Data Visualization Using Tableau

Mastering Tableau: Unveiling the Power of Visual Analytics

Engage and Think

Imagine you are managing a popular café in your city. Everyday, you collect tons of data: sales figures, customer feedback, inventory levels, and more. This data holds valuable insights that could help you improve your café's performance and customer satisfaction.

Have you ever wondered how big companies like Starbucks or McDonald's use data to enhance their services and keep you coming back for more?

Learning Objectives

By the end of this lesson, you will be able to:

- Analyze the principles of data visualization to present a compelling story with data
- Examine how to connect, open, and discover sections in the Tableau interface to improve efficiency in data analysis
- Utilize various types of files in Tableau to enhance data integration skills
- Create worksheets, dashboards, and stories to sharpen data visualization and storytelling abilities

Data Visualization

Data Visualization

It is the graphical or pictorial representation of data.

iso3	iso2	imfn	country	region	income	year
AFG	AF	512	Afghanistan	South Asia	Low income	1960
AFG	AF	512	Afghanistan	South Asia	Low income	1961
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AFG	AF	512	Afghanistan	South Asia	Low income	1971
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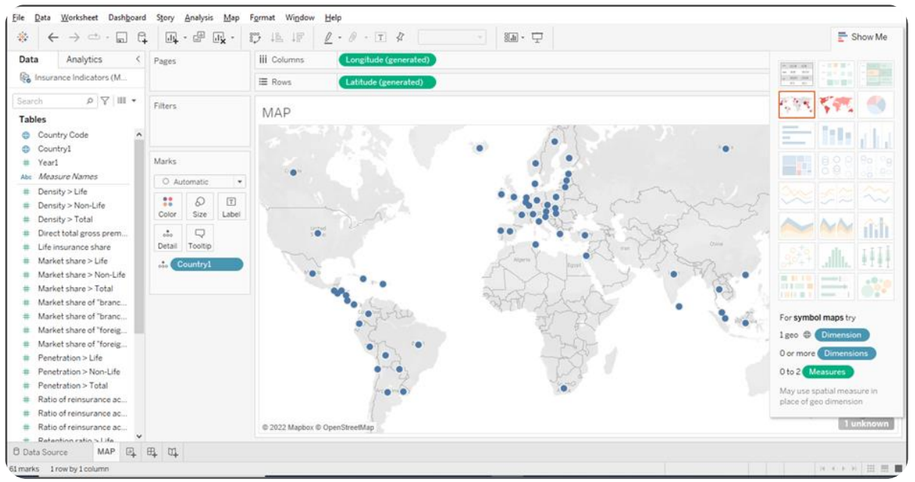


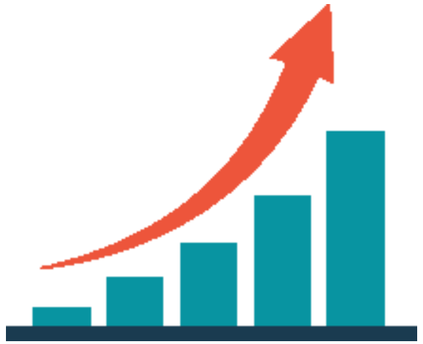
Excel data

Tableau representation

It is crucial to represent data in a way that is easy to interpret and helps make data-driven decisions.

Data Visualization

It transforms complex data sets into easily understandable visual representations. These visualizations serve several key purposes in the data analytics process:



Identify trends

Identify patterns and outliers

Get insights

Example: Income vs. Life Expectancy Chart

An example of an insightful chart that depicts the relationship between income and life expectancy:

Low-income country

High-income country

According to the chart, high-income countries exhibit higher life expectancy rates compared to low-income countries.

This chart was produced by Hans Rosling.

Data Visualization Tools

A few data visualization tools available on the market are:

Dundas

Zoho

Qlik

Power BI

Matplotlib

Excel

Tableau

Looker

Data Visualization Tools

The current market leaders listed in Gartner's Magic Quadrant for analytics and business intelligence platforms are as follows:

Microsoft Power BI

Tableau

Qlik

Dos and Don'ts of Visualizations

Crafting compelling data visualizations requires a delicate balance.

- Understand the context
- Choose an effective visual
- Use only those elements that are necessary for creating the visual
- Ensure the visual effectively communicates a data story

- Don’t use too many elements and labels
- Avoid cluttering visualizations with too much information
- Prioritize accuracy over aesthetics
- Avoid using too many colors, especially if they don't serve a specific purpose

Data Visualization: Best Practices

Quick Check

Data visualization makes it easier for a user to _____.

A. Identify trends

B. Identify patterns and outliers

C. Get insights

D. All of the above

Storytelling with Data

Data Storytelling

It is a method that uses a compelling narrative to communicate information tailored to a specific audience.
Here are the steps for storytelling:

- Start with a problem statement
- Discuss how the data has been analyzed to discover insights
- Recommend a solution

It requires an understanding of the context to be effective.

Data Storytelling

Data is continuously mined and analyzed these days.

An effective data presentation:

- Communicates clearly and effectively for easy understanding and assimilation
- Is essential for transforming insights into actionable outcomes

Select the right visual, using only essential elements, and ensure that the visual effectively tells a data story.

Quick Check

_____ forms the basis of storytelling.

A. Visualization

B. Data

C. Context

D. Color patterns

Introduction to Tableau

Tableau

It is a data visualization application that allows for advanced computing, data blending, and dashboarding to create amazing data visualizations.

- It is a popular and widely used tool in the industry.
- It allows the evaluation of raw data in the form of reports and graphs.
- It has data blending as one of the most significant aspects.
- It helps in handling a large amount of data.

Features of Tableau

Drag-and-Drop

It is easy for users to create visualizations without the need for extensive coding knowledge.

Connectivity

It can connect to various data sources like Excel, SQL databases, cloud data, and warehouses.

Visualization

It offers a wide range of charts, graphs, maps, and dashboards.

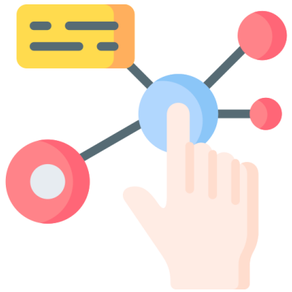
Data Blending

It can combine multiple data sources for a comprehensive analysis.

Advantages of Tableau

User-friendly interface for creating visualizations quickly

Capability of handling large datasets for real-time analysis



Inability of users to create interactive dashboards

Compatibility with various data sources and applications

Introduction to Tableau Products

Tableau Products

Tableau provides different product offerings for their visualization software:

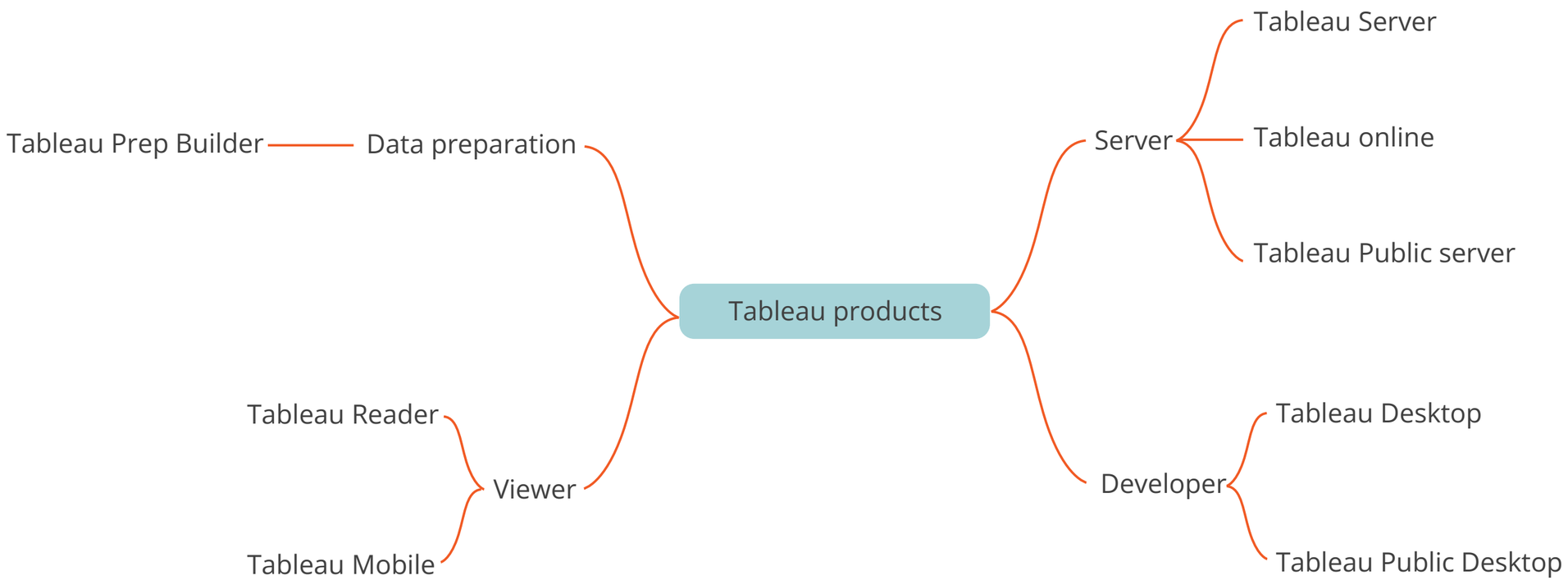
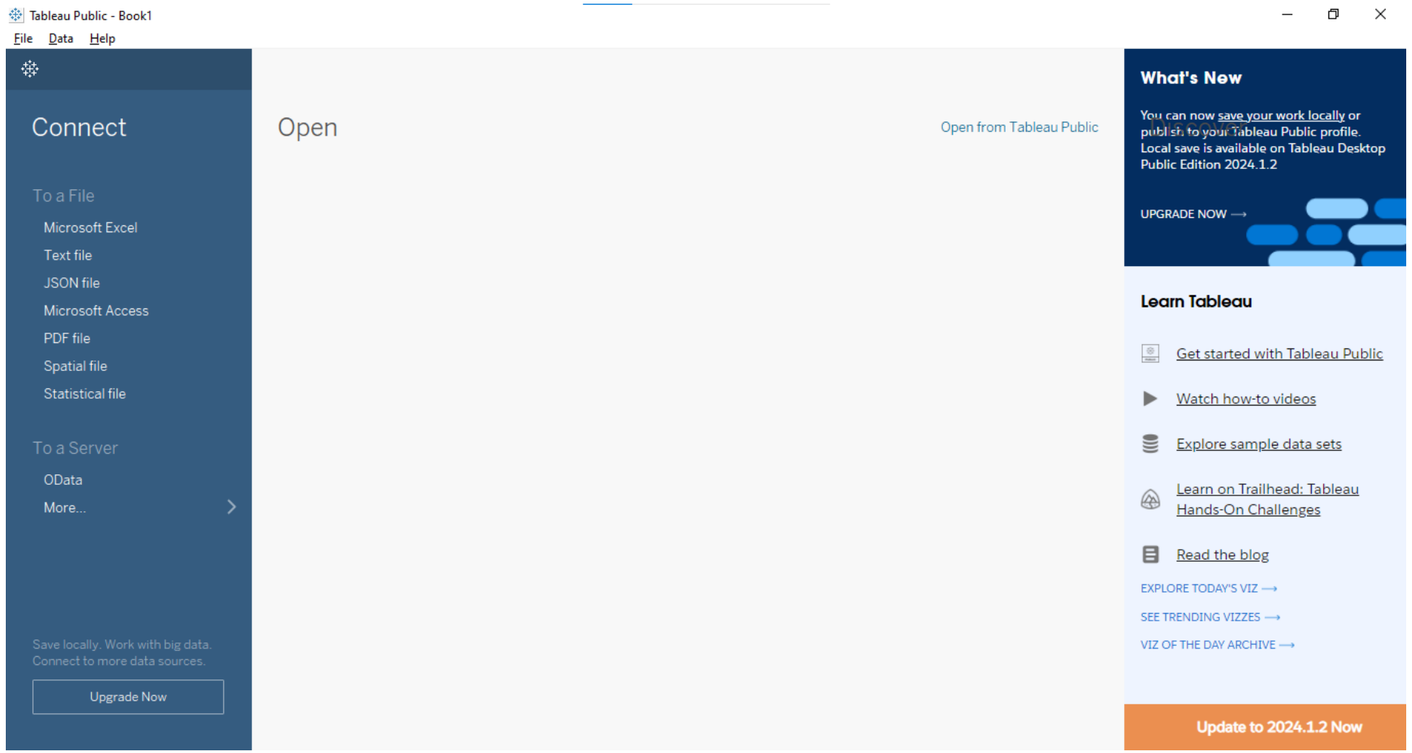


Tableau Public

It is a free version of Tableau visualization software that offers limited features.



It connects seamlessly to multiple types of data, like files and data connectors.

Tableau Public: Features

It builds visuals with public data for personal use.

It operates on a cloud server and does not provide integration with other Tableau products.

It needs an internet connection.

It does not provide data privacy or security.

Tableau Desktop

It is a fully loaded, paid developer version of Tableau visualization software.

- It offers many advantages, including better security and the provision to work offline.
- It connects seamlessly to different types of data.
- It supports many file types.
- It supports around 60 types of data connectors.
- It is used by business organizations and teams for building visuals.

Tableau Desktop: Features

- Provides an intuitive drag-and-drop interface
- Imports data through live and extract data connections
- Offers diverse visualization options
- Blends data from multiple sources and perform joins
- Creates calculated fields and dynamic parameters

Tableau Public vs. Tableau Desktop

Tableau Public

- Offers a free license
- Provides access to a limited range of file types and data connector types
- Requires files to be published online
- Limits data to 1 million rows

Tableau Desktop

- Offers a paid license
- Offers more file type and data connector type options
- Supports saving visuals on local machines
- Offers unlimited storage, analysis, and distribution of data rows

Note: In this course, visualizations are created with Tableau Desktop.

Quick Check

Which Tableau product is ideal for sharing, collaborating, and managing Tableau content within an organization?

A. Tableau Prep

B. Tableau Public

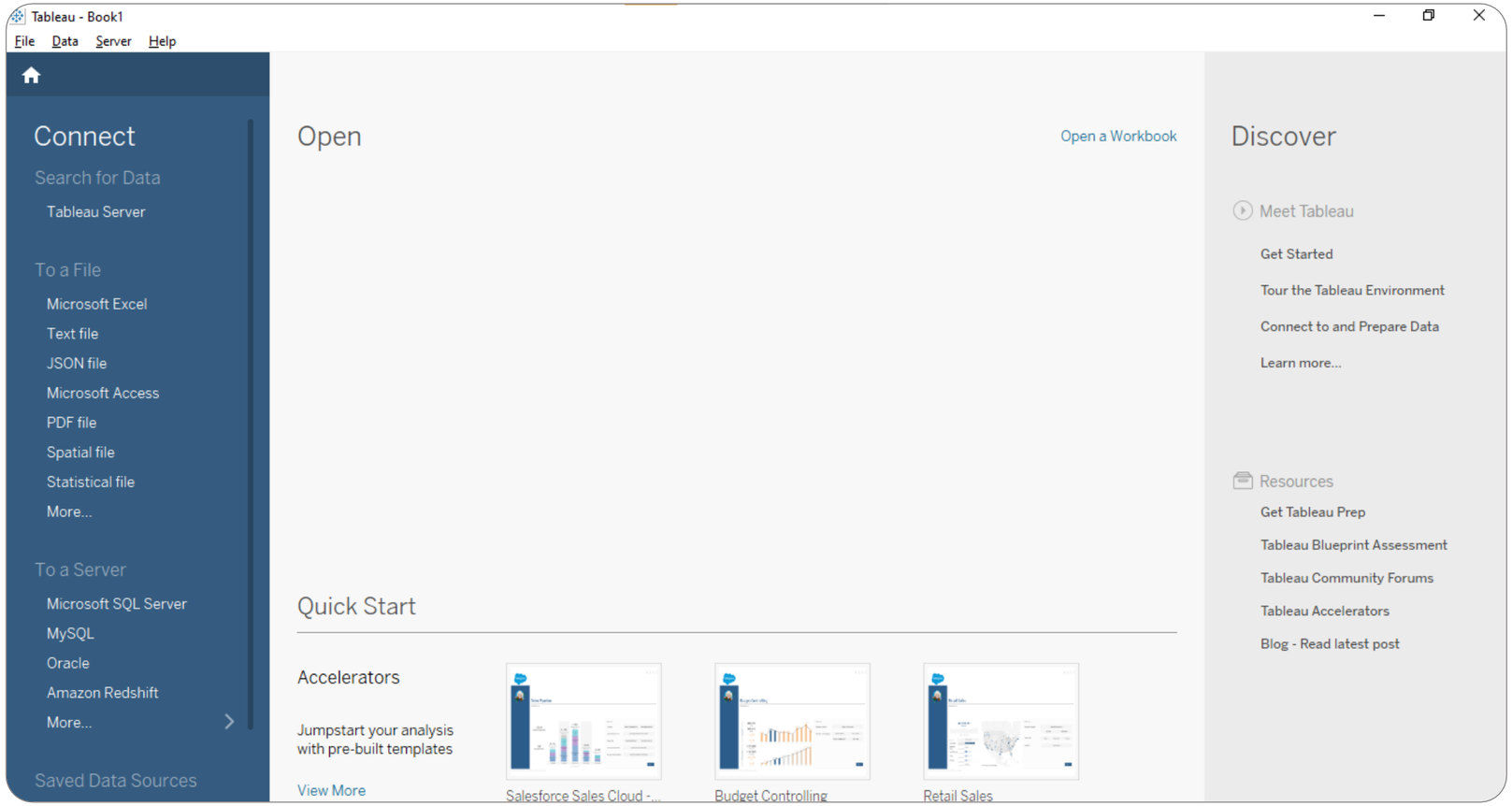
C. Tableau Server

D. Tableau Mobile

Introduction to Tableau Desktop Workspace

Tableau Desktop: Welcome Screen

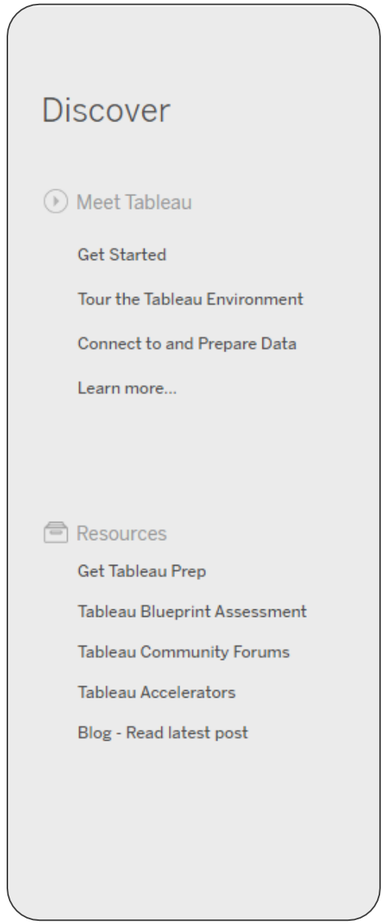
Tableau Desktop is a paid platform for exploring, creating, and sharing data visualizations.



The first screen to appear when accessing Tableau Desktop is Tableau Workspace (the welcome screen).

Discover Section

It helps one connect with the Tableau community and access training videos and blogs.

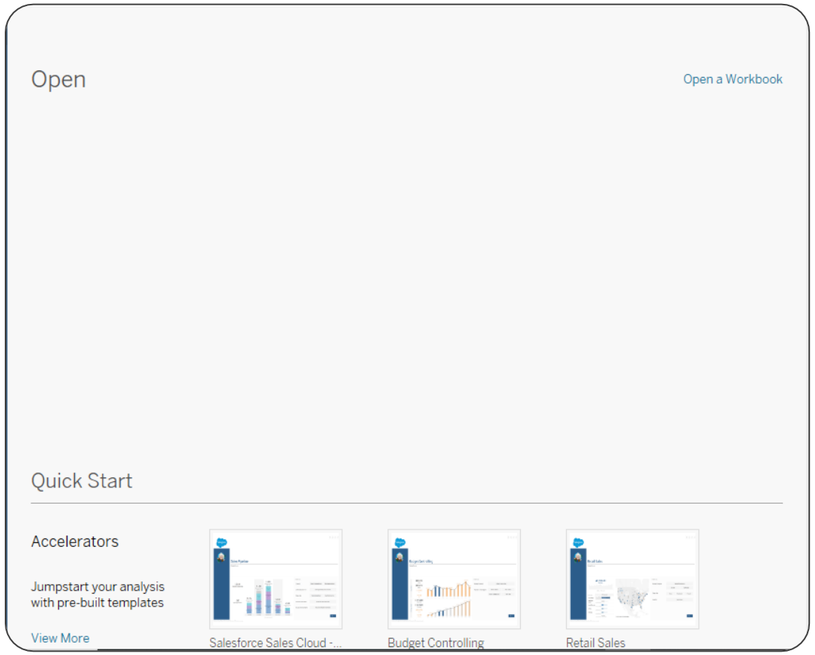


This section has two subsections, namely:

- Meet Tableau
- Resources

Open Section

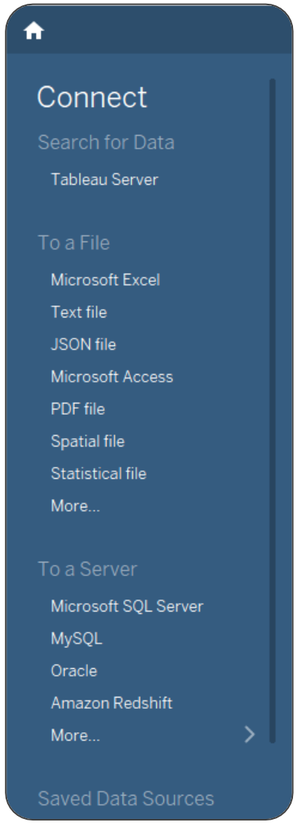
It shows the recently opened files along with sample dashboards.



The area will be empty if Tableau is opened for the first time, as there may not be any recently opened files.

Connect Section

The connect section imports or connects to different types of files on a local machine or a server.



Various data sources can be connected through the pane visible on the left of the screen.

The list of data sources is available under the **To a File** and **To a Server** categories.

Demo: Introduction to Tableau and Its Workspace

Duration: 15 minutes

Import and modify data from different file types in Tableau and navigate its workspace for effective data visualization.

DEMONSTRATION

Quick Check

What sections are present on the Tableau welcome screen?

A. Connect pane

B. Open pane

C. Discover pane

D. All of the above

Data Connectors

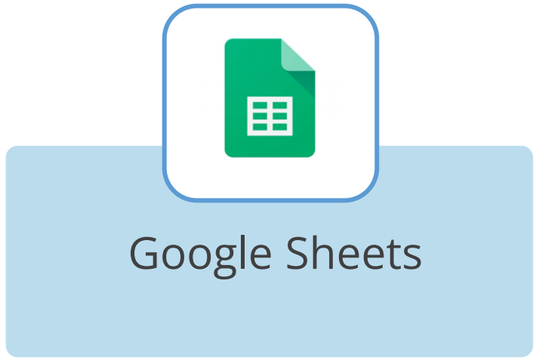
Data Connectors

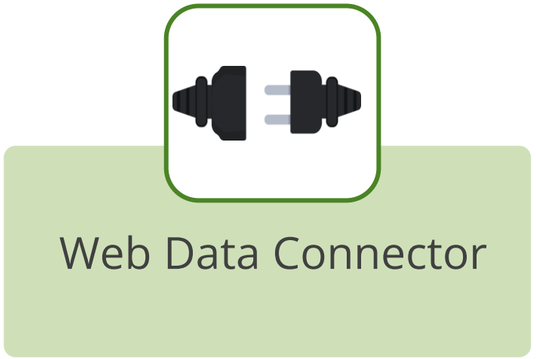
It is a tool that allows users to connect to various data sources, such as databases, spreadsheets, and cloud services.

It is used to access and extract data from various data sources, enabling users to create visualizations and perform analysis within Tableau using real-time and up-to-date data.

Types of Connectors

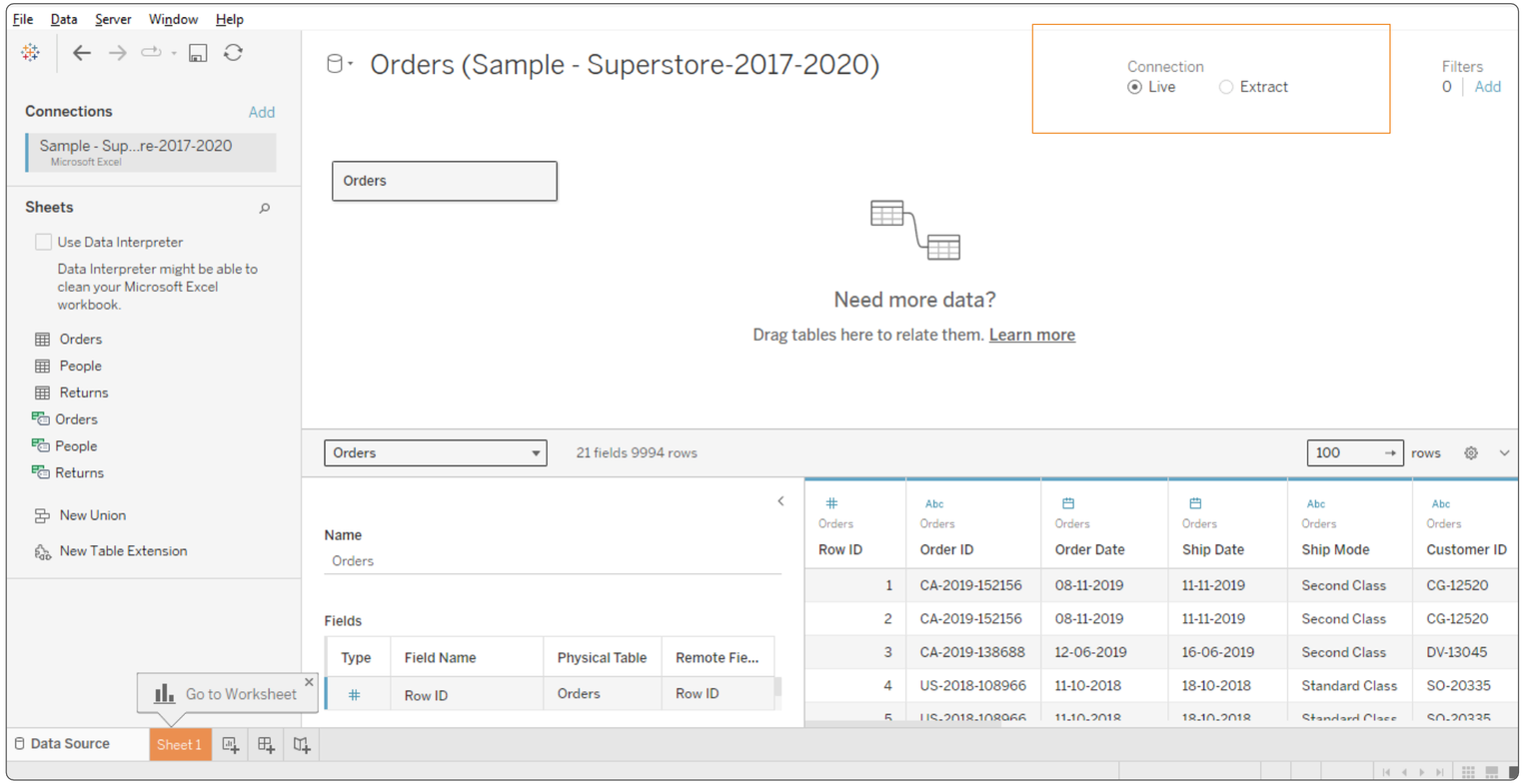
The different types of connectors available in Tableau Desktop are as follows:





Extract and Live Connection

Extract and Live connections are two different ways of connecting to data sources for analysis and visualization.



Extract and Live Connection

The primary difference between using an extract and a live connection lies in how Tableau accesses and manages data.

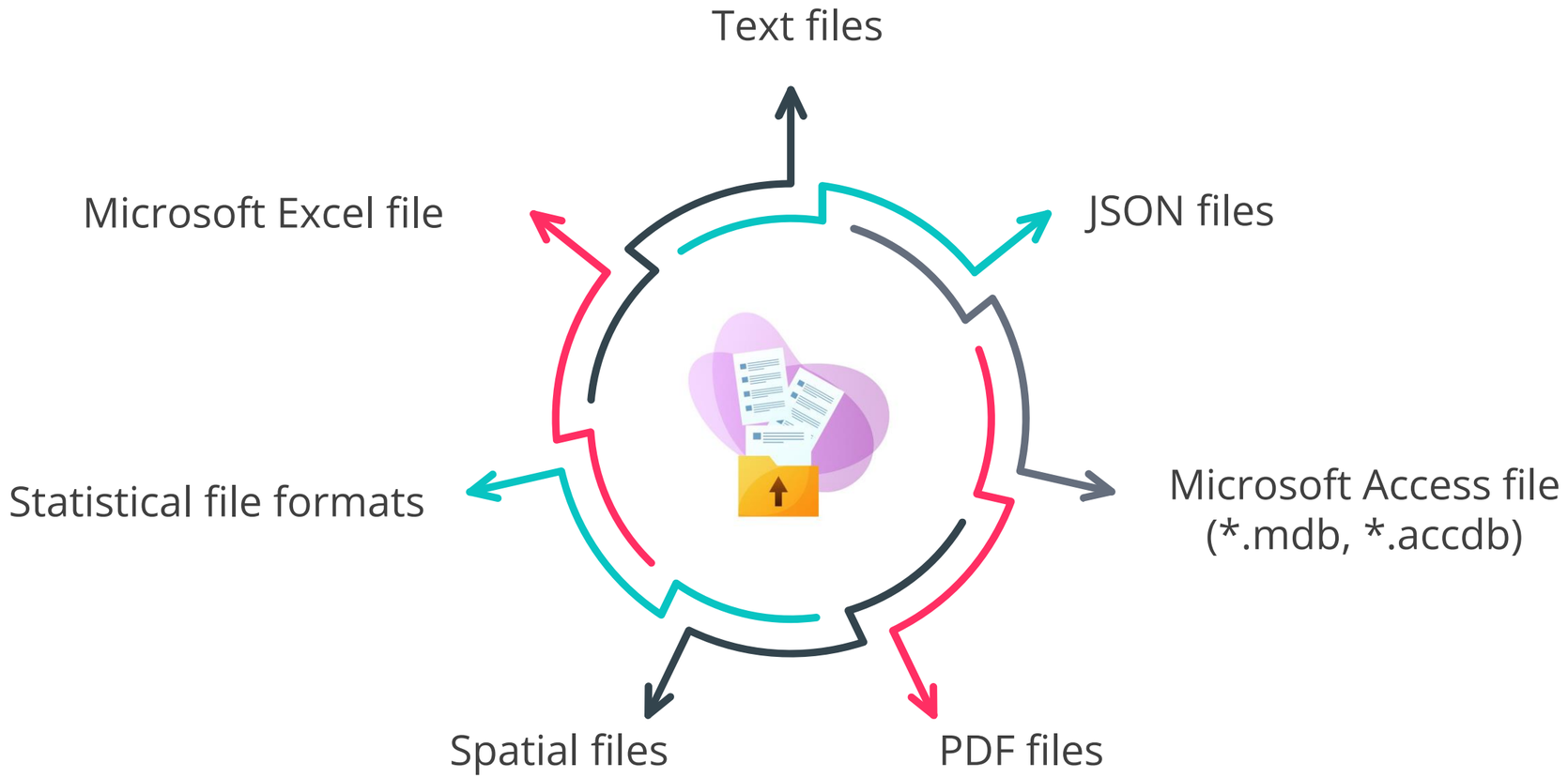
	TDE (Tableau Data Extract)	Live Connection
Optimization	It speeds up the workbook through optimization.	Database are not optimized for faster performance.
Performance and preference	Workbook performance is preferred.	Live and refreshed data is important.
Time-based usage	When one wants to visualize daily, monthly, or weekly trends	When one wants a real-time update
Tableau product support	Tableau Public only supports TDE.	Tableau Desktop supports both TDE and Live connection.
Refresh	Need to schedule refresh	No need to schedule refresh as it is a real-time update connection
Dependency on database	Does not require a database after the extract is created	Rely on the database query all the time

Data Types

It defines the nature of the values stored in a field, column, or variable within a dataset.

Icon	Data type
Abc	Text (string) values
	Date values
	Date & Time values
#	Numerical values
T|F	Boolean values (relational only)
	Geographic values (used with maps)
	Image role (used with image link URLs)
	Cluster Group (used with Find Clusters in Data)

Different Types of Files Used to Extract Data



Demo: Extract vs. Live Connections

Duration: 05 minutes

Demonstrate a live connection by updating the Excel data and reflecting those changes in Tableau.

DEMONSTRATION

Quick Check

What are Tableau Data Extracts (TDE) used for?

A. Storing raw, unaggregated data for long-term archival purposes

B. Optimizing data for quick recall and aggregation in Tableau visualizations

C. Creating real-time connections to live databases for up-to-date data

D. Exporting data from Tableau to external systems

Parts of the View

Parts of the View

This section covers the fundamental view elements in Tableau, allowing you to customize visibility as required.

Pills

Data pills in Tableau help identify variable types in the analysis.

Marks Card

It is a central element in Tableau that allows you to control the visual properties of marks (data points) in your visualization.

Legends

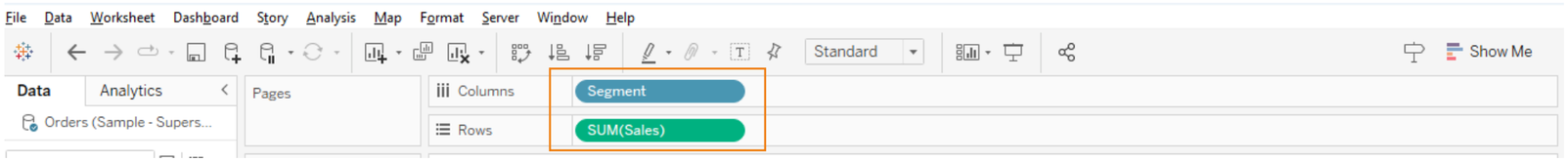
It provides a key for interpreting the colors, sizes, shapes, or other visual properties of marks in your visualization.

Labels

They display additional information about marks directly on the visualization.

Pills in Tableau

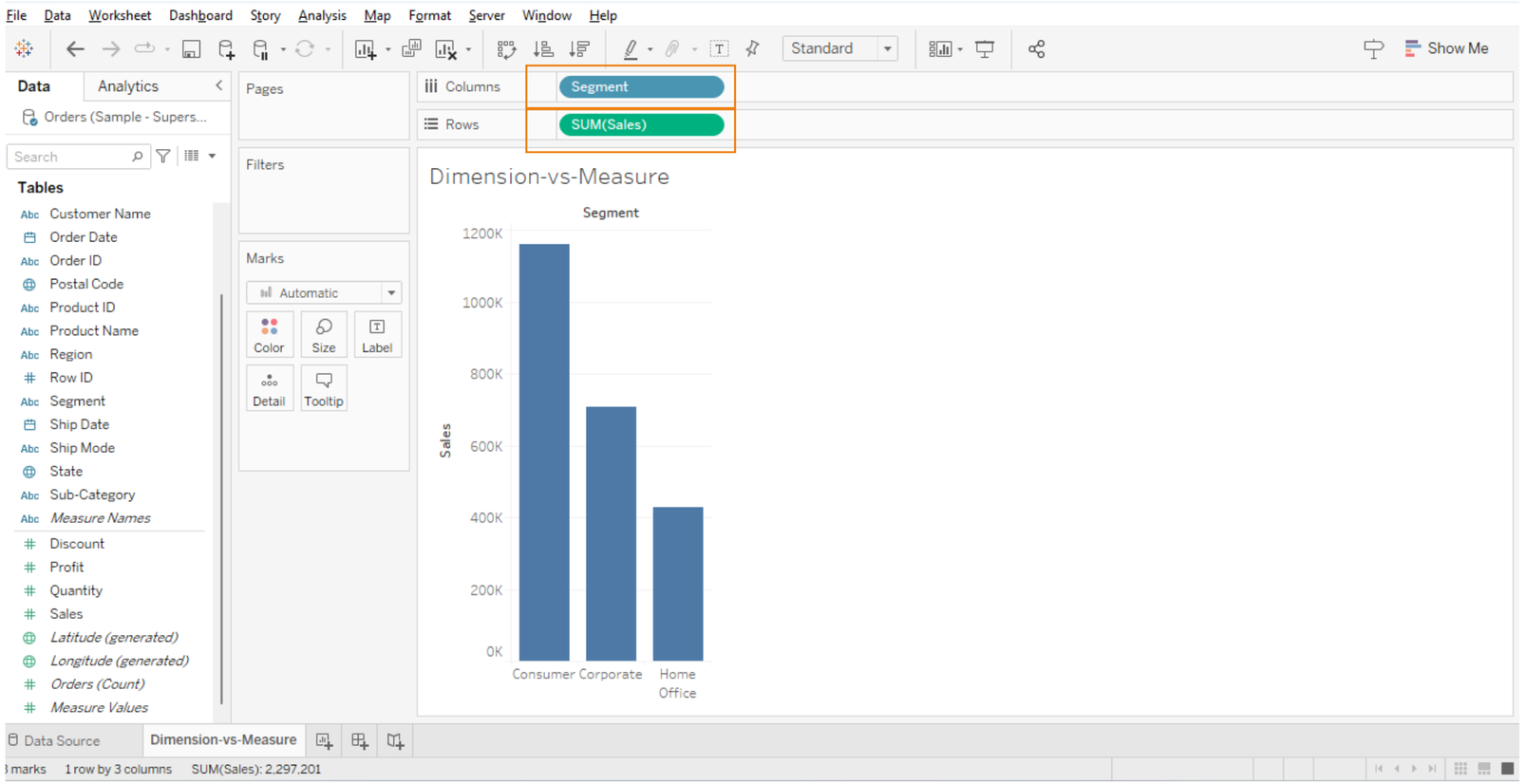
It refers to the fields or measures from your dataset that you use to build visualizations.



These pills are the building blocks for creating charts, graphs, maps, and other visual representations of your data within Tableau's interface.

Green vs. Blue Pills

Tableau identifies each field as a dimension or measure in the Data pane, depending on the type of data the field contains.



Green vs. Blue Pills

Measures (Green Pills):

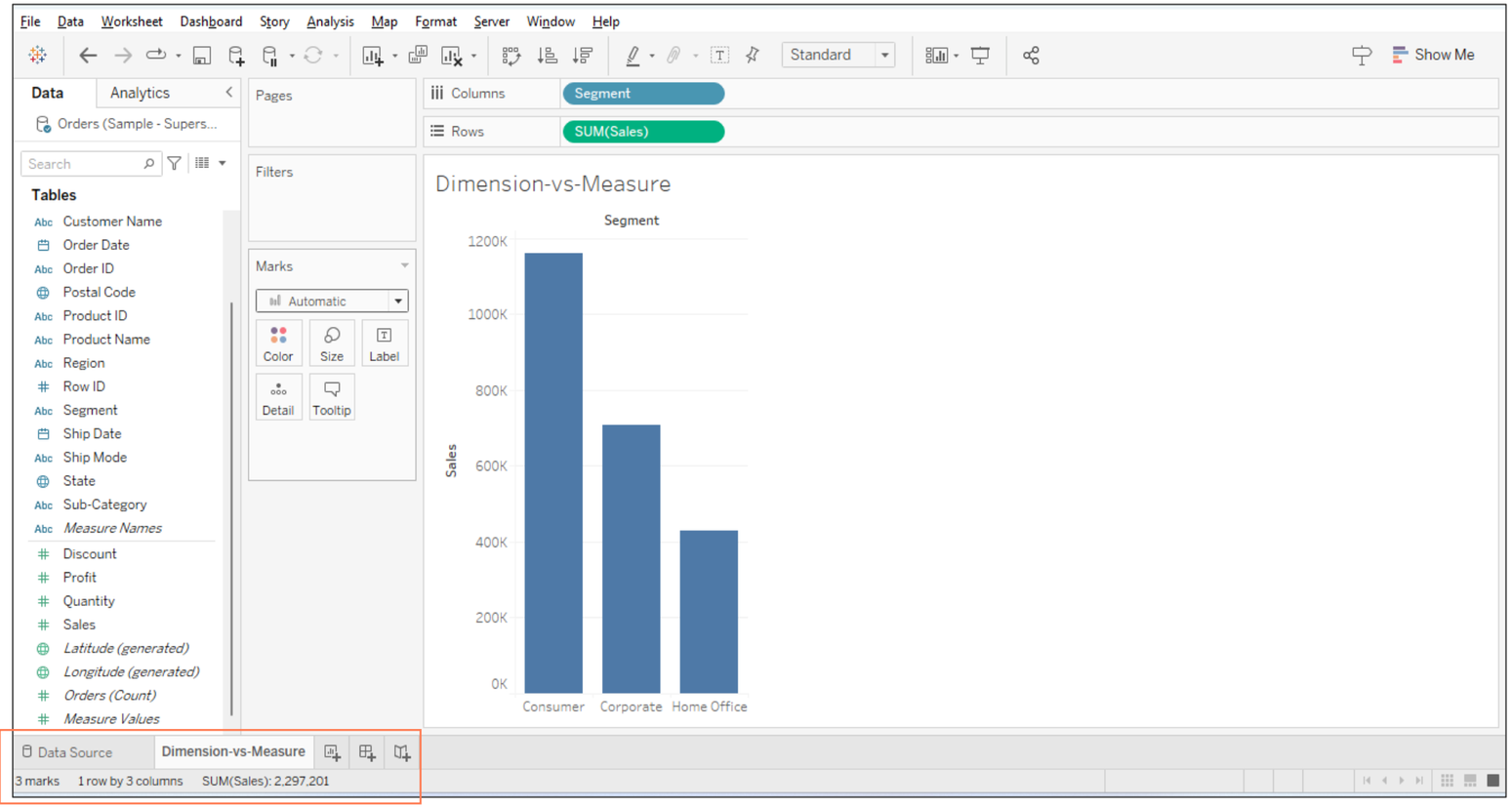
- They are numerical fields with quantitative data and continuous data.
- They represent values and add aggregation to them automatically.
- They are used for quantitative analysis and visualization.
- They add an axis to visualization.
- Example: sales, weight, and height.

Dimensions (Blue Pills):

- They are categorical fields organizing qualitative data into categories or groups.
- They create visualization structure, granularity, and the level of detail of the visualization.
- They add headers to the view.
- Example: countries, regions, and names.

Marks and Marks Card

Marks are visual elements that represent data points on a chart.

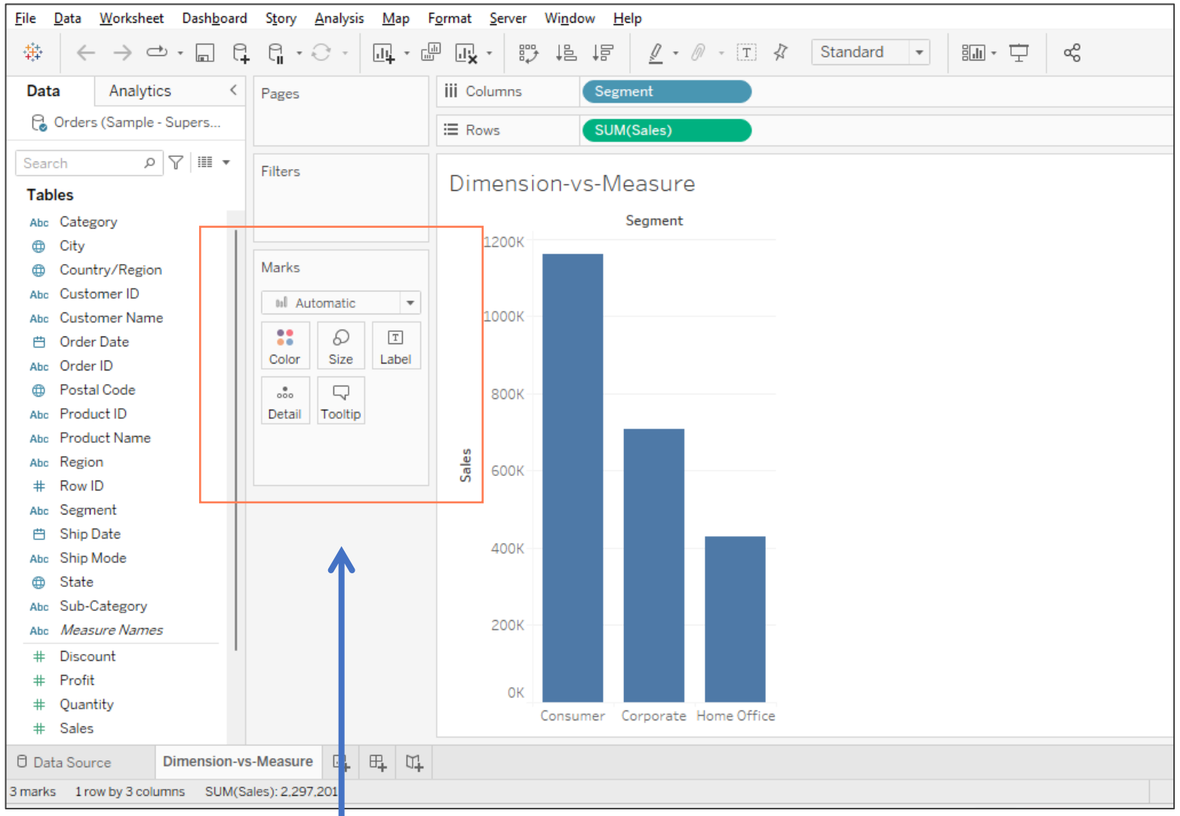


Information on number of Marks, Rows, and Columns and the total value of measures

Tableau explicitly mentions the number of Marks used in the chart at the left bottom corner of the view.

Marks and Marks Card

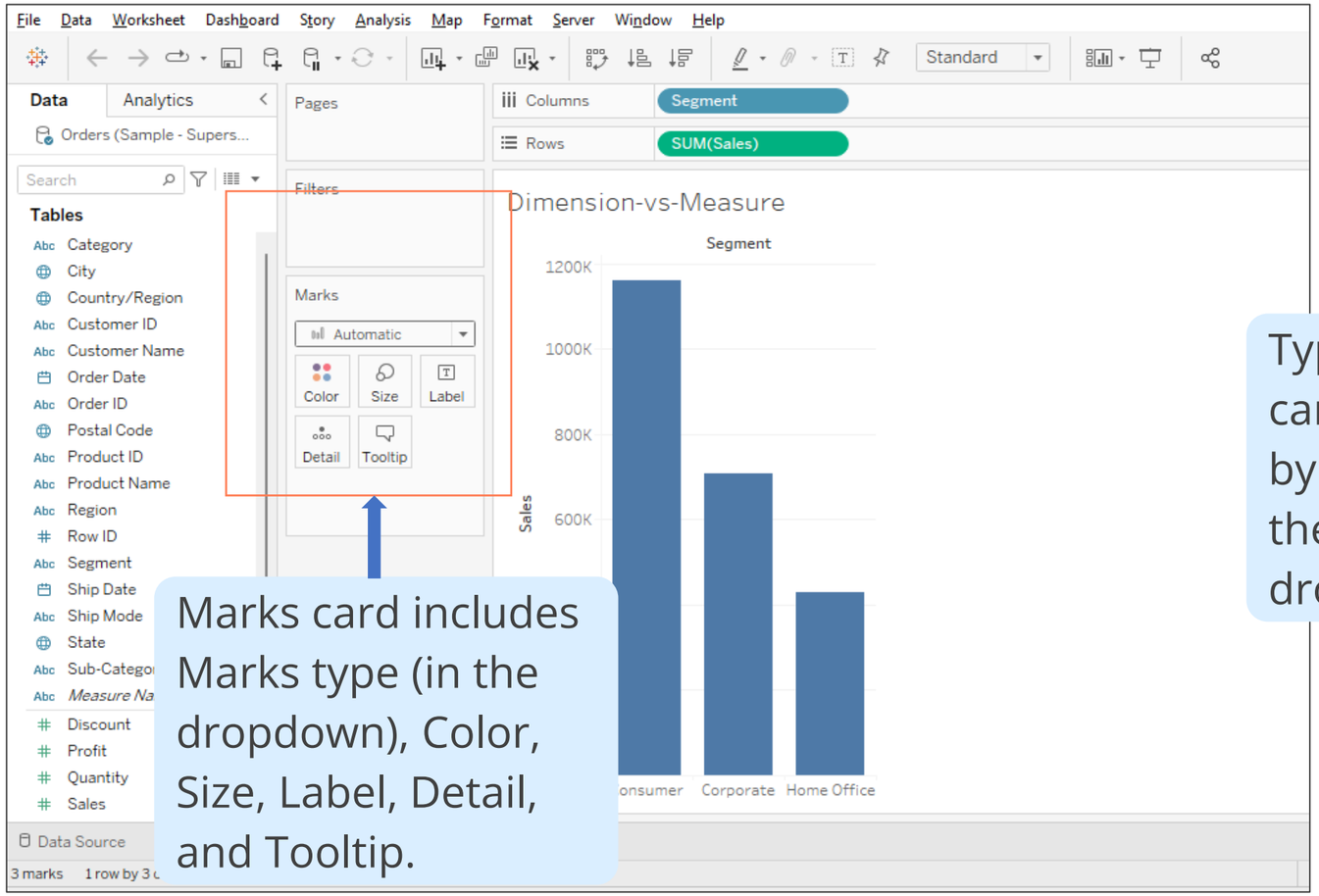
Marks can be changed using the Marks card to add more context and interactivity.



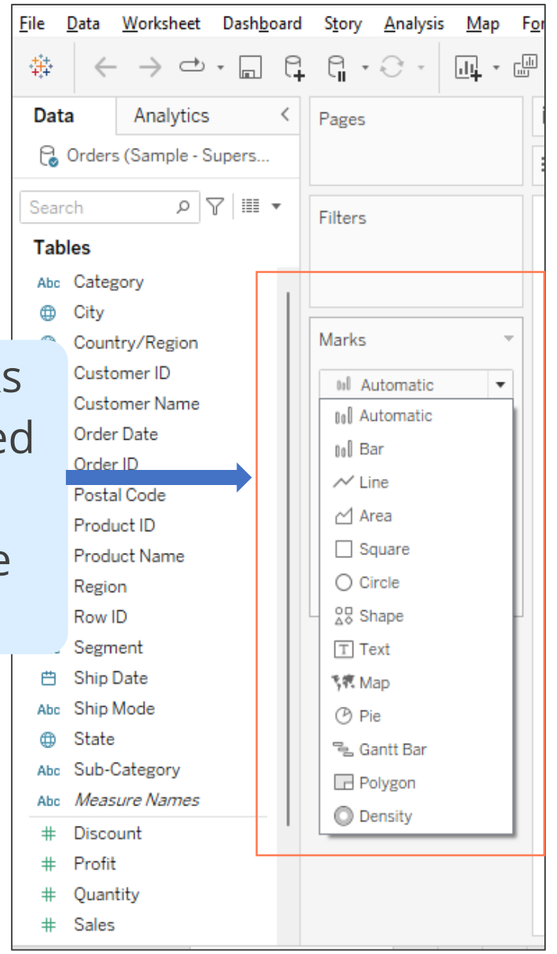
Marks card used to make changes in the marks

Marks and Marks Card

The Marks card changes the Mark type, color, and size and adds labels, details, and tooltips.



Types of Marks can be changed by selecting them from the dropdown.



Demo: Green vs. Blue pills and Components of the Chart

Duration: 10 minutes

Demonstrate adding measures and dimensions, selecting mark types, and setting up tooltips in Tableau for effective data visualization.

DEMONSTRATION

Quick Check

Which of the following best describes dimensions in Tableau?

A. They represent numerical data used for calculations and aggregations.

B. They are used for filtering data based on conditions.

C. They categorize and segment information, such as dates, geographic locations, and categories.

D. They are used for creating visualizations like bar charts and line graphs.

Guided Practice

Overview

Duration: 20 minutes

In this project, you will analyze social media metrics in multiple files, including .csv, .txt, and .pdf formats. Your goal is to create a detailed overview of social media activity over a designated period. Tableau simplifies the union of data by automatically aligning column names or permitting manual modifications. This process yields a single dataset that offers an integrated perspective of social media interactions across different platforms.

Key Takeaways

- Effective data presentation plays a crucial role in converting insights into actionable outcomes.
- Data storytelling uses a compelling narrative to communicate information tailored to a specific audience.
- Tableau offers a free version known as Tableau Public and a paid version known as Tableau Desktop.
- Tableau imports data from text, CSV, and Excel file types to its workspace.
- Each field in tableau is identified as either a dimension or a measure in the Data pane based on the type of data it contains.

Additional Resources

- Tableau Features to Know from A to Z
- Viz-of-the-day
- Data types
- Tour the Tableau environment

Q&A