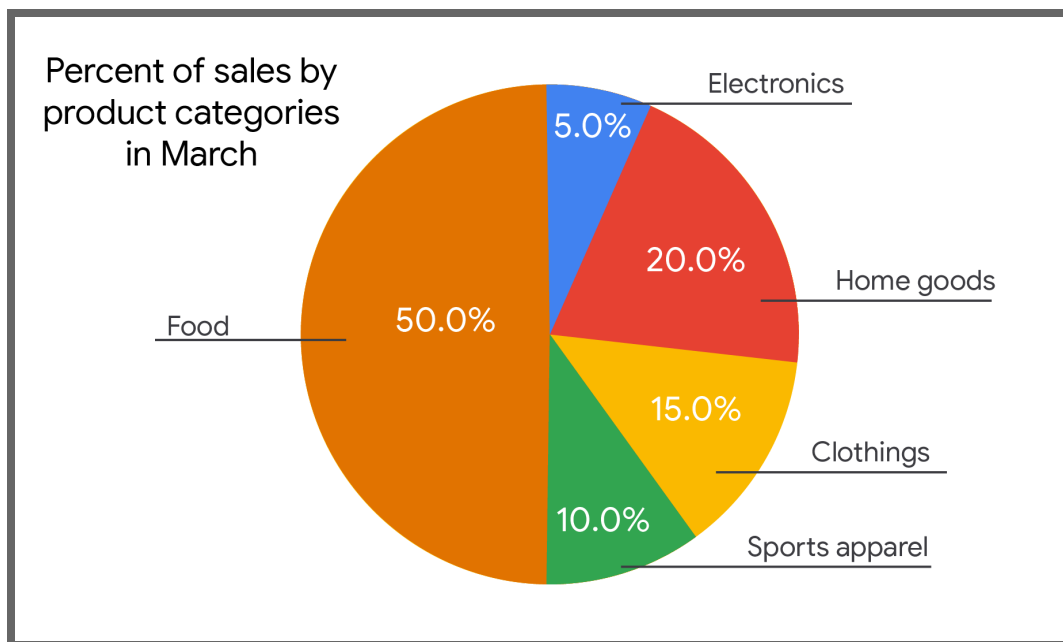


## Categorical data

Since categorical data is descriptive, and groups values by a label or characteristic, visualizations that represent parts of a whole, or distinct categories, are more appropriate to illustrate the data's meaning. For example, a bar chart or pie chart can represent numerical data, but the category that the bar or slice of the pie represents is just as important. Here are some visualization types that work well with categorical data:

Chart type	Description
Bar chart	Compares values between different groups of data
Pie chart	Compares proportions of data by category
Tree diagram	Shows the hierarchy or grouping of categorical data

The following composition visualization is an example of a pie chart. The pie chart displays how much each product category contributes to a retail store's total sales for the month of March.



## Combining visualizations

Sometimes, stakeholders will have questions that require deeper analysis, so you may need to use a combination of visuals in your dashboard to provide answers.

For example, a stakeholder wants to know which product category sells best during the month that has the highest average number of sales from the last three years. To answer their

question, you create two different visualizations. The first visualization is a scatter plot that shows monthly sales averages. The second is a bar chart that compares how categories of goods sell each month. The scatter plot helps the stakeholder identify which month consistently performs best, while the bar chart helps them understand which product category sells best that month.

This example highlights the importance of understanding the questions that your stakeholders want answered prior to designing your dashboard. In the example, you focused on your stakeholder's question to identify the types of visualizations that could be grouped together to provide relevant insights.

## Key takeaways

No matter what type of data you're working with, you can create visuals to effectively communicate your data's story. You can improve your visualizations by aligning them with the stakeholders' analysis goals. You can also present data clearly by considering whether it is numerical or categorical, and choosing a visualization that accurately portrays that data type. As you become more comfortable creating visualizations, you may even combine multiple visualizations to help stakeholders answer their business questions.

## Resources for more information

Review these resources to learn more about choosing the right graph for your analysis goals, and for examples of charts that work for each type of visualization:

- [Google Cloud's blog](#) describes how to choose the best chart or graph for your data
- [Temple University's library site](#) provides examples of each type of visualization