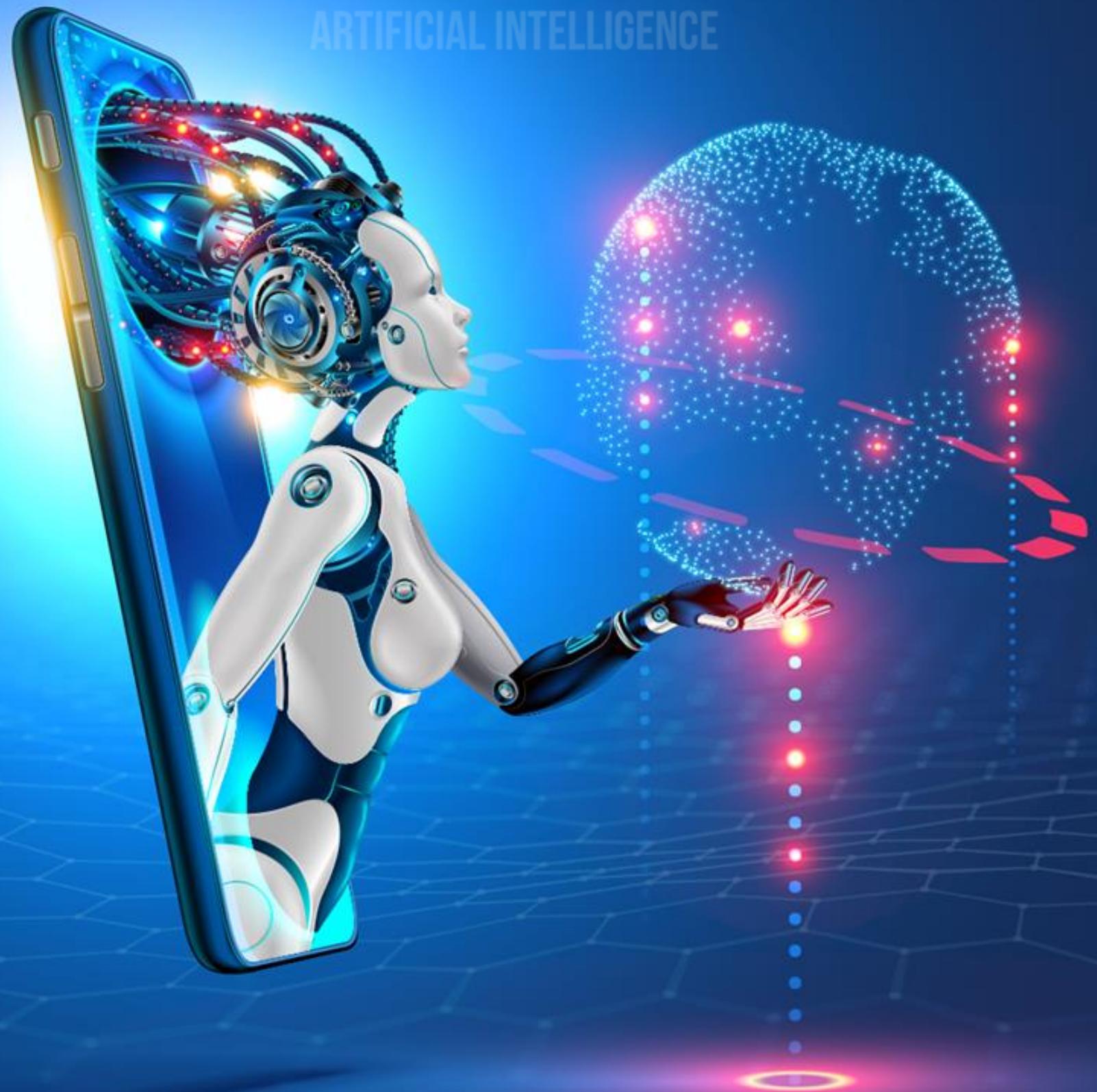


**DATA AND  
ARTIFICIAL INTELLIGENCE**



## Tableau Training



## Introduction to Data Visualization and Tableau

# Learning Objectives

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

- Explain the concept and uses of business intelligence
- Infer the meaning, history, and benefits of data visualization
- Explain tableau, its installation, and loading of data from Excel
- List the components of Tableau user interface



# A Day in the Life of a Data Analyst



As a Data Analyst of an organization:

You are required to manipulate the data in a tabular and systematic form as company is facing a lot of challenges in managing profits.

You are also required to load the data from Excel to Tableau.

To achieve these tasks, you will be learning a few concepts, such as business analytics, data visualization, Tableau, load data from excel to tableau that will help find a solution for the given scenario.

## What is Business Intelligence?

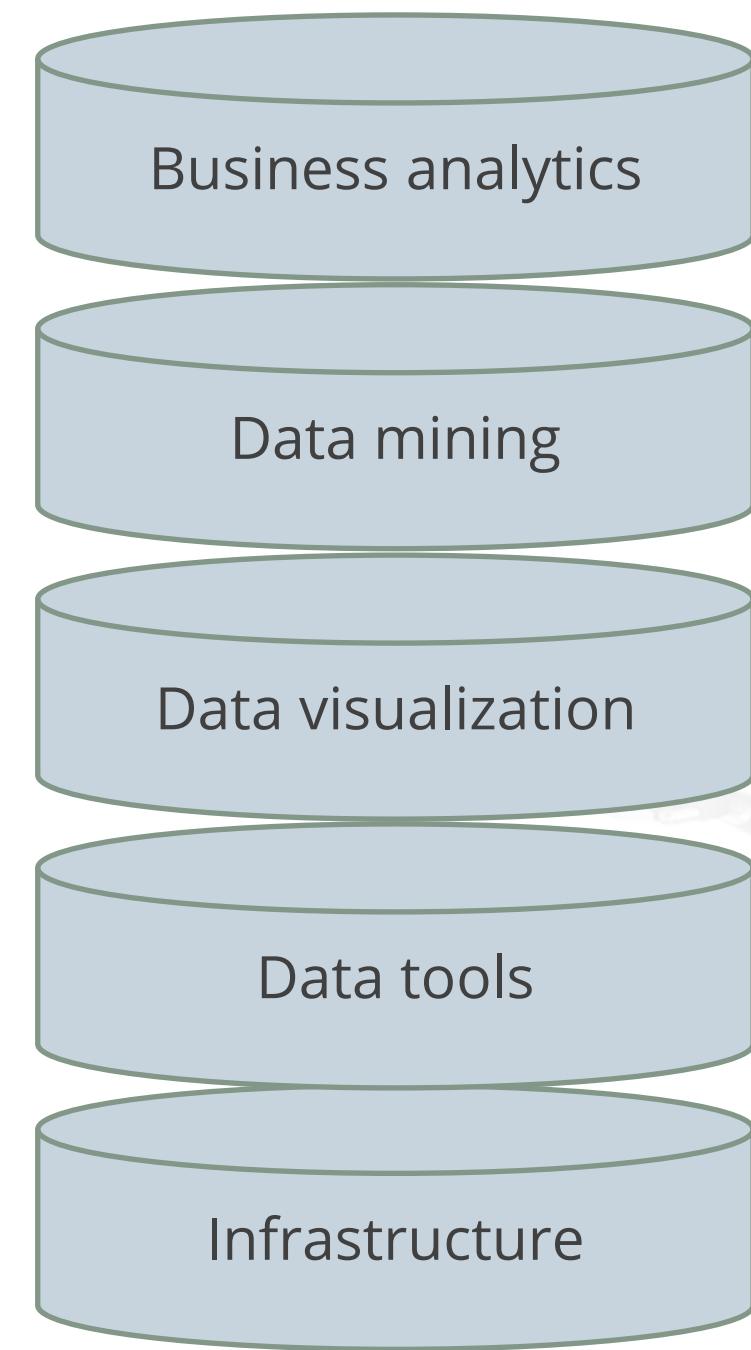
# Business Intelligence

It is defined as the right information to the right people at the right time to enable better decision making.



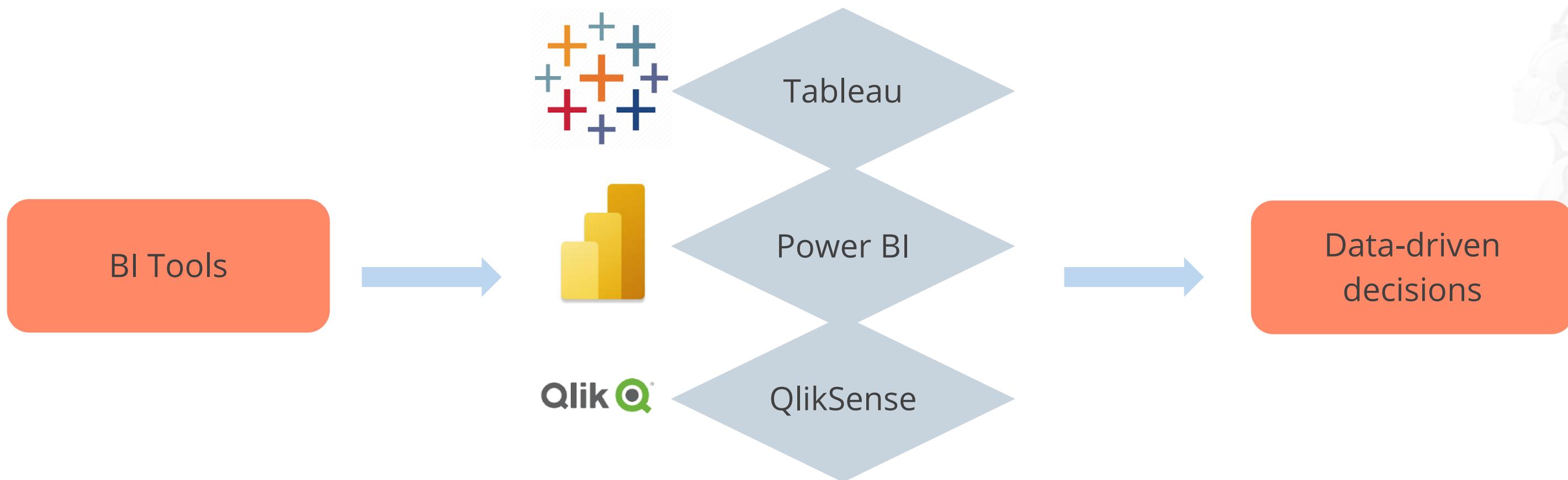
# Business Intelligence

Business intelligence is a combination of:



# Business Intelligence

BI Tools such as Tableau, Power BI, and QlikSense help organizations to make more data-driven decisions.



## Uses of BI

Identify ways to increase profit

Analyze customer behavior

Compare data with competitors

Track performance

## Uses of BI

Optimize operations

Predict success

Spot market trends

Discover issues or problems

## What is Data Visualization

# Data Visualization

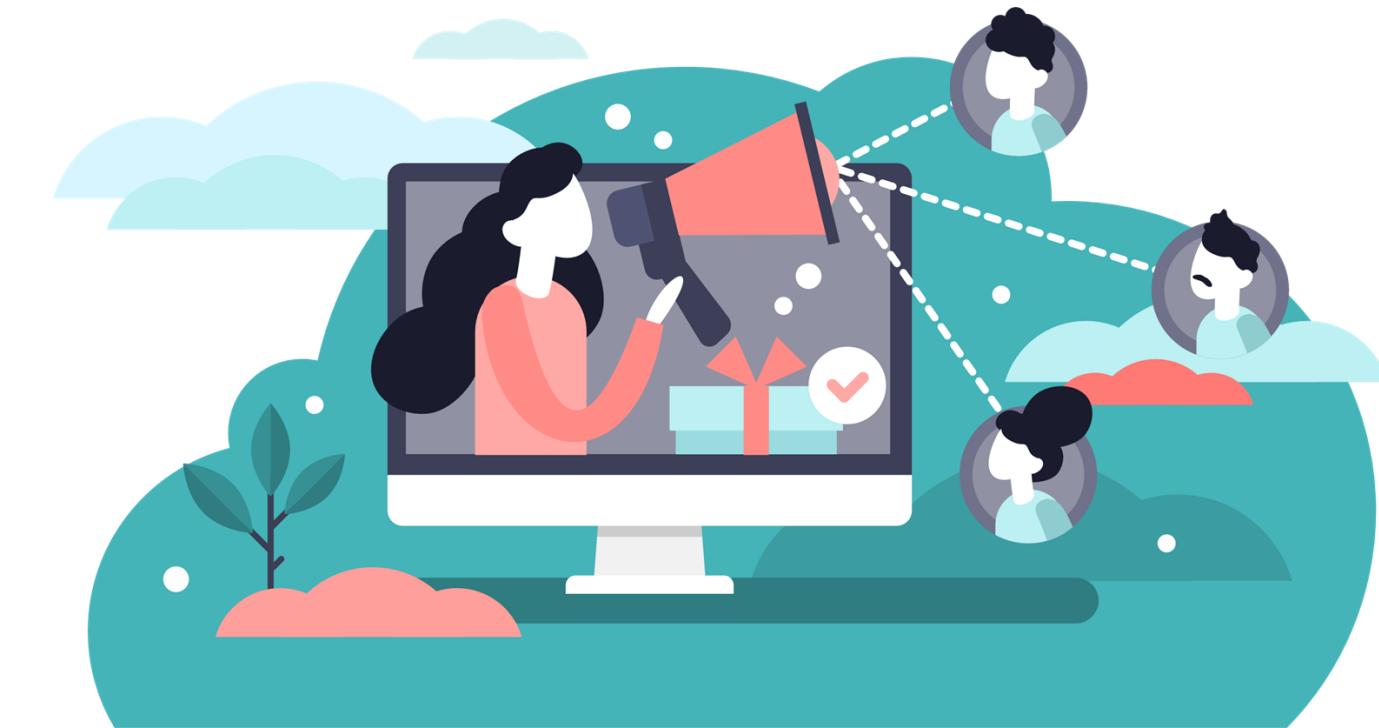
Graphical way of representing information and data.



Data visualization uses  
pictures to represent data.

# Data Visualization

Data visualization is the most effective and efficient way of communication which involves any volume of data.



# Data Visualization

Data visualization is at the heart of business intelligence and data analytics tools.

It lends itself well to what is called data-driven and fact-based decision making.

# Data Visualization Tools

Data visualization tools are software which helps us convert any raw data into a pictorial representation.



# Data Visualization Tools

Tableau

Power BI

QlikSense

Spotfire

# Data Visualization Tools

Grafana

D3.js

MicroStrategy

Sisense

## Benefits of Visualizing Raw Data

# Quantitative Data

Visualize quantitative data to perform activities such as:

Exploration

Communication

Making sense of data

Informed decision

Understanding

Discovery

To achieve goals

# Quantitative Data

Some quantitative tasks can be best performed when values are displayed graphically.



## Quantitative Data

We have evolved to perform many data sensing and processing tasks visually.

Vision is our dominant sense.



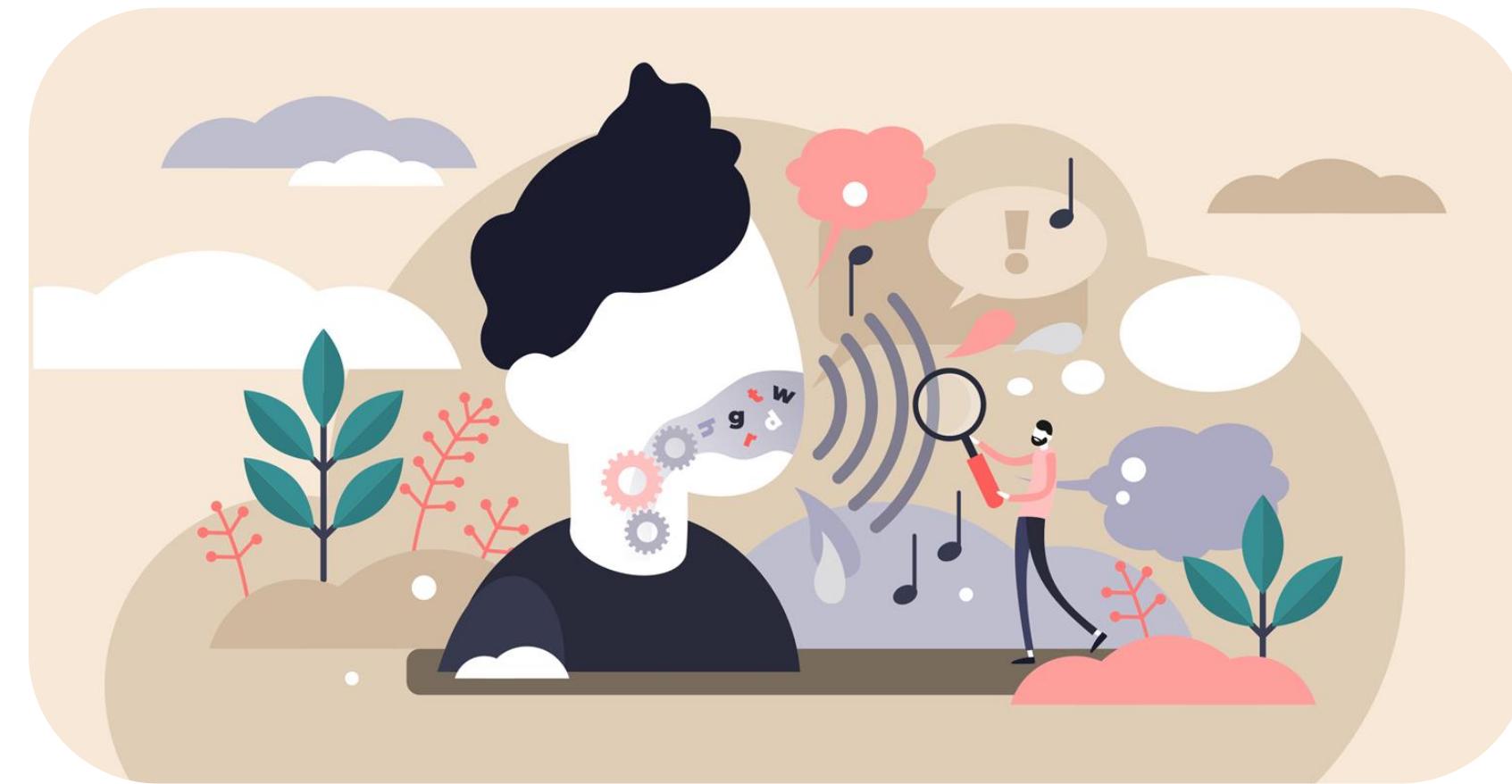
## Quantitative Data

This has been since the days of our earliest ancestors who survived and learned to thrive in the African savannah.



# Quantitative Data

Anything that visual perception does particularly well can be performed quicker and better than our brains' conscious thinking regions.



# Quantitative Data

Graphs provide a high-level overview of a data collection.

An overview summarizes data's essential characteristics, from which we can discern what the routine vs. exceptional is.



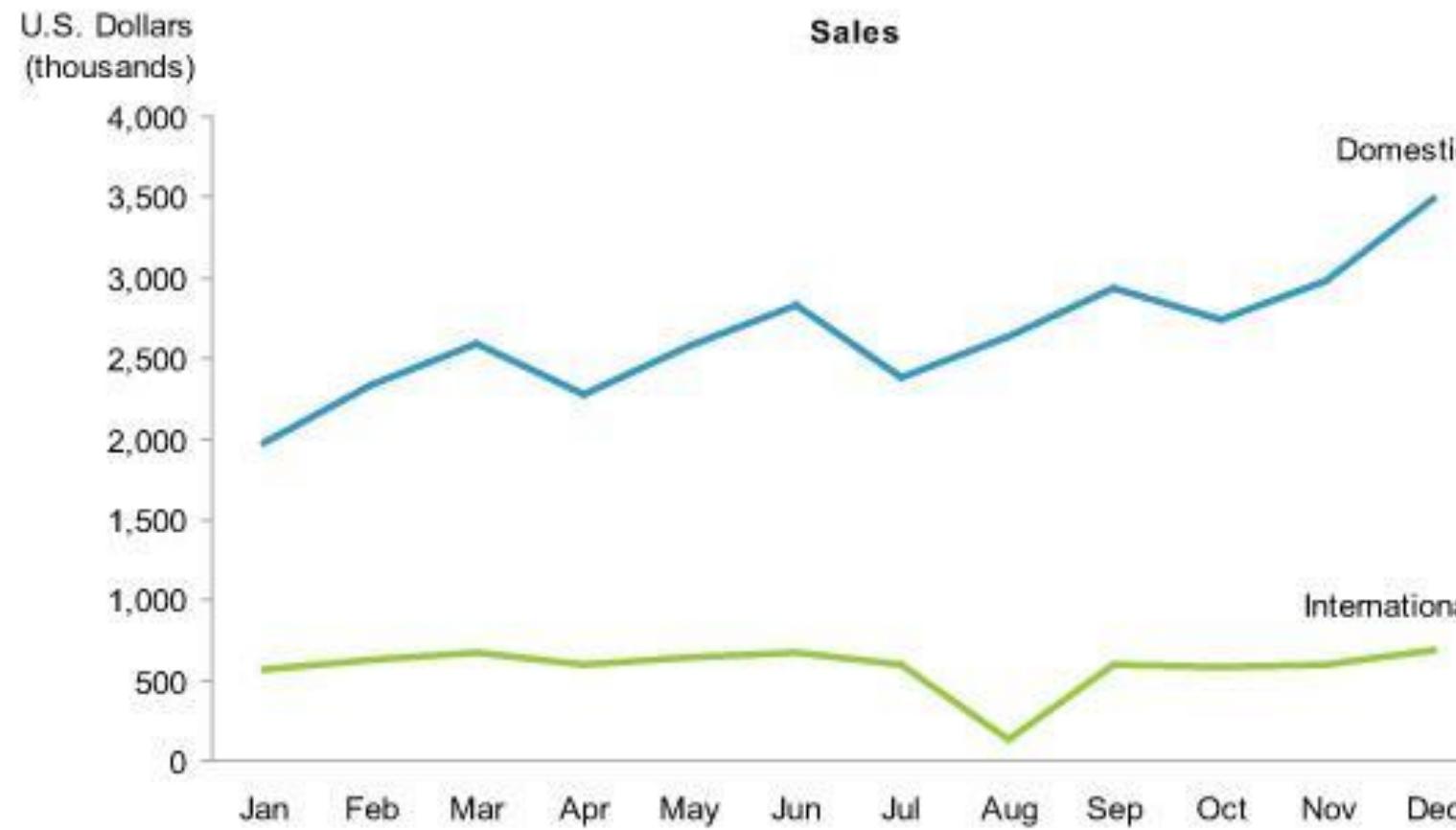
# Quantitative Data

Example: Consider the table and try to construct a pattern on the monthly trend variations.

Sales		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Domestic		1,983	2,343	2,593	2,283	2,574	2,838	2,382	2,634	2,938	2,739	2,983	3,493
International		574	636	673	593	644	679	593	139	599	583	602	690
		\$2,557	\$2,979	\$3,266	\$2,876	\$3,218	\$3,517	\$2,975	\$2,773	\$3,537	\$3,322	\$3,585	\$4,183

# Quantitative Data

Consider the visual representation of the same data under the power of data visualization.



One will be able to perceive the pattern without making any conscious effort.

## History of Data Visualization

# History

Visual representations are an important part of human learning and comprehension.



# History

Since the dawn of creation, humans have used images to:

Instruct

Transmit meaning

Tell stories

# History

The history of data visualization dates to when our great ancestors lived in caves and used drawings to convey their lifestyle.



## History

They were followed by the next-generation scholars who used maps to identify the planetary position and cartographers who created geographical maps to navigate the world.



# History

They were followed by the contemporary mathematicians and statisticians who used charts to convey stories and insights to our modern world. They used different tools to perform data sensing and process tasks visually.



# History

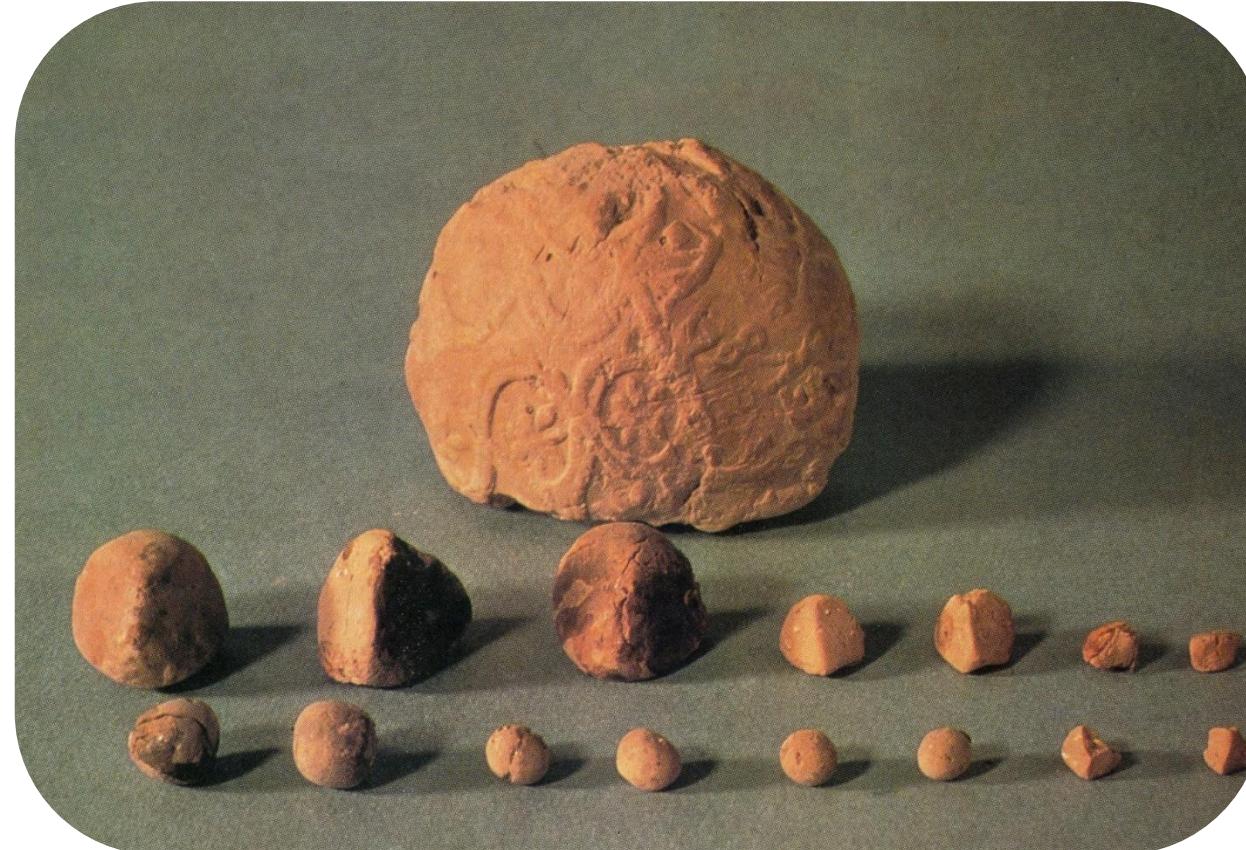
Some of the visualizations from the past made their impact along its period.



*Cave Paintings – Serra da Capivara National Park*

# History

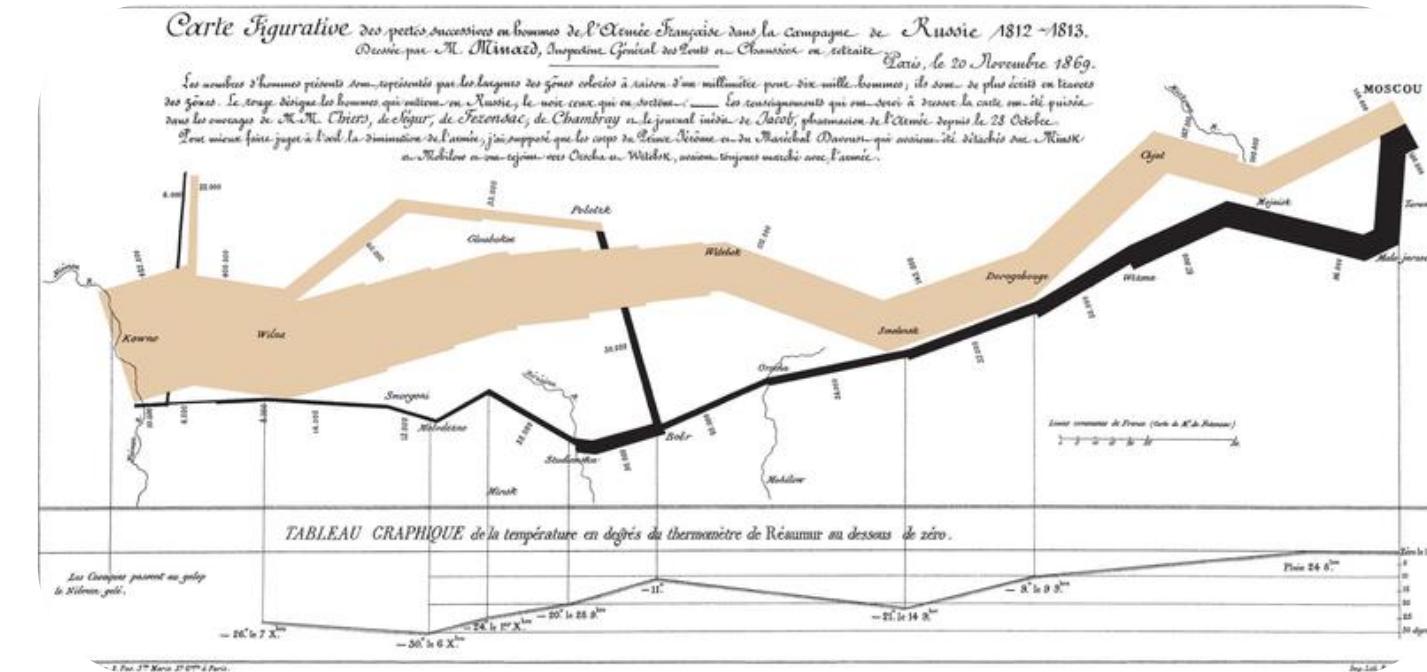
Some of the visualizations from the past made their impact along its period.



*Physical Data Visualization: Mesopotamian Clay Tokens (5500 BC)* - Clay tokens suggest that physical objects were used to externalize information, support visual thinking, and enhance cognition way before paper and writing were invented.

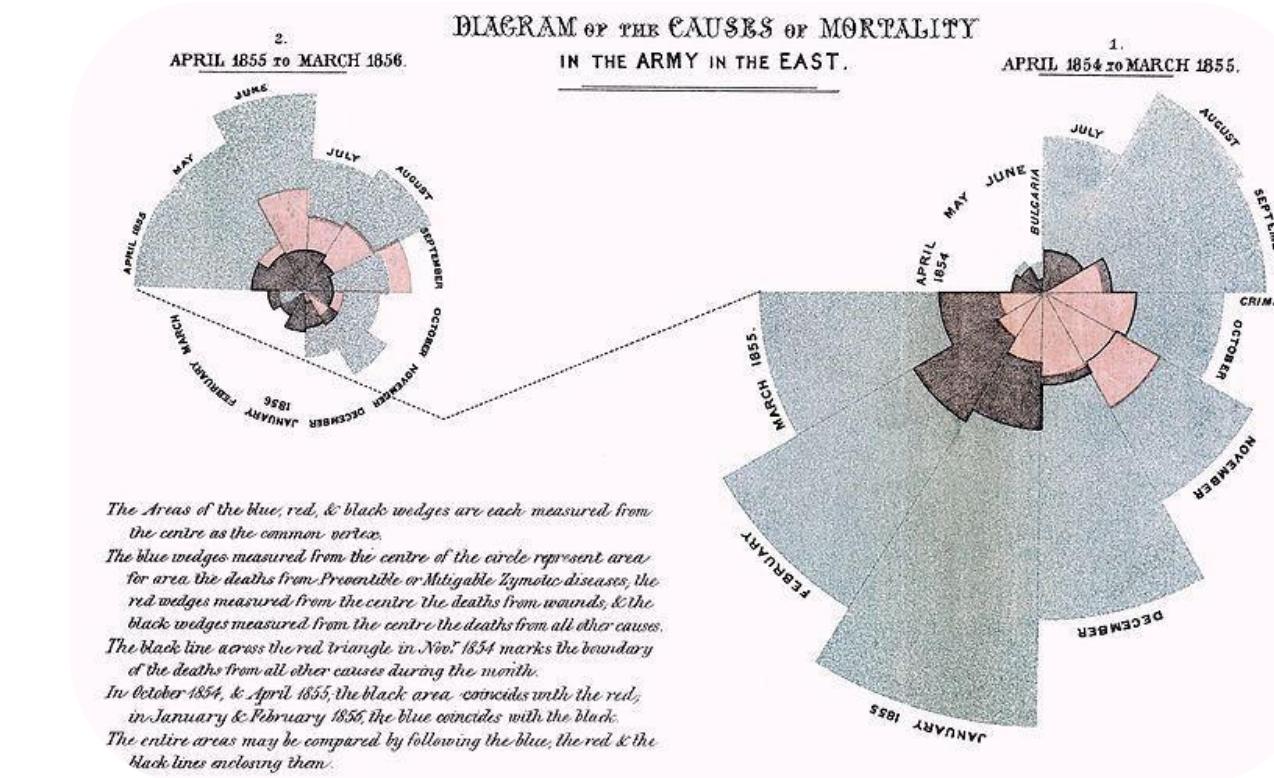
# History

Some of the visualizations from the past made their impact along its period.



# History

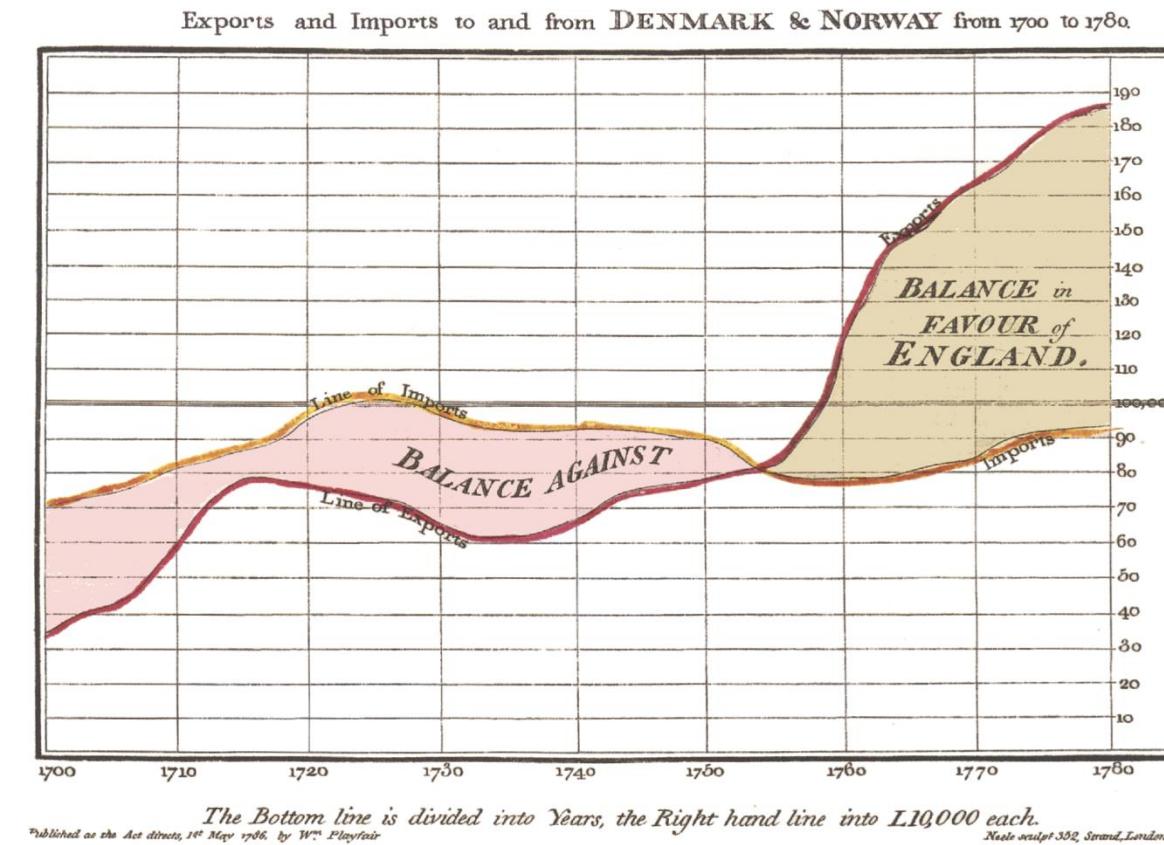
Some of the visualizations from the past made their impact along its period.



*Causes of Mortality during Crimean War – Florence Nightingale (1856 AD)*

# History

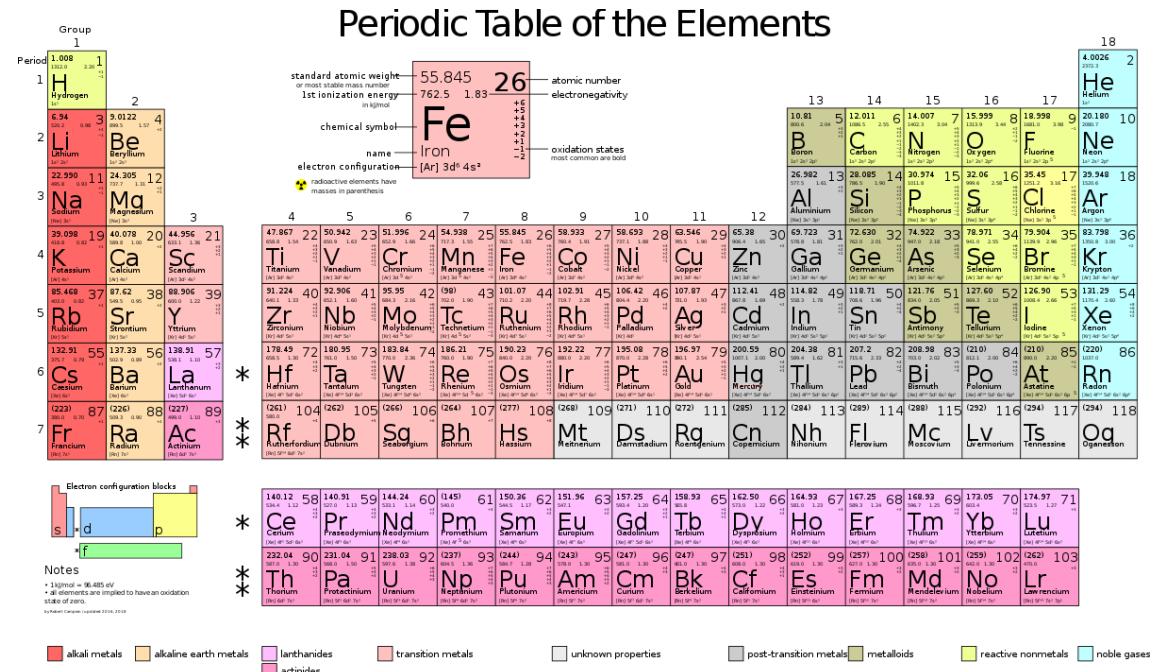
Some of the visualizations from the past made their impact along its period.



Trade Balance time series chart - William Playfair (Father of Modern Visualization - 1786 AD)

# History

Some of the visualizations from the past made their impact along its period.

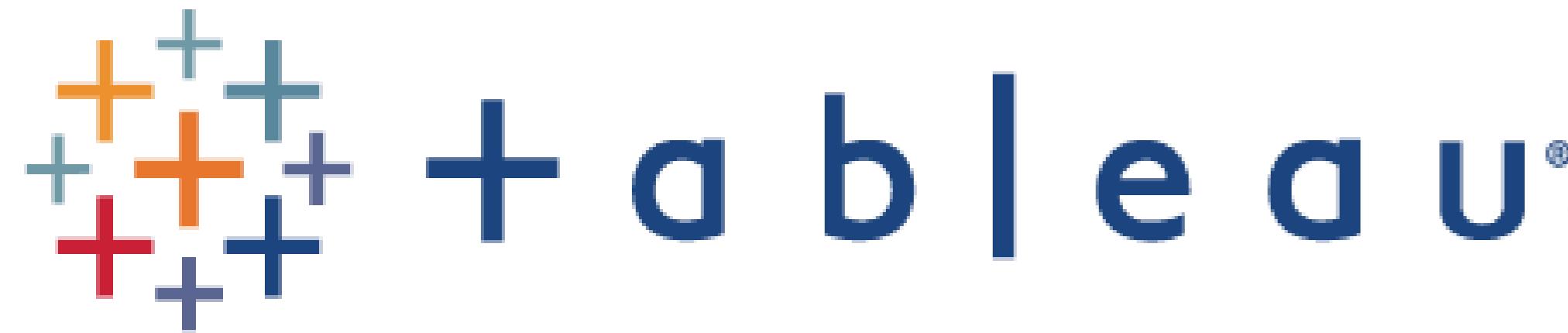


Mendeleev's Periodic Table (1904 AD)

## **Introduction to Tableau**

# Introduction to Tableau

Tableau is a powerful data visualization solution that is quickly gaining popularity.



# Introduction to Tableau

Tableau allows us to evaluate raw data in the form of:



Graphs



Report

# Introduction to Tableau

Data in the form of Big Data, Hadoop, SQL, or Cloud can be visualized using Tableau.



# Introduction to Tableau

Tableau software does not require any technical or programming experience.



# Introduction to Tableau

The reasons to use Tableau are:



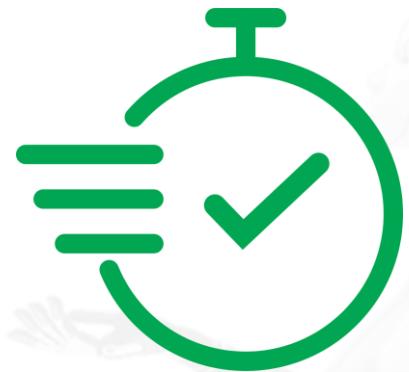
Ultimate skill for Data  
Science



User-friendly



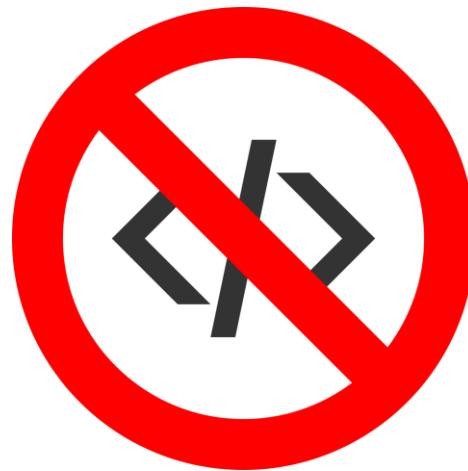
Applicable to any  
business



Fast and easy

# Introduction to Tableau

The reasons to use Tableau are:



No Coding  
necessary



Huge community



Insights turned  
to actions



Data report access

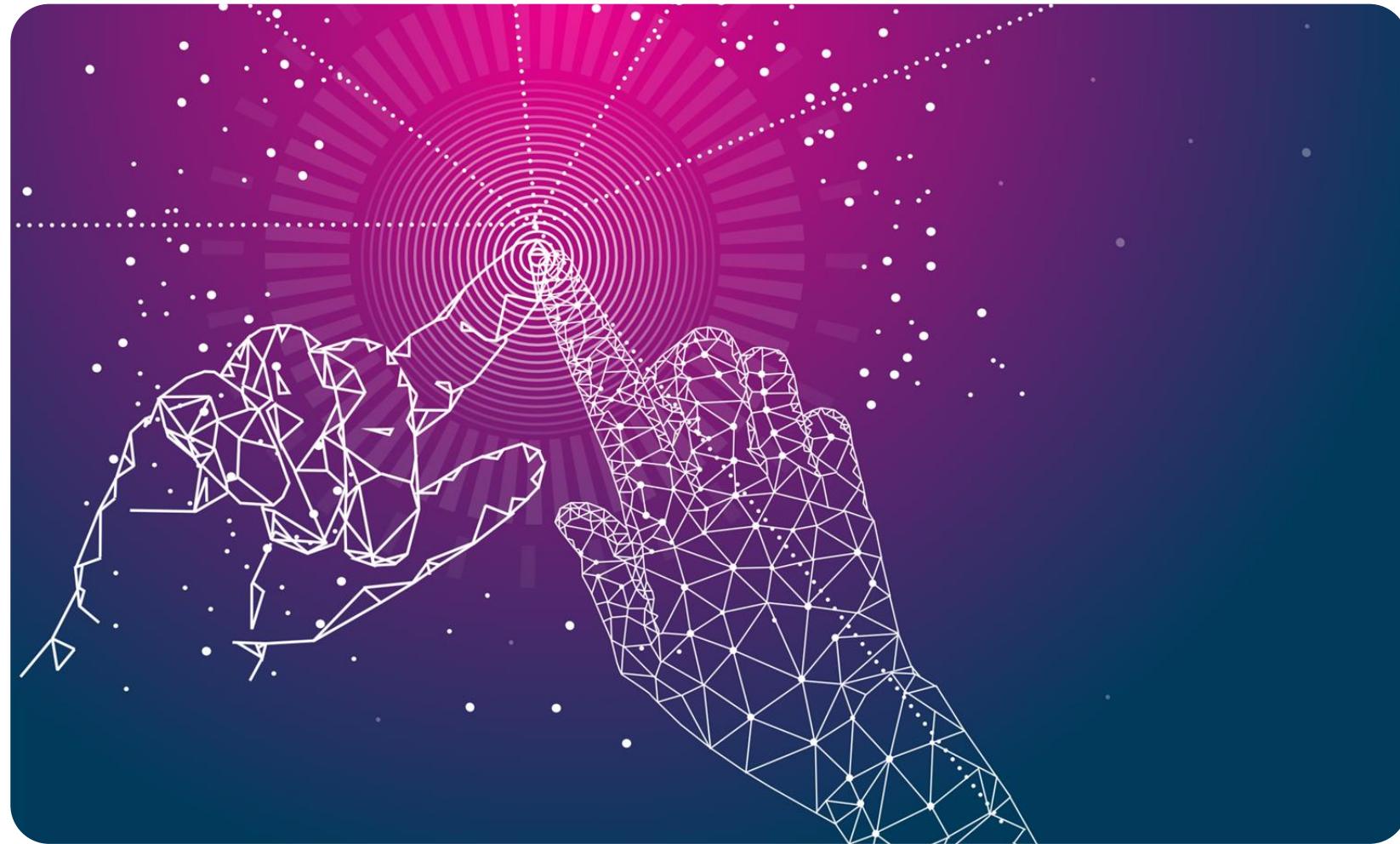
# Data Blending

The most significant aspect of Tableau is data blending.



# Data Blending

It is used to evaluate linked data from numerous data sources in a single view and exhibit it in the form of a graph.



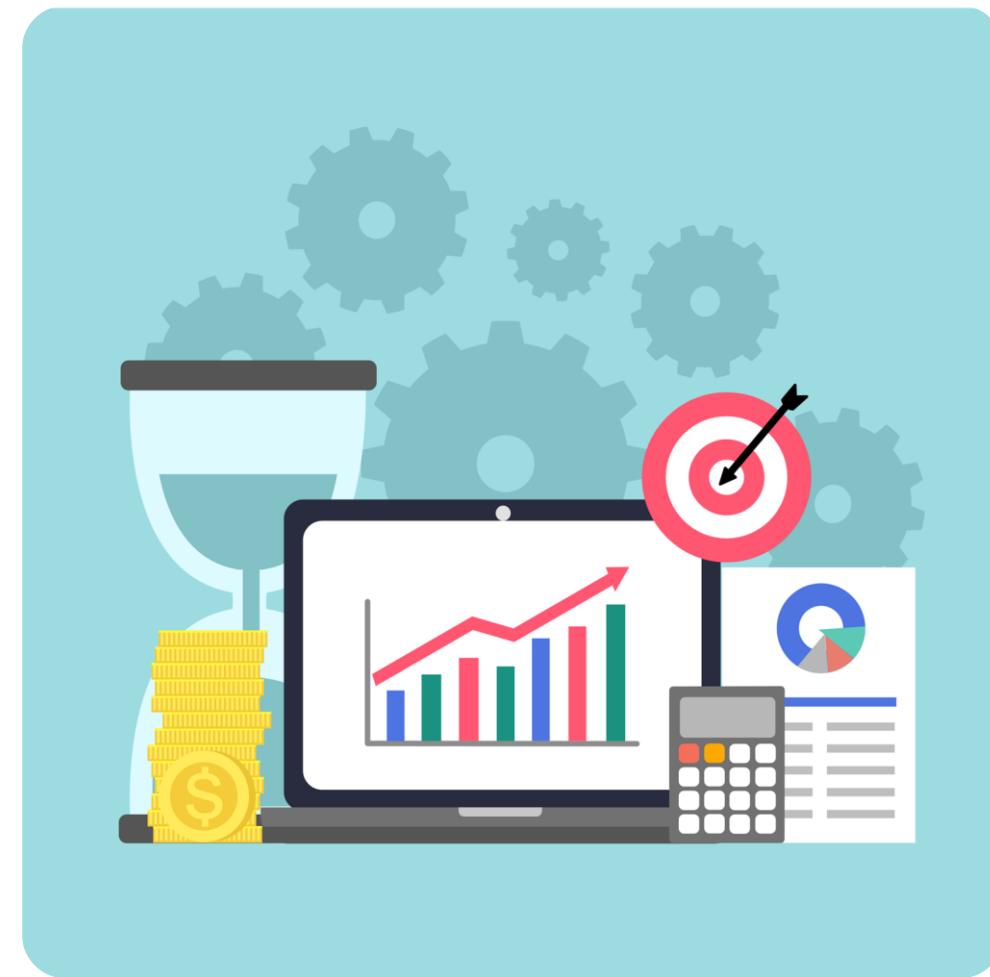
# Data Blending

Sales data in a relational database and Sales Target data on an Excel sheet.



# Data Blending

Compare actual sales to goal sales and blend the data.



# Data Blending

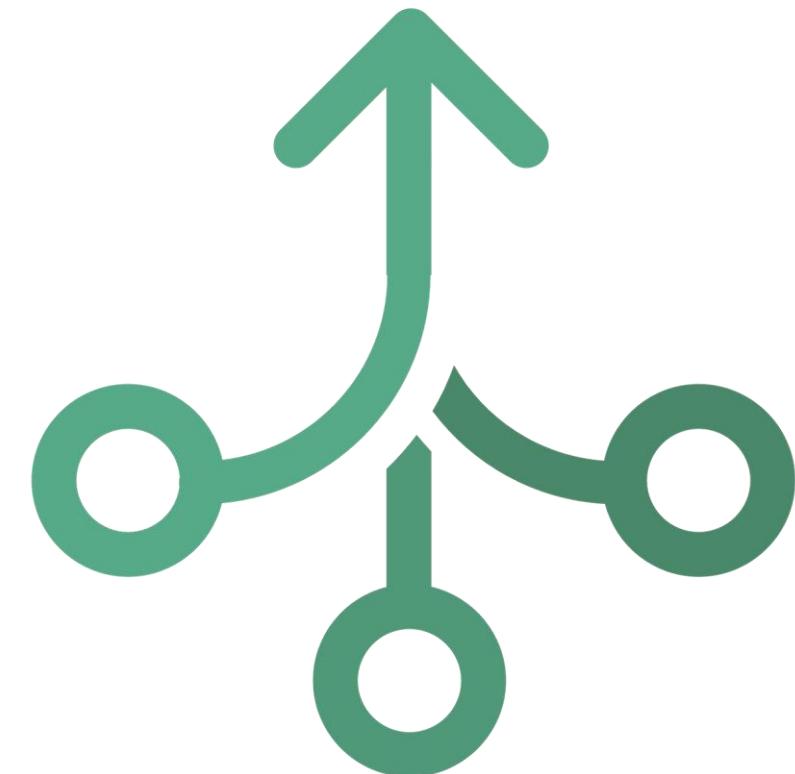
Primary Data

Secondary Data



## Data Blending

To blend the data, a left join will be established between the primary data source and the secondary data source.



# Real-Time Analysis

It enables users to swiftly interpret and evaluate dynamic data.



# Real-Time Analysis

With interactive analytics, Tableau can help extract useful insights from fast-moving data.



# Collaboration of Data

Since data analysis is not a solitary task, Tableau is designed to facilitate collaboration.



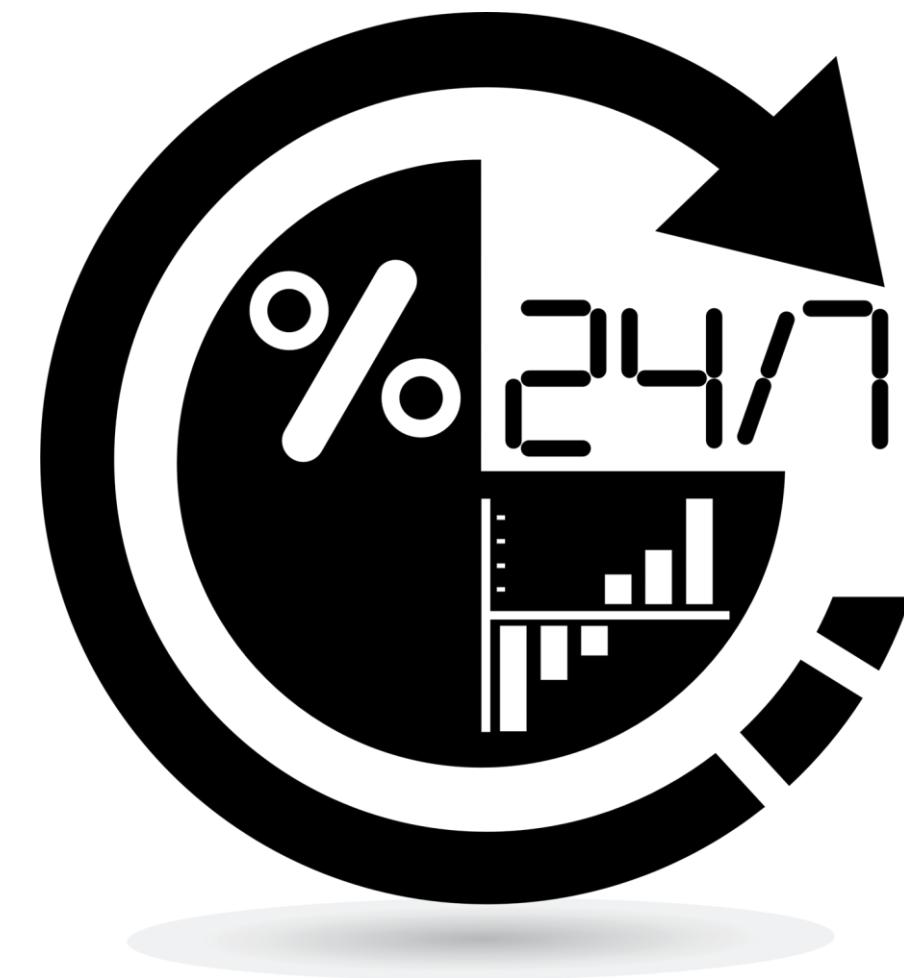
# Collaboration of Data

Team members may exchange data, ask follow-up questions, and provide clear visuals to anyone who could benefit from the data.



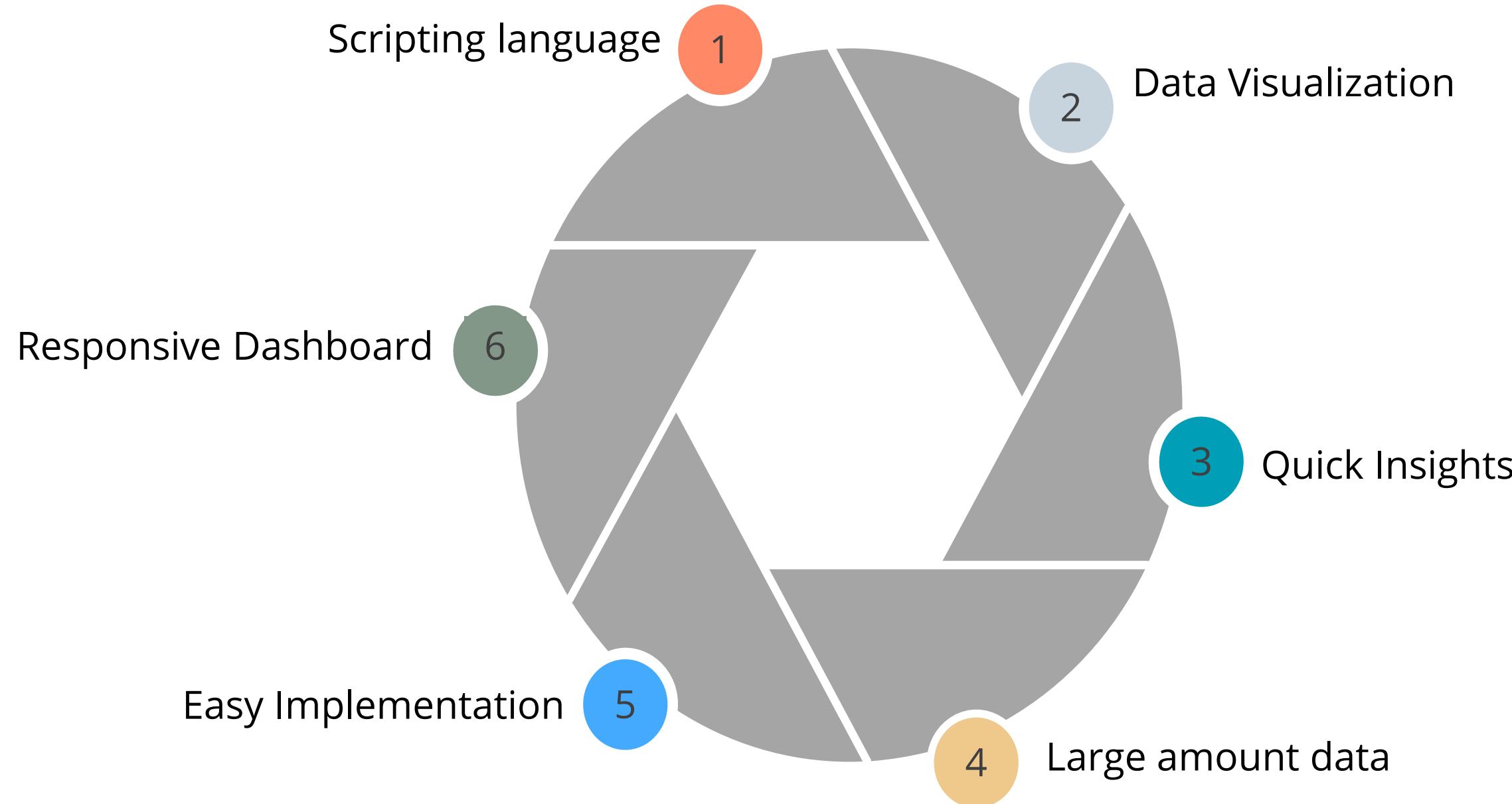
## Collaboration of Data

In order to succeed, it is vital to ensure that everyone understands the facts and makes informed decisions.



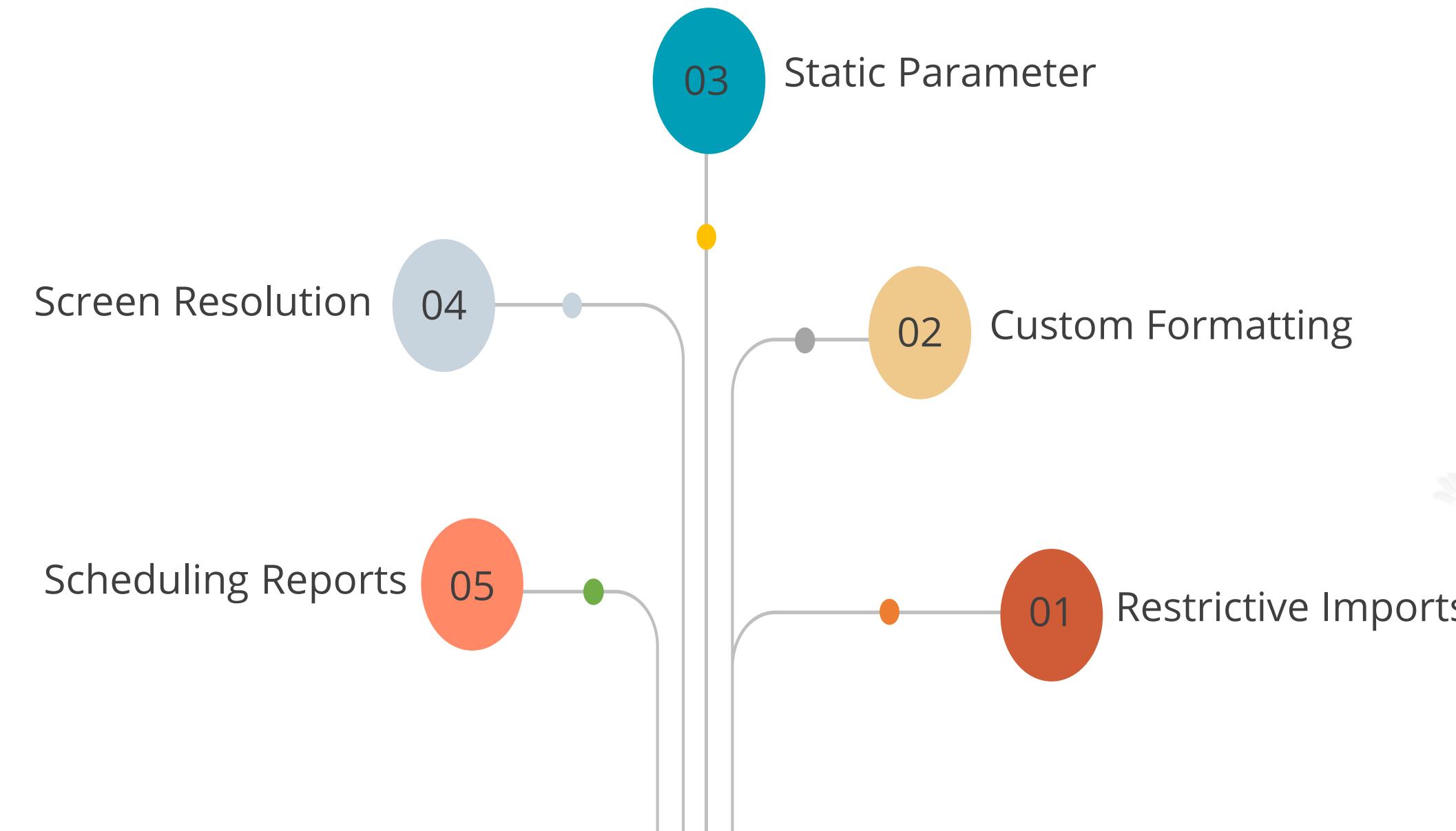
## Advantages of Tableau

# Advantages of Tableau



## Disadvantages of Tableau

# Disadvantages of Tableau



## Download and Install Tableau Public

# Tableau Public

Tableau Public is free downloadable software, which can be used to create:



Dashboards



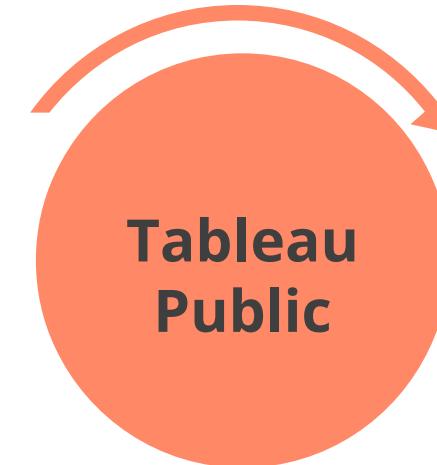
Interactive visualizations

# Tableau Public vs. Tableau Desktop

The functionality remains the same between Tableau Public and Tableau Desktop, but there are two major differences.



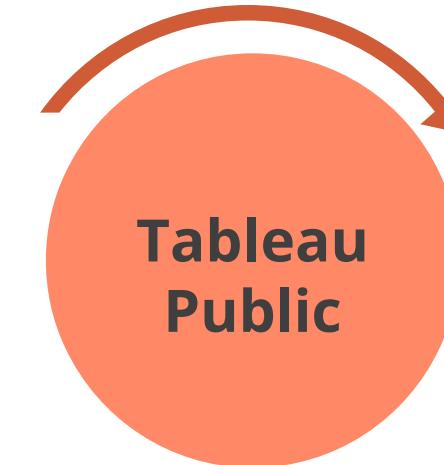
# Tableau Public vs. Tableau Desktop



Limited connectivity  
to the servers

Connection with more  
than 70+ databases

# Tableau Public vs. Tableau Desktop



The workbook cannot  
be saved locally.

The workbook can be  
saved locally.

## Download and Install Tableau Public

To download Tableau Public, use the following URL:

[public.tableau.com/en-us/s/download](http://public.tableau.com/en-us/s/download)

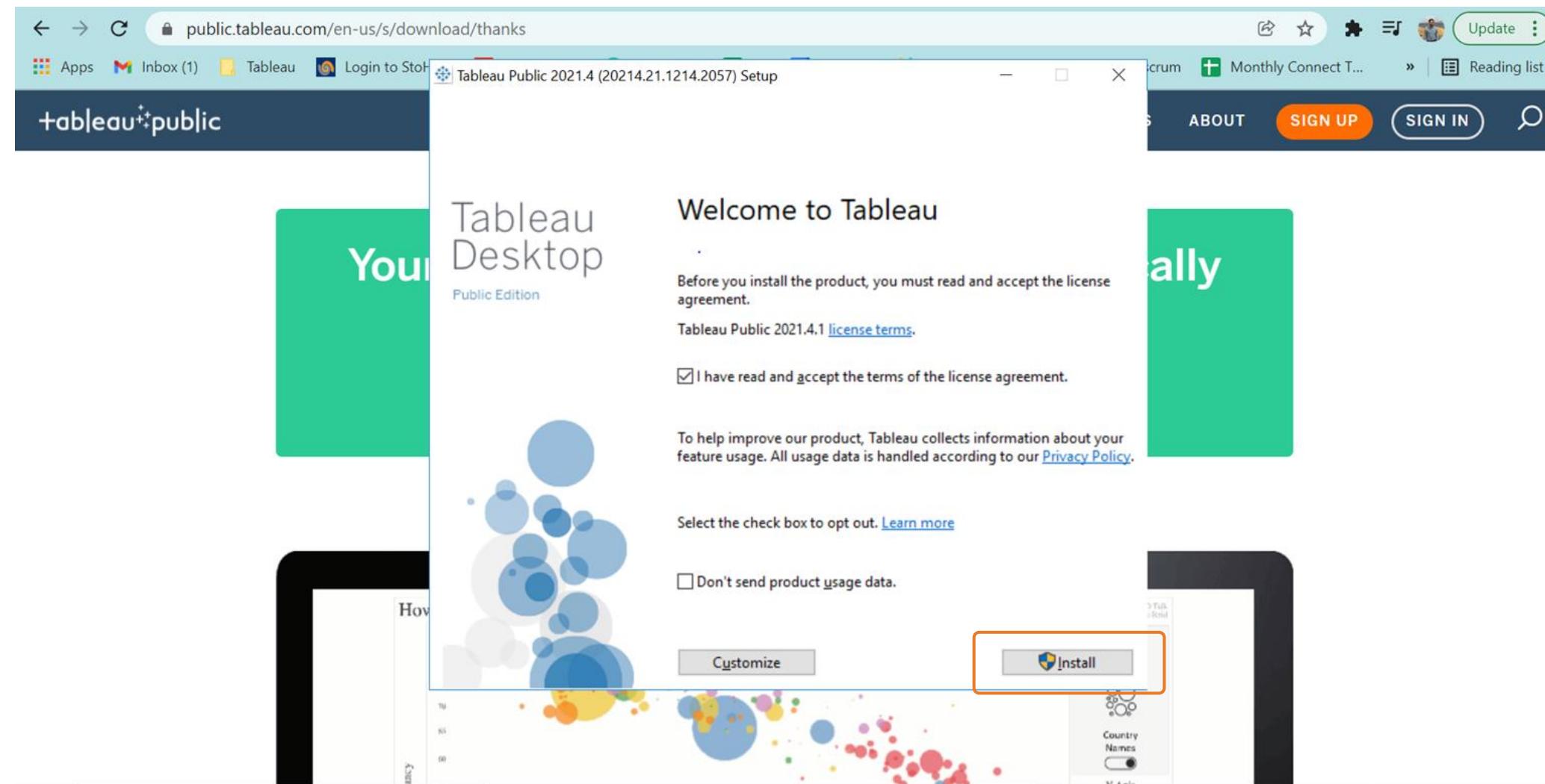
# Download and Install Tableau Public

Enter your email address and click on Download

The screenshot shows the Tableau Public homepage. At the top, there's a dark header with the Tableau Public logo, navigation links for DISCOVER, BLOG, RESOURCES, and ABOUT, and buttons for SIGN UP and SIGN IN. A magnifying glass icon is also present. Below the header, a large text area says "You'll be exploring in minutes" in bold. Underneath, a subtext reads: "Create interactive graphs, stunning maps, and live dashboards in minutes. Save your viz to your Tableau Public profile, and share it anywhere on the web. Anyone can do it, it's that easy—and it's free." Below this text are two buttons: a white one labeled "Enter your email address" and an orange one labeled "DOWNLOAD THE APP". At the bottom of the main content area, there's a note about "2021.4 Available for Windows and Mac" and a link to "System Requirements". On the right side of the page, there's a faint watermark of a person's arm and hand reaching out.

# Download and Install Tableau Public

Once the download is complete, open the file and click on Install



## Load Data from Excel

# Load Data from Excel



Tableau Public can load data from nine different data sources. Excel is one of them.

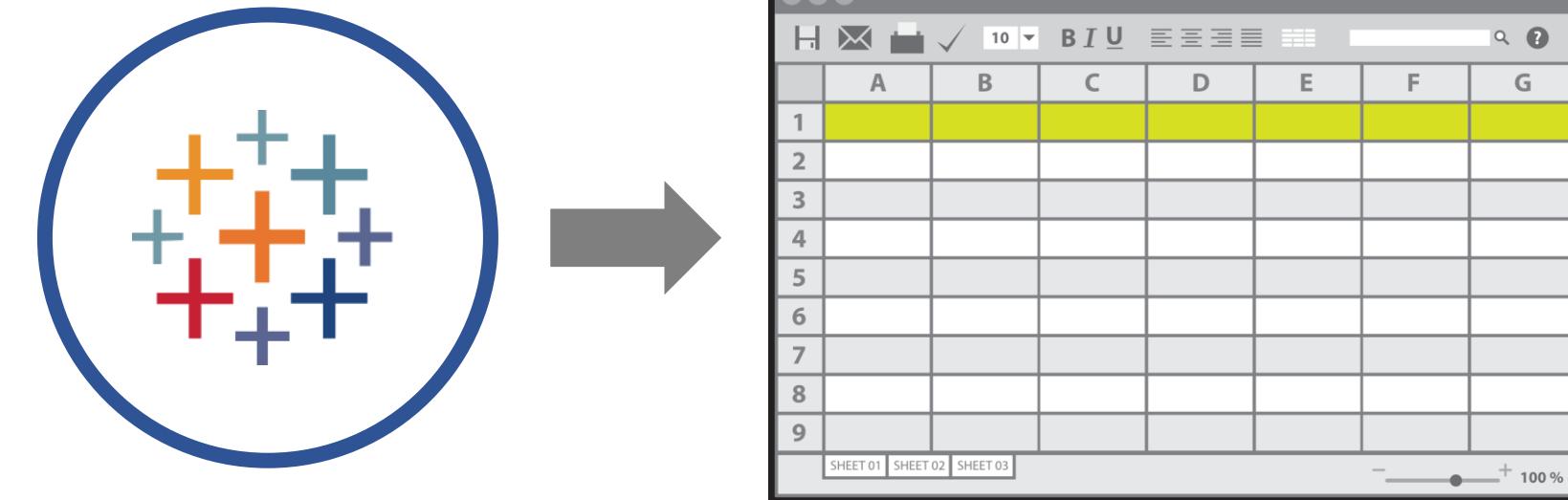


Tableau Desktop can load data from more than seventy-seven data sources.



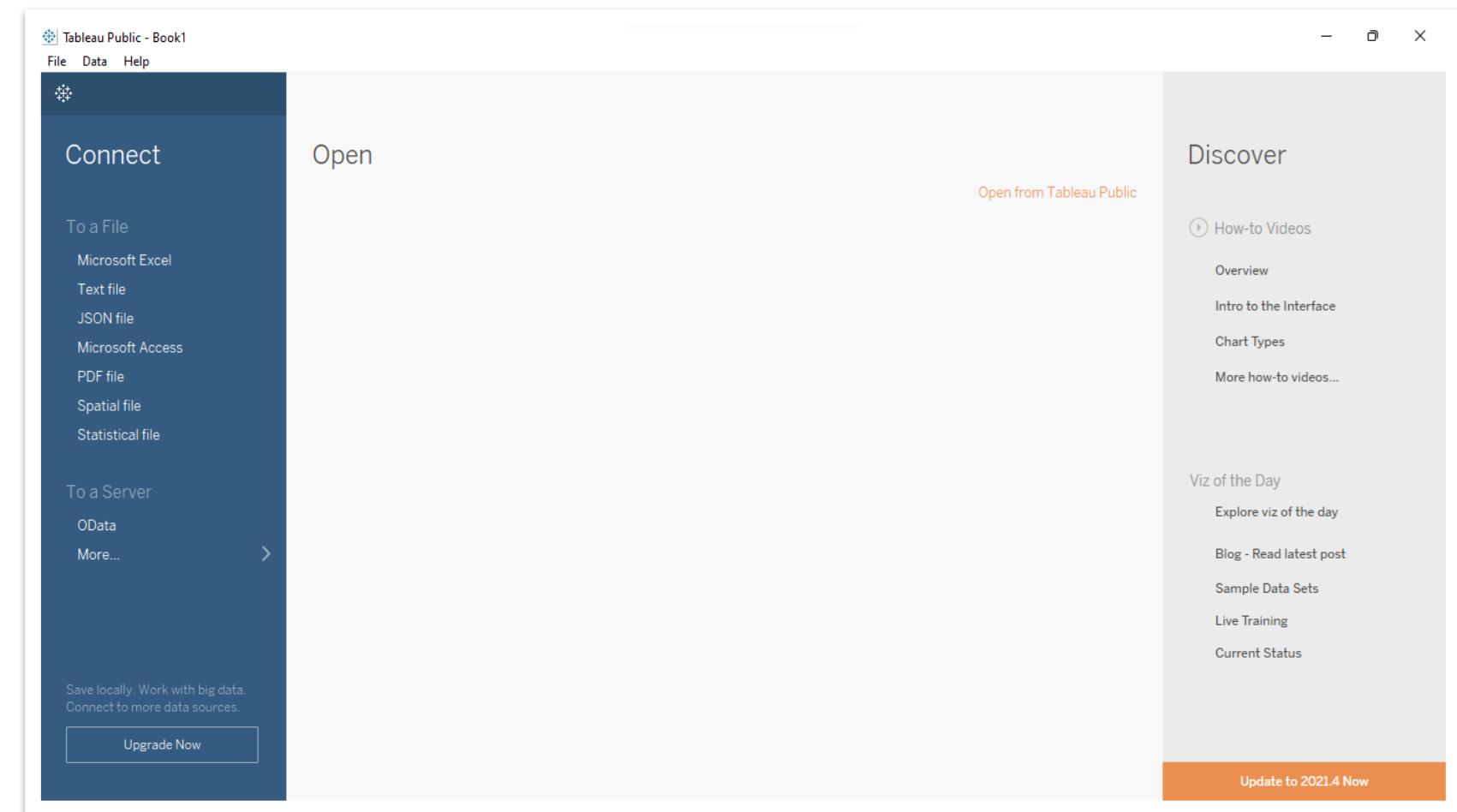
# Load Data from Excel

When Excel loads data, Tableau recognizes the column headers and sheets present in it.



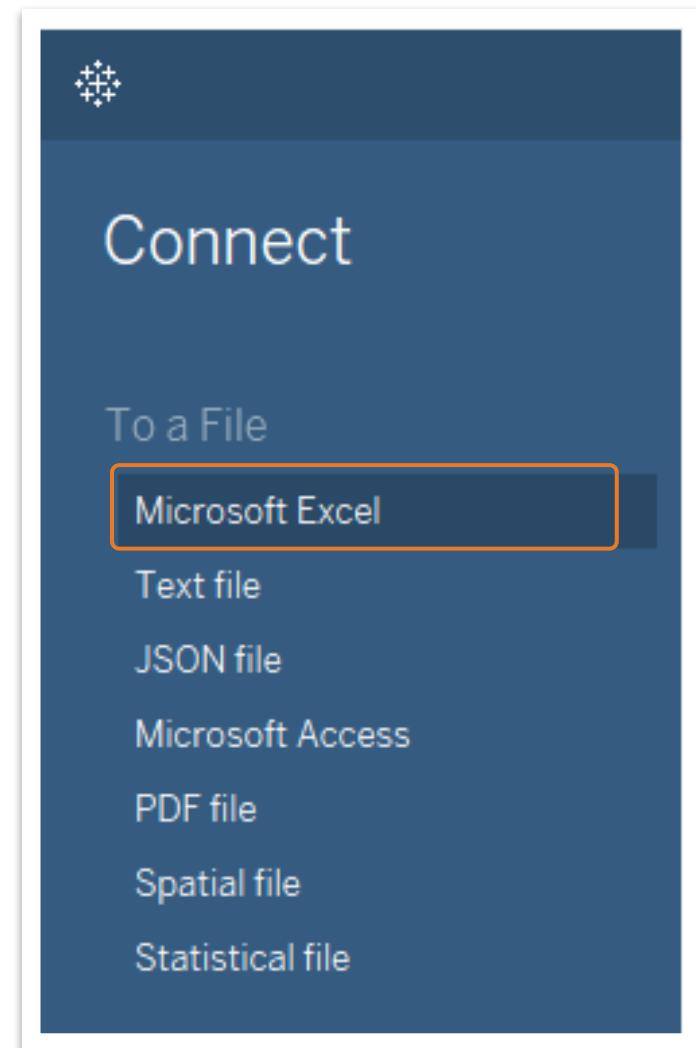
# Steps to Load Data from Excel

Open Tableau Public



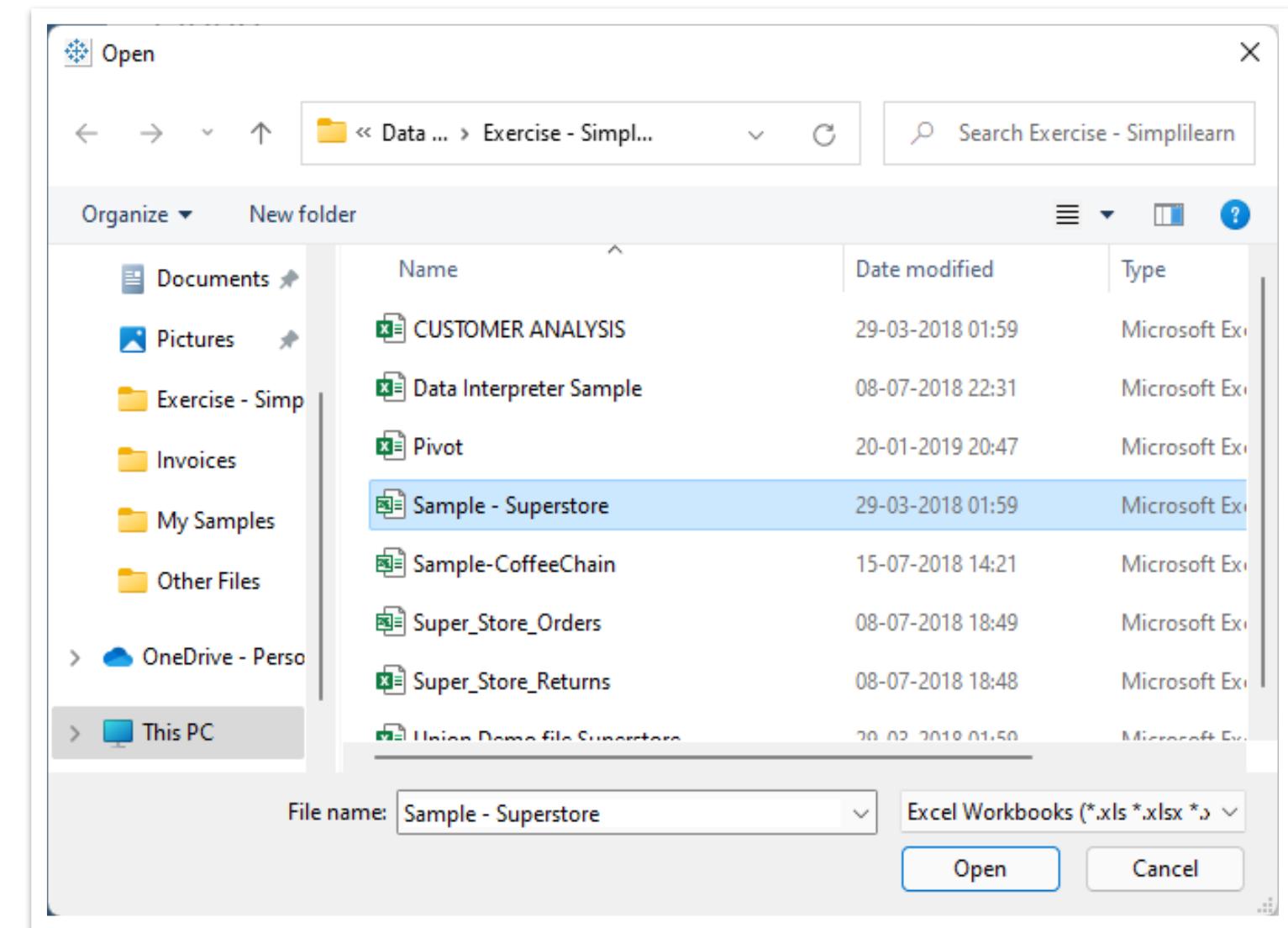
# Steps to Load Data from Excel

Select **Microsoft Excel** from the connect pane



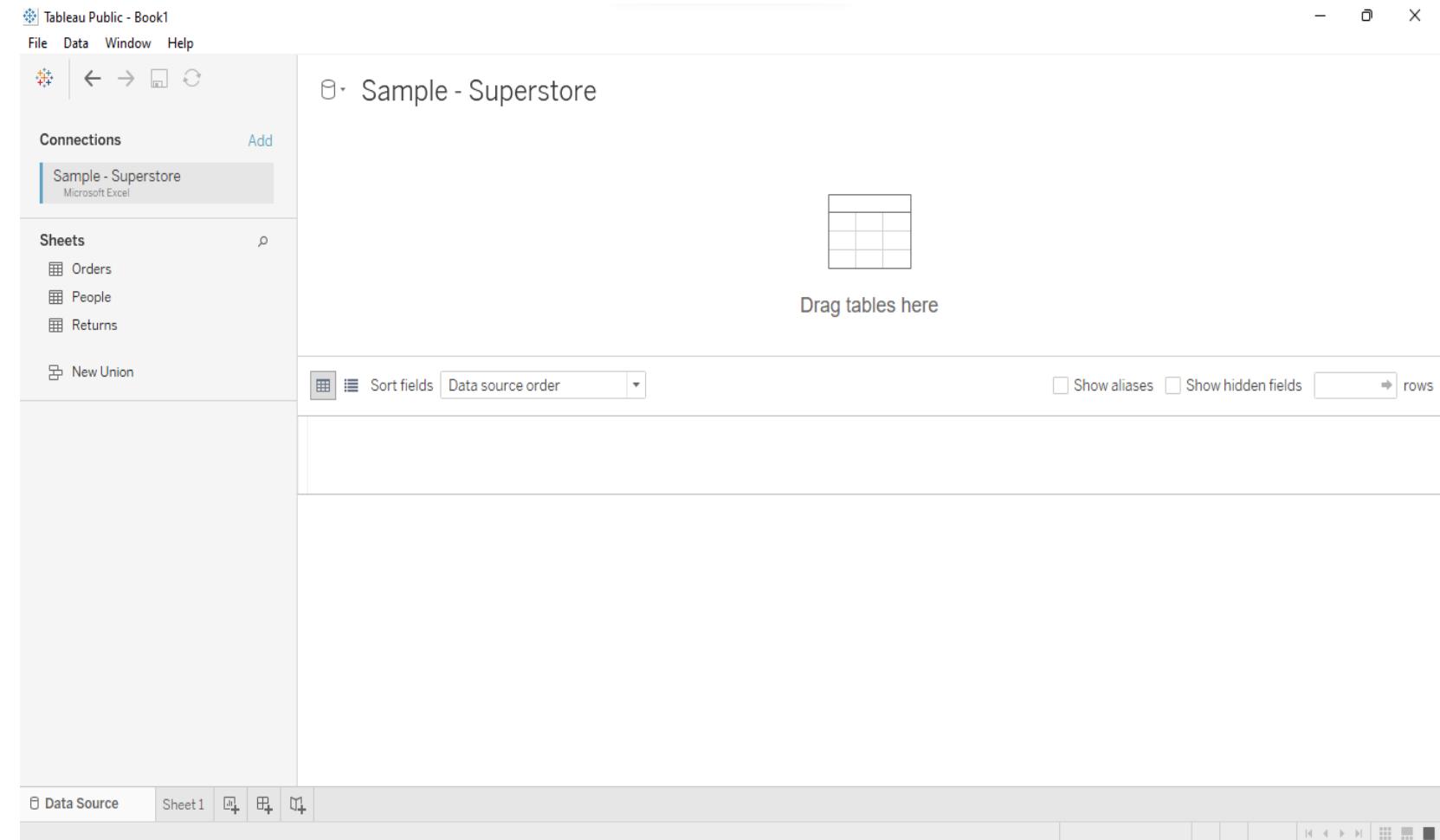
# Steps to Load Data from Excel

Browse and select the Excel file from local



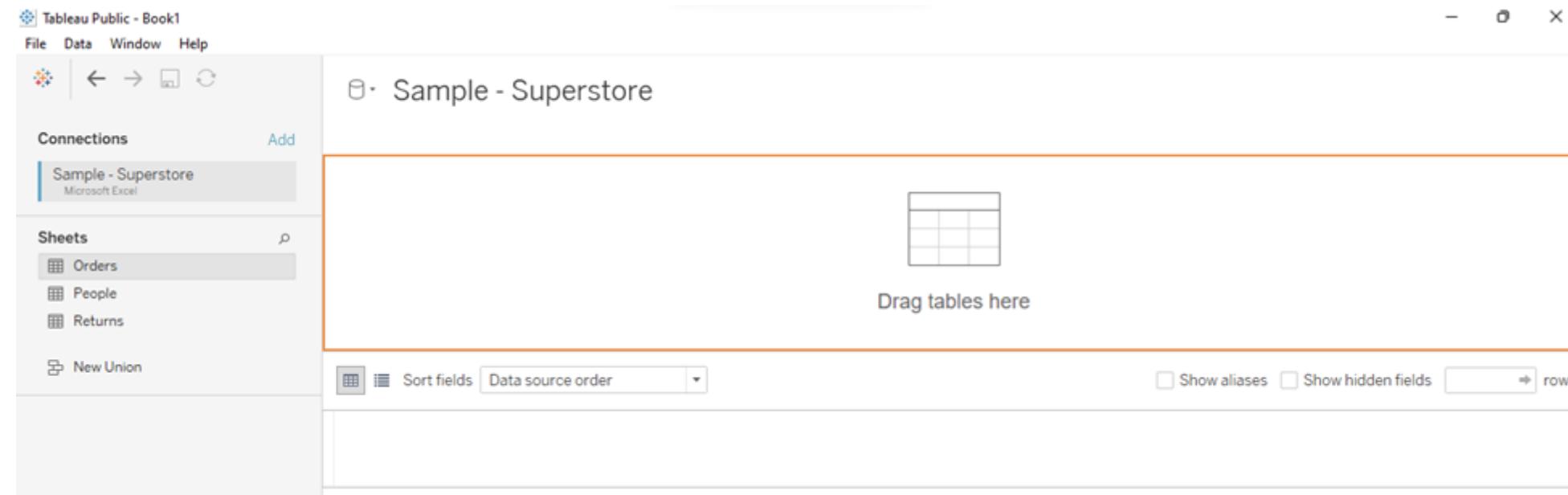
# Steps to Load Data from Excel

Data source will open



# Steps to Load Data from Excel

Drag the **Orders** table from the **Sheets** area and drop it into the highlighted Join area



# Steps to Load Data from Excel

This generates the preview and forms the base to create the visualizations

The screenshot shows the Tableau Public interface with the title "Tableau Public - Book1". In the top left, there's a "Connections" section with "Sample - Superstore Microsoft Excel" selected. To its right is a "Sheets" section listing "Orders", "People", and "Returns". Below these is a "New Union" section. The main workspace displays a preview of the "Orders" table under the heading "Orders (Sample - Superstore)". The preview includes a "Need more data?" message and a "Drag tables here to relate them. Learn more" link. At the bottom of the preview, there are sorting options ("Sort fields", "Data source order"), filtering checkboxes ("Show aliases", "Show hidden fields"), and a row limit input field ("1,000"). The actual data table has columns: Row ID, Order ID, Order Date, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, and Country. The first eight rows of data are visible. A "Go to Worksheet" button is located at the bottom left of the preview area. The bottom navigation bar shows "Data Source" and "Sheet1" (which is highlighted in orange), along with other worksheet icons.

#	Abc Orders Row ID	Abc Orders Order ID	Abc Orders Order Date	Abc Orders Ship Date	Abc Orders Ship Mode	Abc Orders Customer ID	Abc Orders Customer Name	Abc Orders Segment	Abc Orders Country
1	CA-2016-152156	08-11-2016	11-11-2016	Second Class	CG-12520	Claire Gute	Consumer	United States	
2	CA-2016-152156	08-11-2016	11-11-2016	Second Class	CG-12520	Claire Gute	Consumer	United States	
3	CA-2016-138688	12-06-2016	16-06-2016	Second Class	DV-13045	Darrin Van Huff	Corporate	United States	
4	US-2015-108966	11-10-2015	18-10-2015	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	
5	US-2015-108966	11-10-2015	18-10-2015	Standard Class	SO-20335	Sean O'Donnell	Consumer	United States	
6	CA-2014-115812	09-06-2014	14-06-2014	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	
7	CA-2014-115812	09-06-2014	14-06-2014	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	
8	CA-2014-115812	09-06-2014	14-06-2014	Standard Class	BH-11710	Brosina Hoffman	Consumer	United States	

## User Interface of Tableau

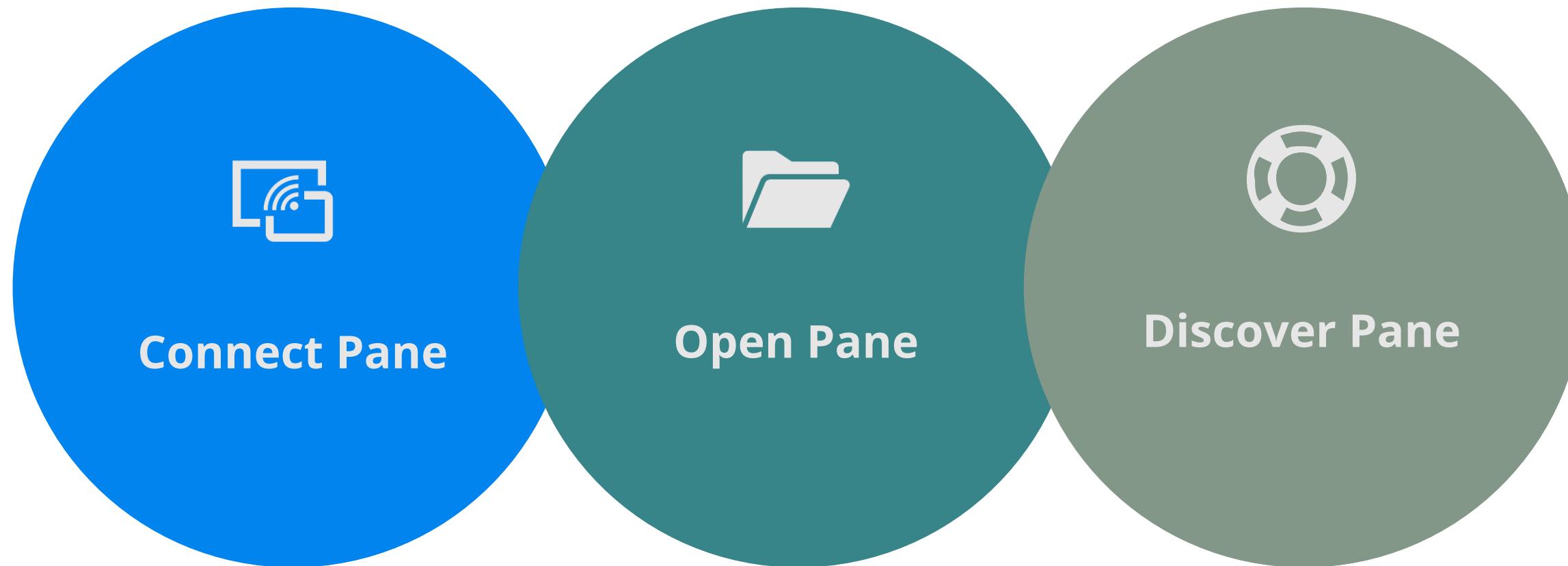
# User Interface of Tableau

Tableau user interface is simple compared to other business intelligence tools.



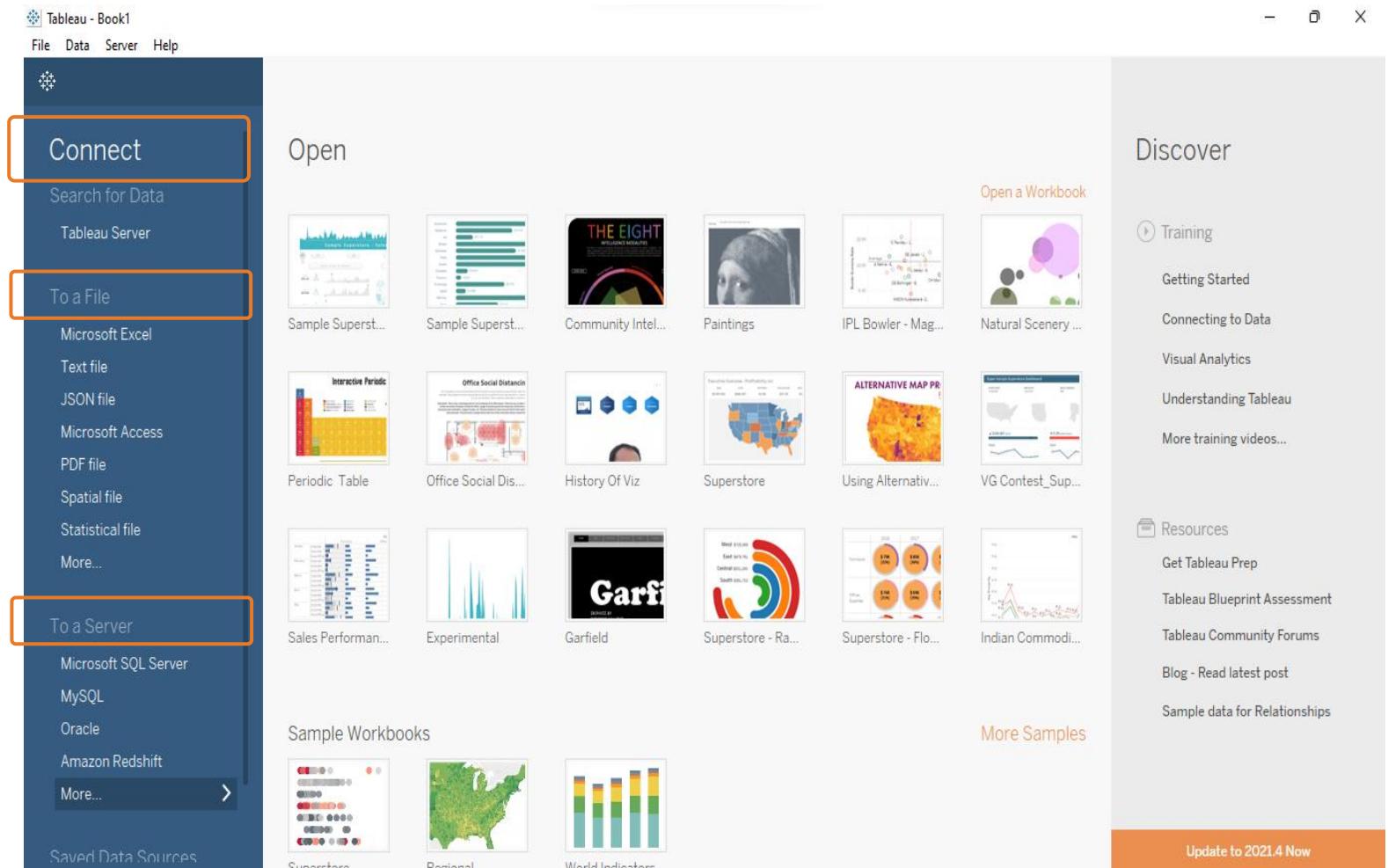
# User Interface of Tableau

After launching the Tableau window, the start page opens, which consists of three main components:



# Connect Pane

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



The different data sources are listed under **To a file** and **To a Server** category.

# Open Pane

The open pane shows the recently opened files along with sample dashboards if any.

Open

The Open pane displays a grid of sample dashboards and workbooks. The top row includes 'Sample Superstore', 'Sample Superstore', 'Community Intel...', 'Paintings', 'IPL Bowler - Mag...', and 'Natural Scenery ...'. The second row includes 'Periodic Table', 'Office Social Distanc...', 'History Of Viz', 'Superstore', 'Using Alternativ...', and 'VG Contest\_Sup...'. The third row includes 'Sales Performan...', 'Experimental', 'Garfield', 'Superstore - Ra...', 'Superstore - Flo...', and 'Indian Commodity...'. Below this grid are sections for 'Sample Workbooks' (Superstore, Regional, World Indicators) and a 'More Samples' button.

Open a Workbook

Sample Superstore Sample Superstore Community Intel... Paintings IPL Bowler - Mag... Natural Scenery ...

Periodic Table Office Social Distanc... History Of Viz Superstore Using Alternativ... VG Contest\_Sup...

Sales Performan... Experimental Garfield Superstore - Ra... Superstore - Flo... Indian Commodity...

Sample Workbooks

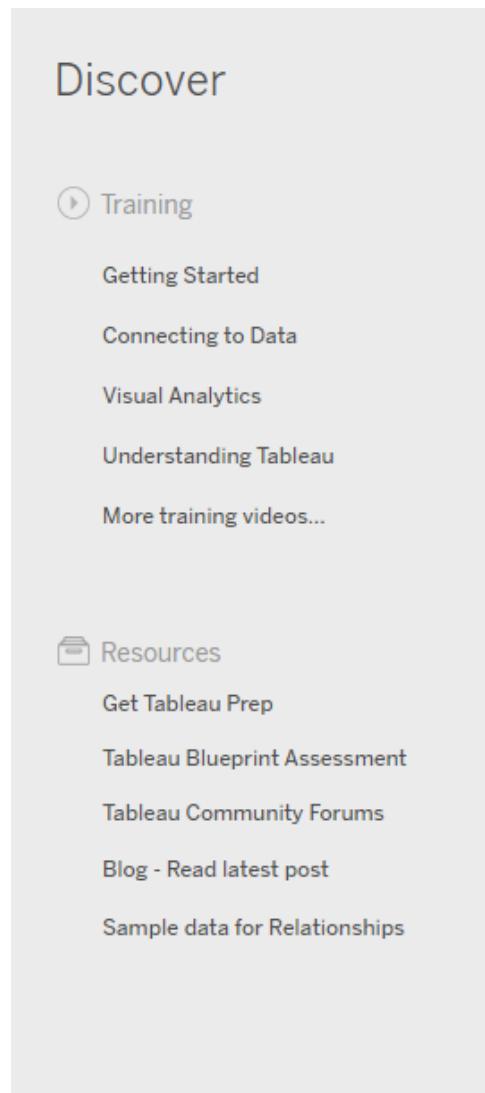
Superstore Regional World Indicators

More Samples

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

# Discover Pane

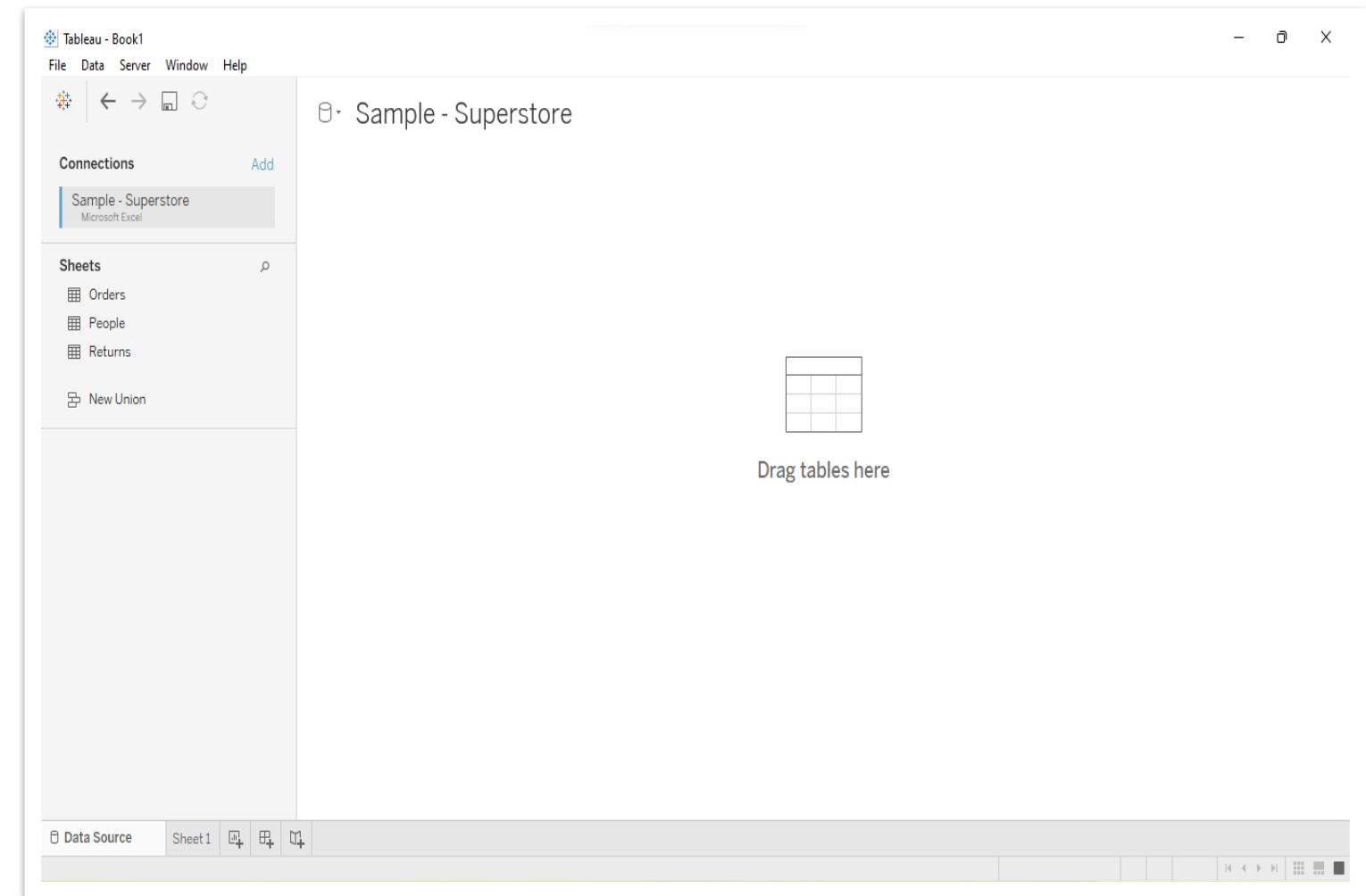
Discover pane helps one to connect with the Tableau community and access training videos and blogs.



- Here, it shows where the peer group is moving toward, what the latest trend is, and an option to update files, if any.
- For a beginner, this pane offers a variety of resources to scale up the skills.

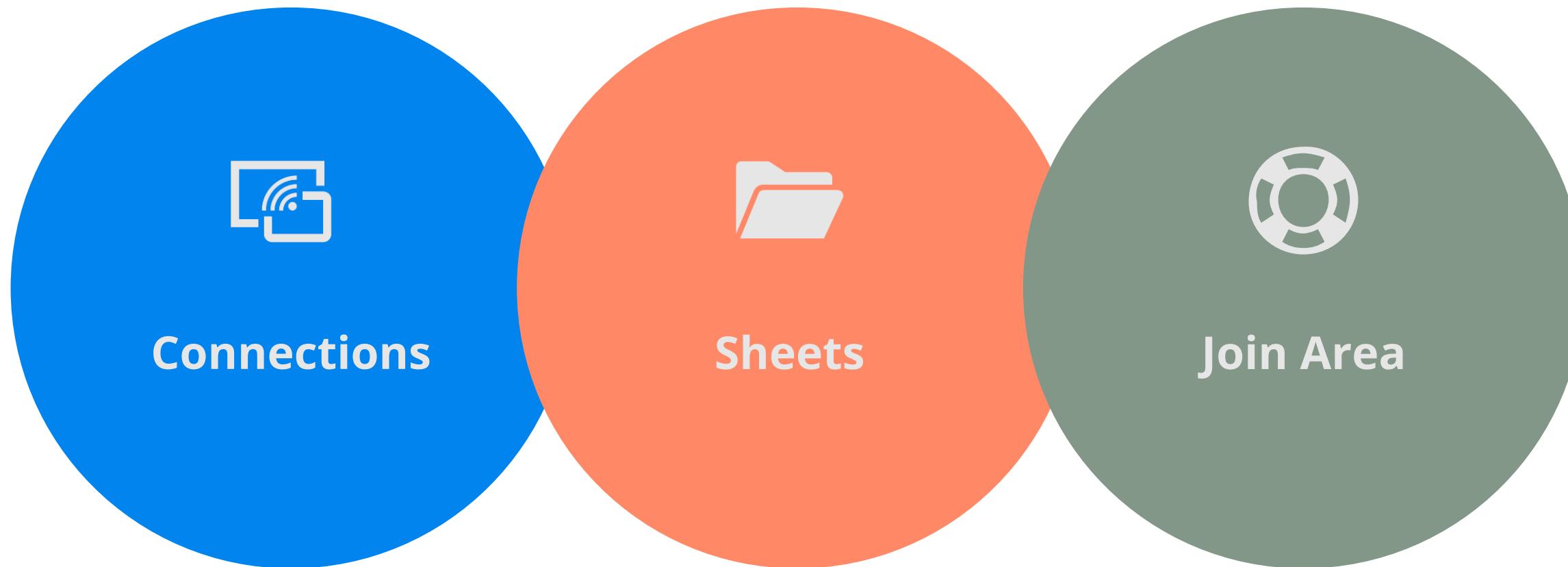
# Data Source Page

Once connected to the data source as mentioned in load data from an Excel file, it will redirect to the data source page.



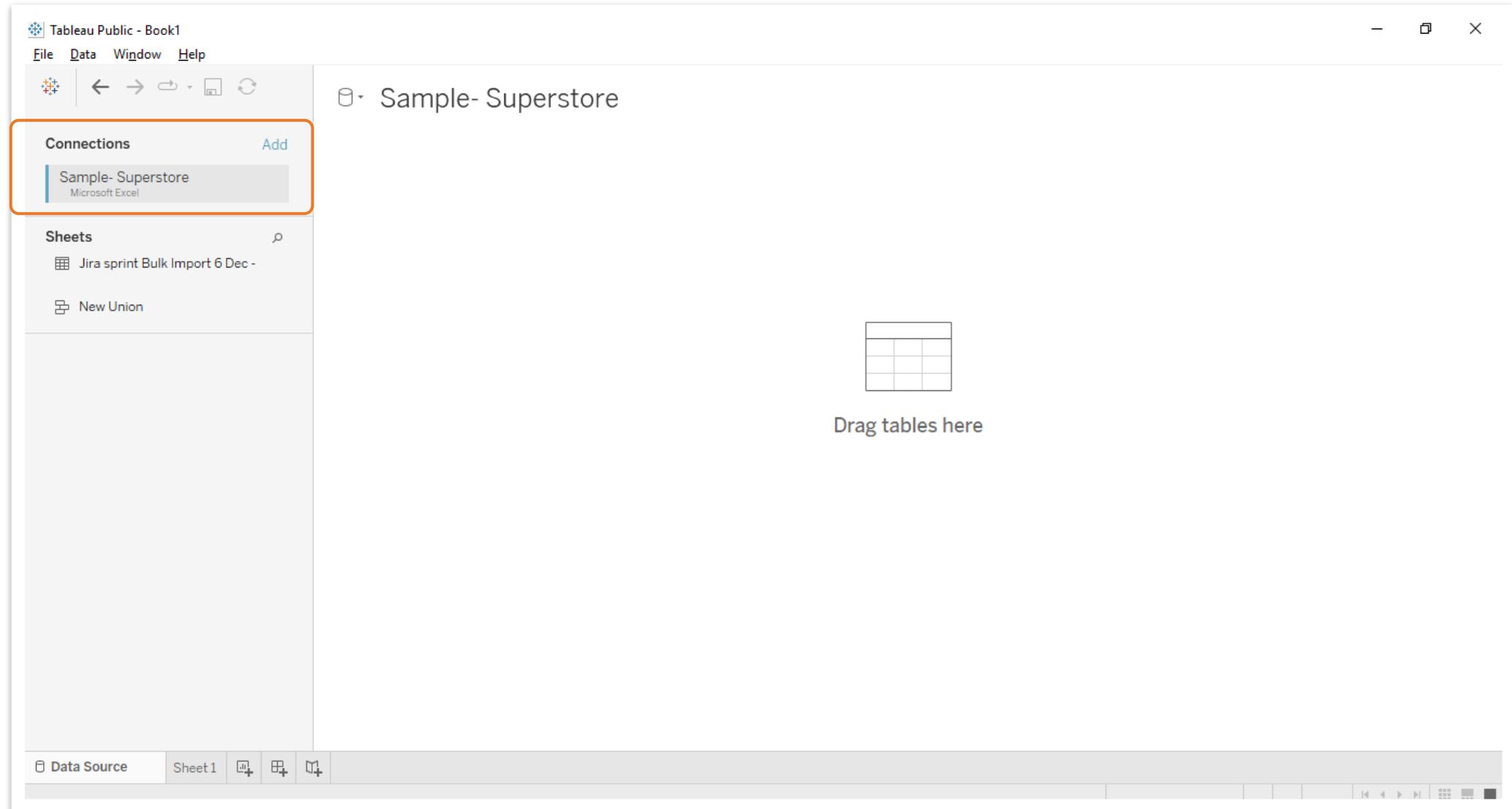
# Data Source Page

The data source page consists of three main components that are:



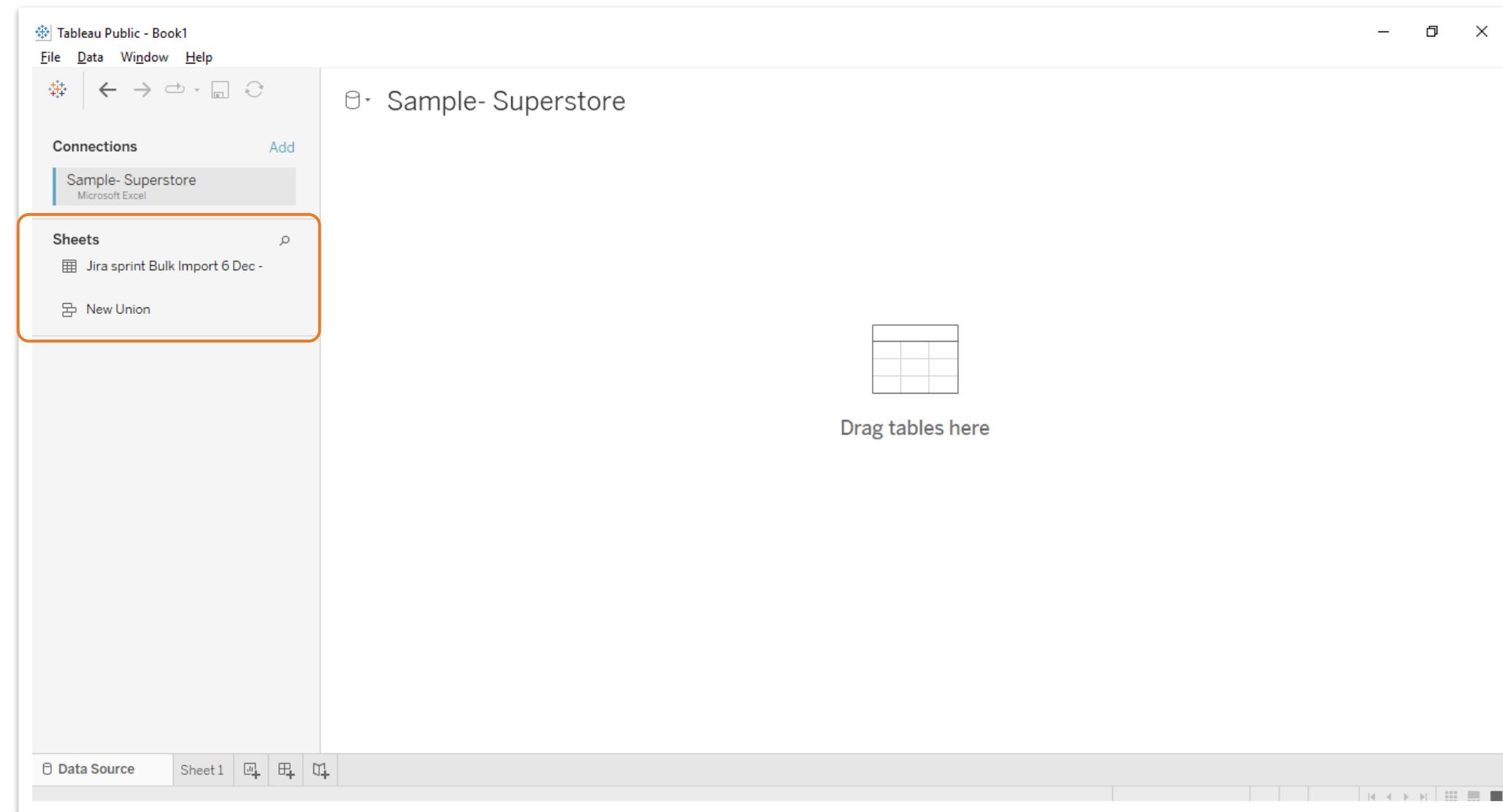
# Connections

Connections show the active connections to the Tableau workbook.



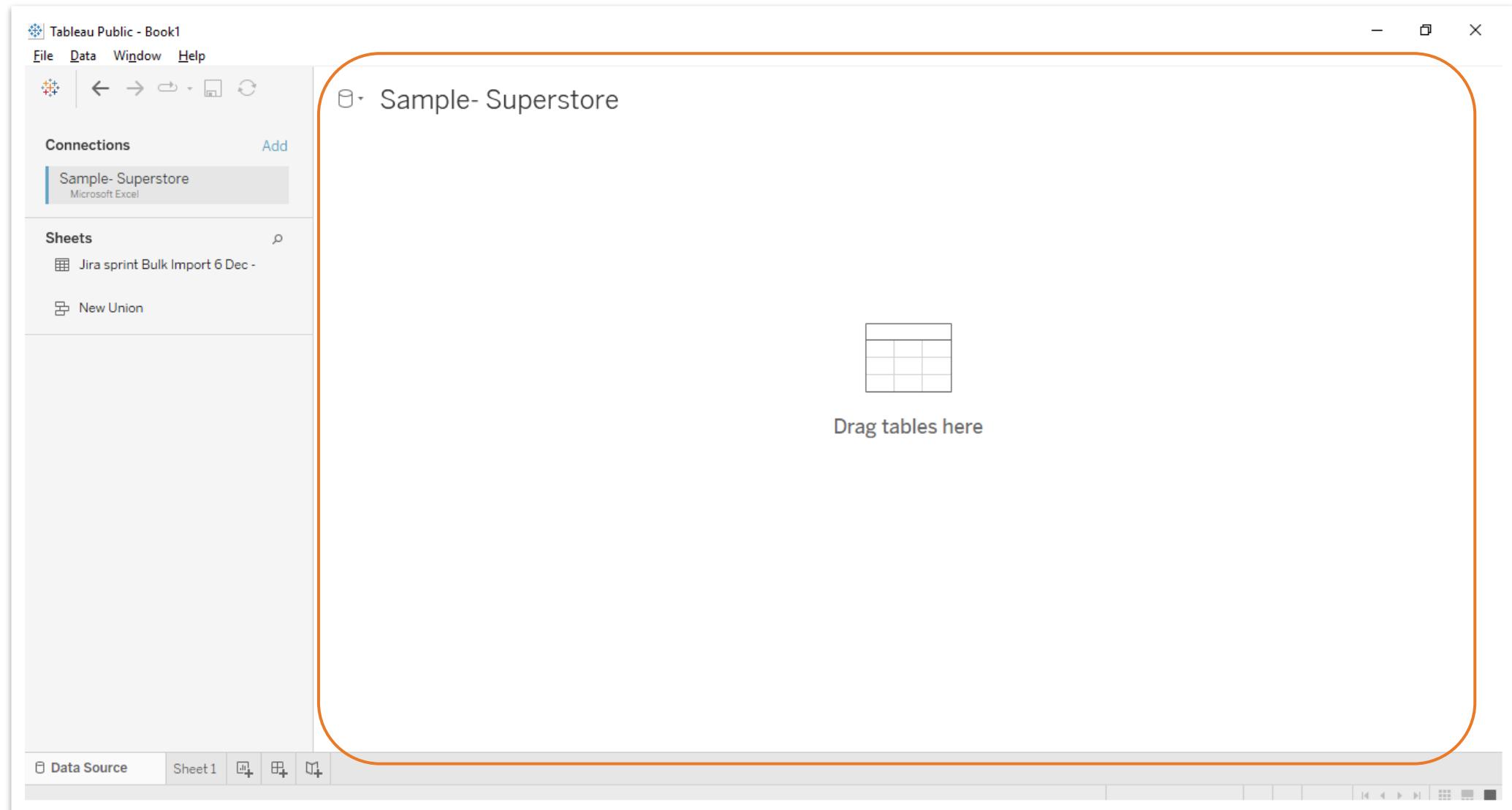
# Sheets

It lists the various tables/sheets in the active connections.



## Join Area

It is the place where one can drag and drop one or more tables for connection.



# Preview Pane

After drag and drop of any sheet into the join area, one can see the preview of the data in the preview pane below the join area.

The screenshot shows the Tableau Public interface with the following details:

- Top Bar:** Tableau Public - Book1, File, Data, Window, Help.
- Connections:** Sample - Superstore (Microsoft Excel).
- Sheets:** Orders (selected), People, Returns, New Union.
- Preview Area:** Shows the "Orders" sheet with a message: "Need more data? Drag tables here to relate them. [Learn more](#)".
- Bottom Panel:** Shows the "Orders" table with 21 fields and 9994 rows. A preview pane is displayed, highlighted with an orange rounded rectangle, showing the first few rows of data:

#	Abc Orders	Orders	Orders	Abc Orders	Abc Orders
Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID
1	CA-2016-152156	08-11-2016	11-11-2016	Second Class	CG-12520
2	CA-2016-152156	08-11-2016	11-11-2016	Second Class	CG-12520
3	CA-2016-138688	12-06-2016	16-06-2016	Second Class	DV-13045
4	US-2015-108966	11-10-2015	18-10-2015	Standard Class	SO-20335
5	US-2015-108966	11-10-2015	19-10-2015	Standard Class	SO-20335

# Metadata Area

The Metadata area lists all the field names from the table in row wise format to quickly edit the relevant attributes.

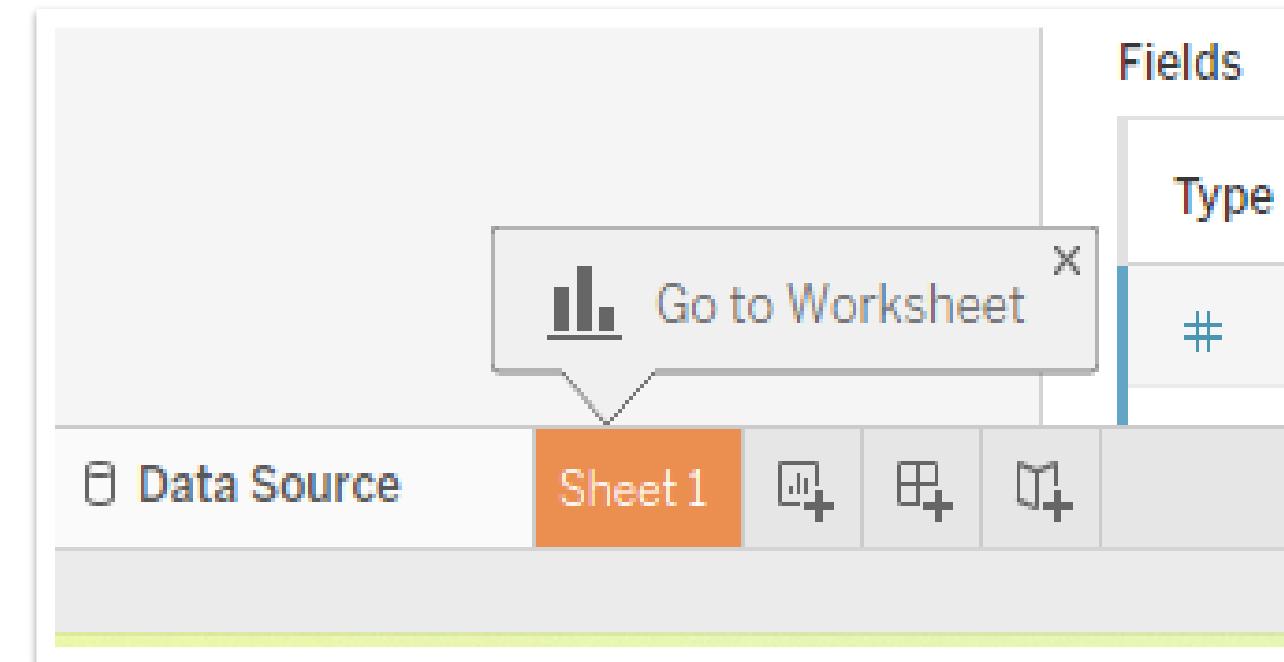
The screenshot shows the Tableau Public interface with the 'Orders' table selected from the 'Sample - Superstore' connection. A red box highlights the 'Fields' section on the left, which displays a table of field names, types, and physical tables. The main area shows the first five rows of the 'Orders' table.

#	Type	Field Name	Physical Table	Remote File...
1	#	Row ID	Orders	Row ID
2				
3				
4				

#	Abc Orders	Orders	Abc Orders	Abc Orders
Row ID	Order ID	Order Date	Ship Date	Ship Mode
1	CA-2016-152156	08-11-2016	11-11-2016	Second Class
2	CA-2016-152156	08-11-2016	11-11-2016	Second Class
3	CA-2016-138688	12-06-2016	16-06-2016	Second Class
4	US-2015-108966	11-10-2015	18-10-2015	Standard Class
5	US-2015-108966	11-10-2015	19-10-2015	Standard Class

# User Interface of Tableau

The Worksheet gets highlighted once the sheet is brought into the Join area.



# User Interface of Tableau

Click to navigate to the worksheet, which consists of:



Quick Access  
Toolbar



Data Pane



Pages



Filters



Marks



Rows and  
Columns Shelf



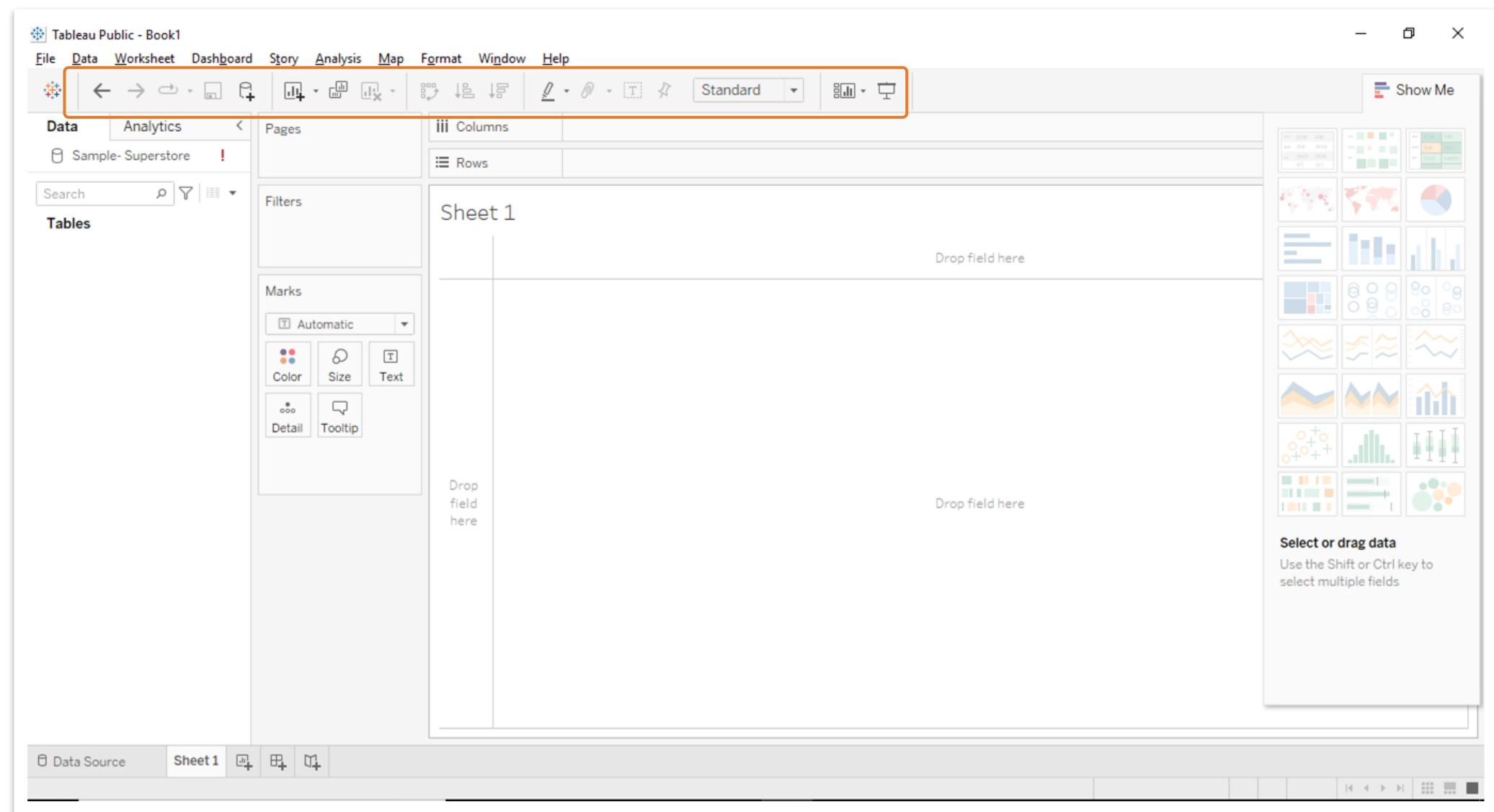
Canvas



Show Me

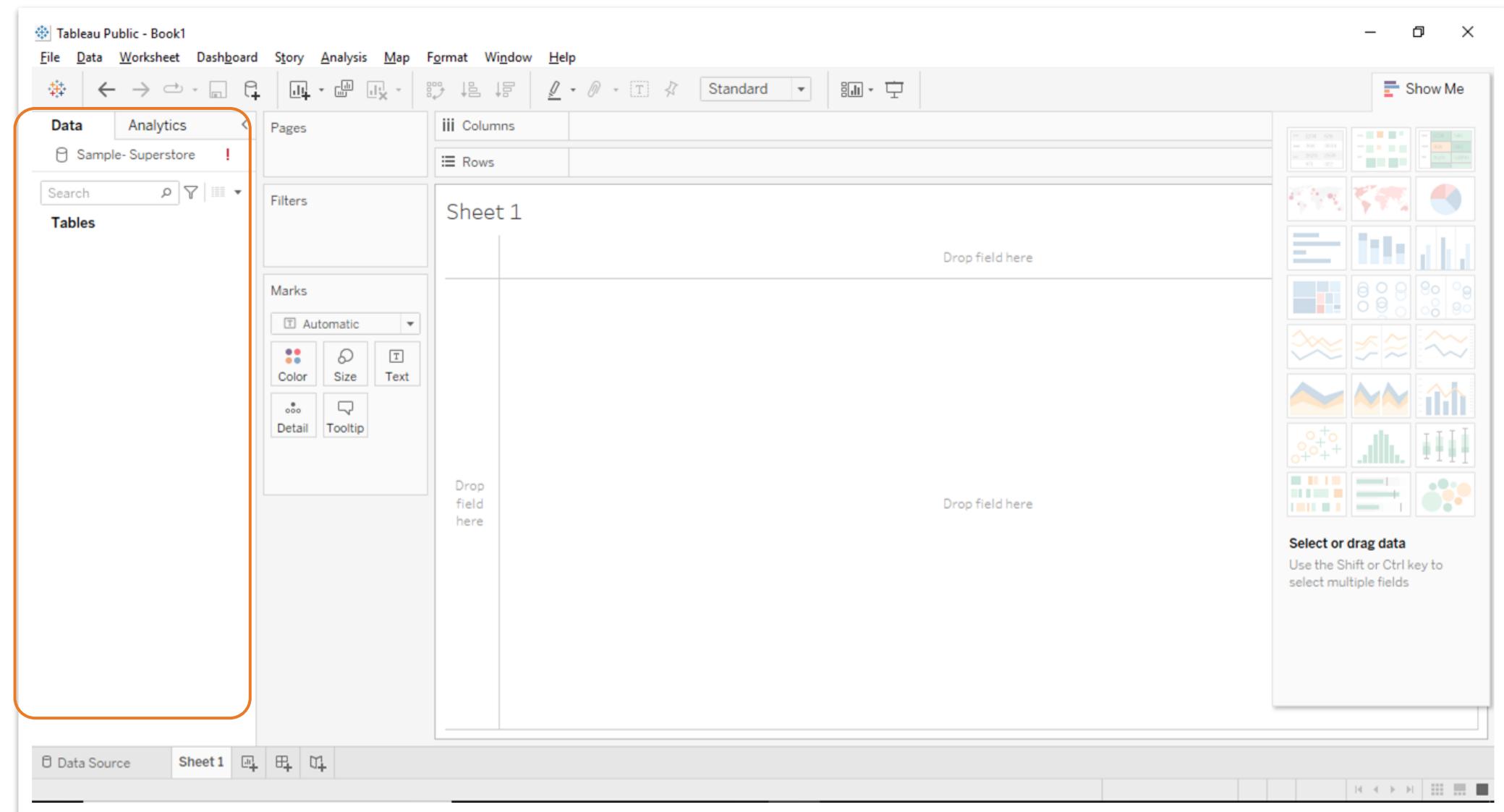
# Quick Access Toolbar

Quick access toolbar displays the most used tools for quicker access.



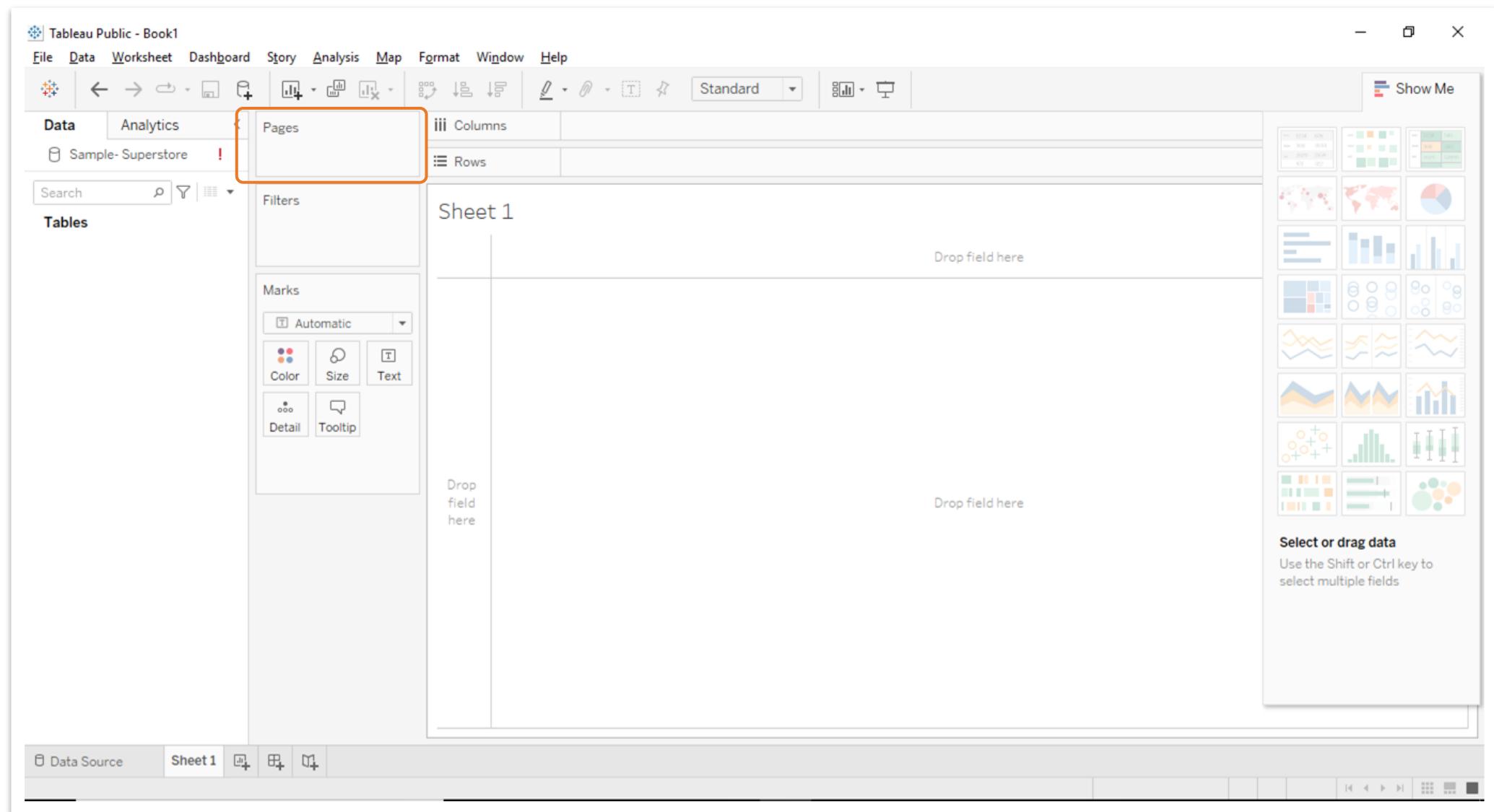
# Data Pane

It displays the data source that has been connected to and all the fields from the data.



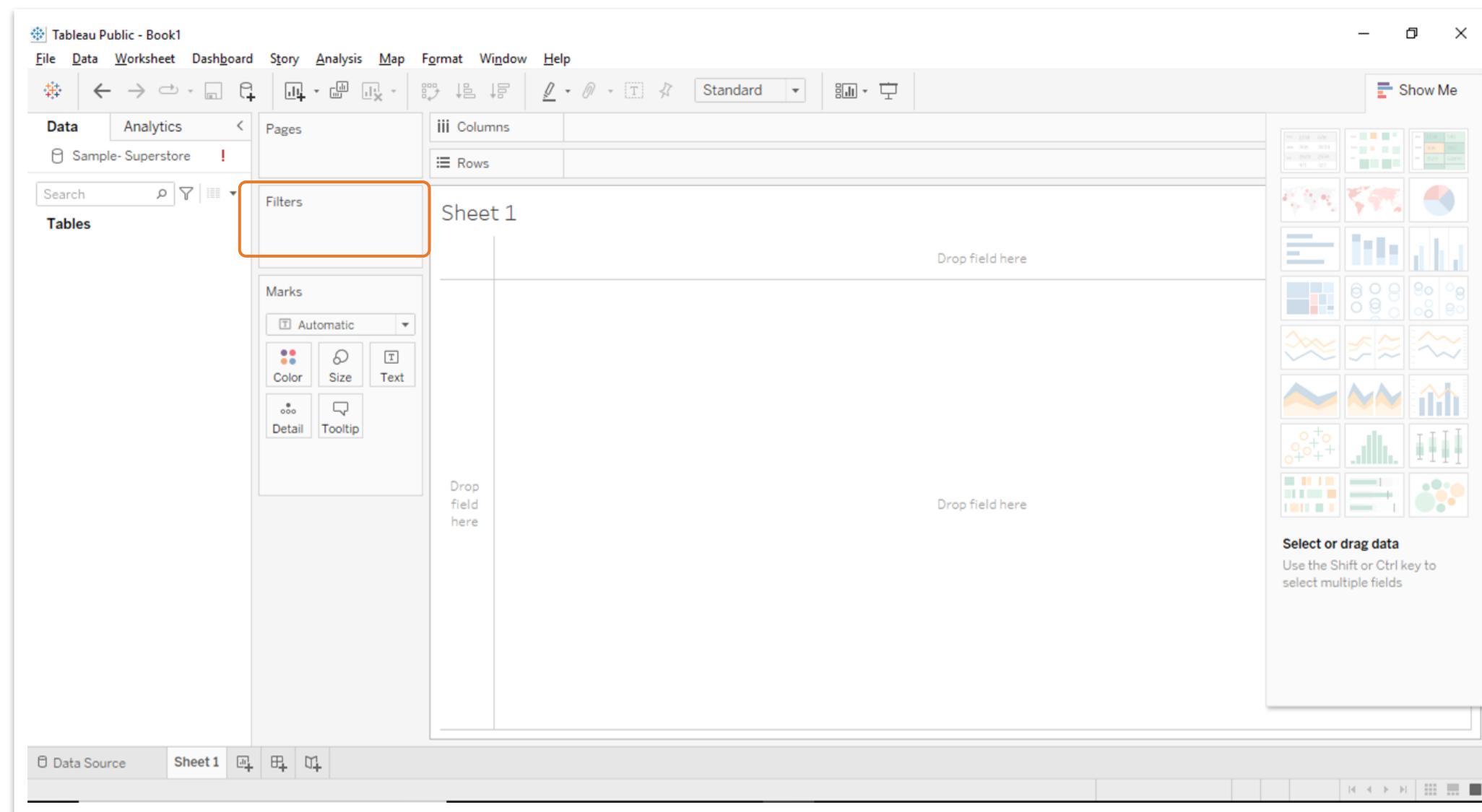
# Pages

Any field placed here creates a play axis.



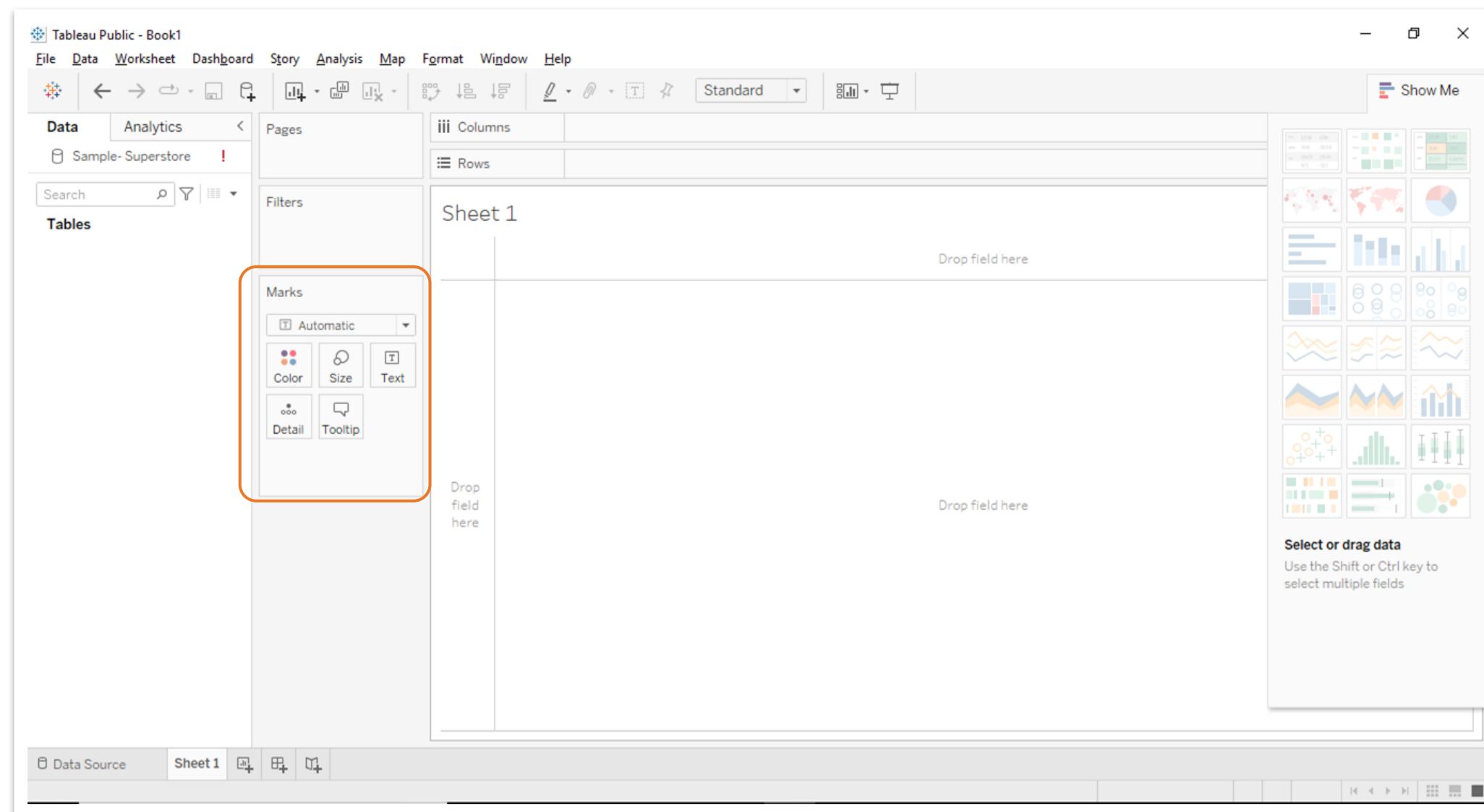
# Filters

Any filters to the visualization to be applied from here.



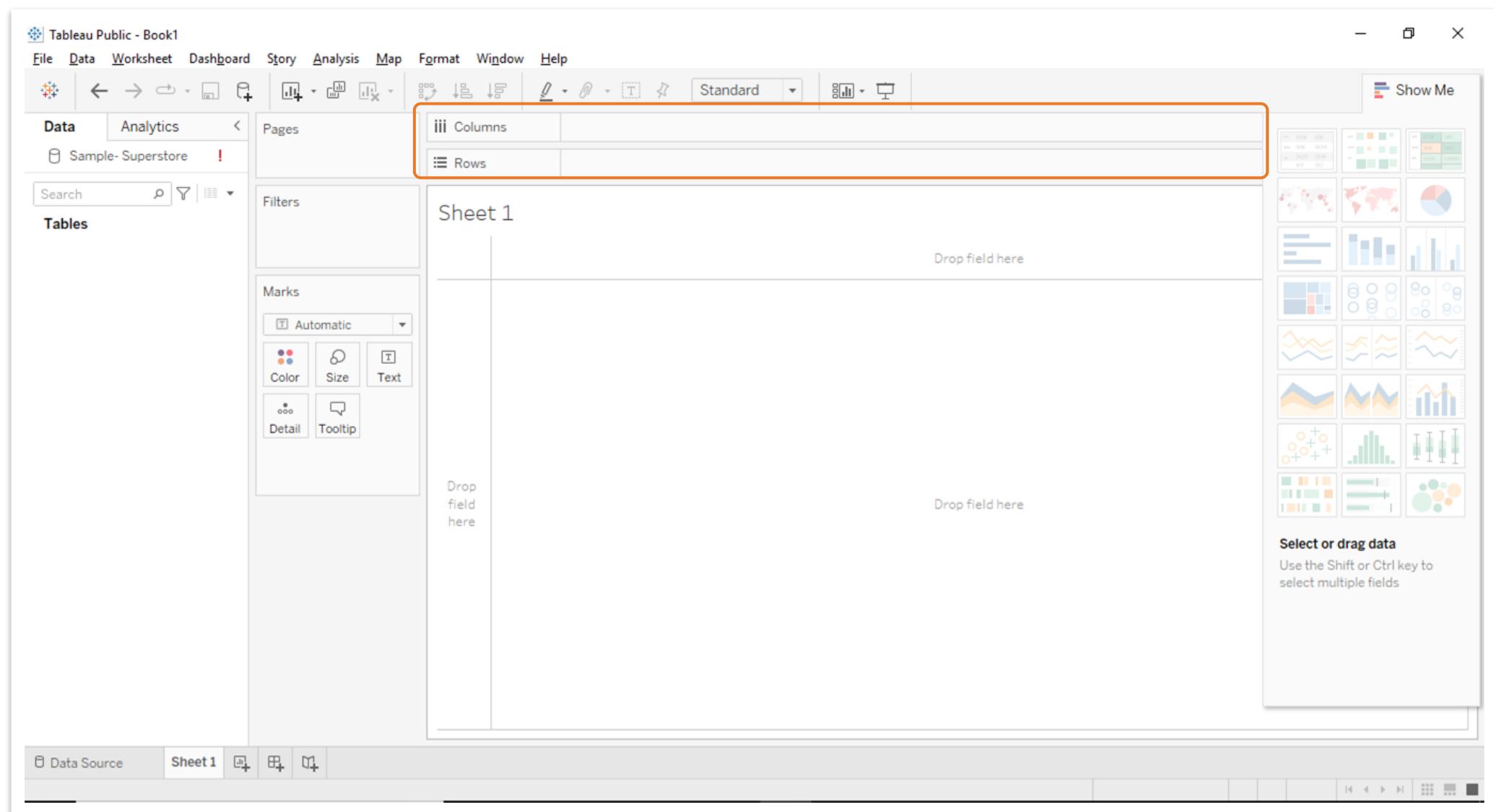
# Marks

This place is used to customize the visualizations such as color, size, and so on.



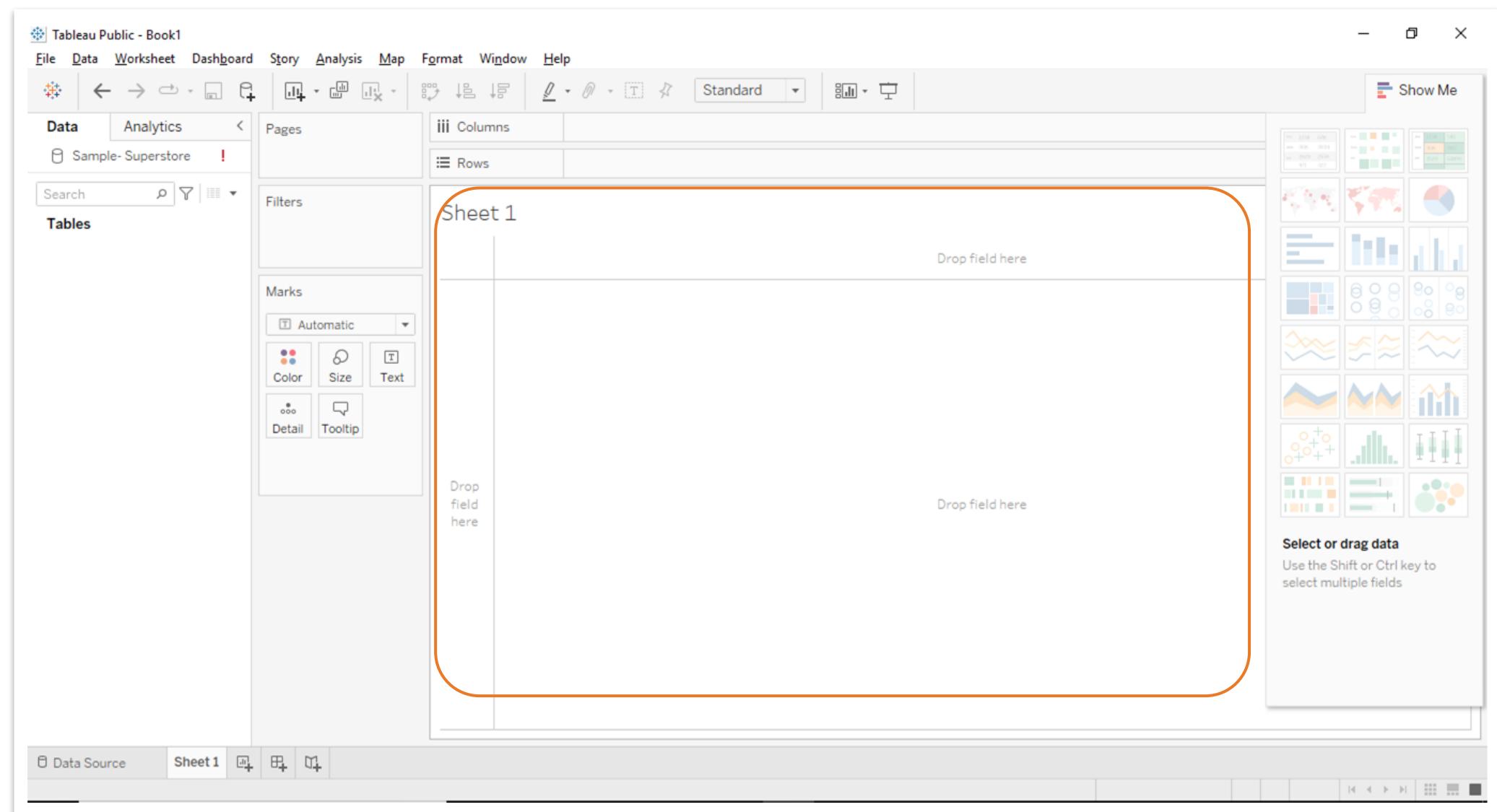
# Rows and Columns Shelf

The fields dropped here will create the headers and axis to the visualization.



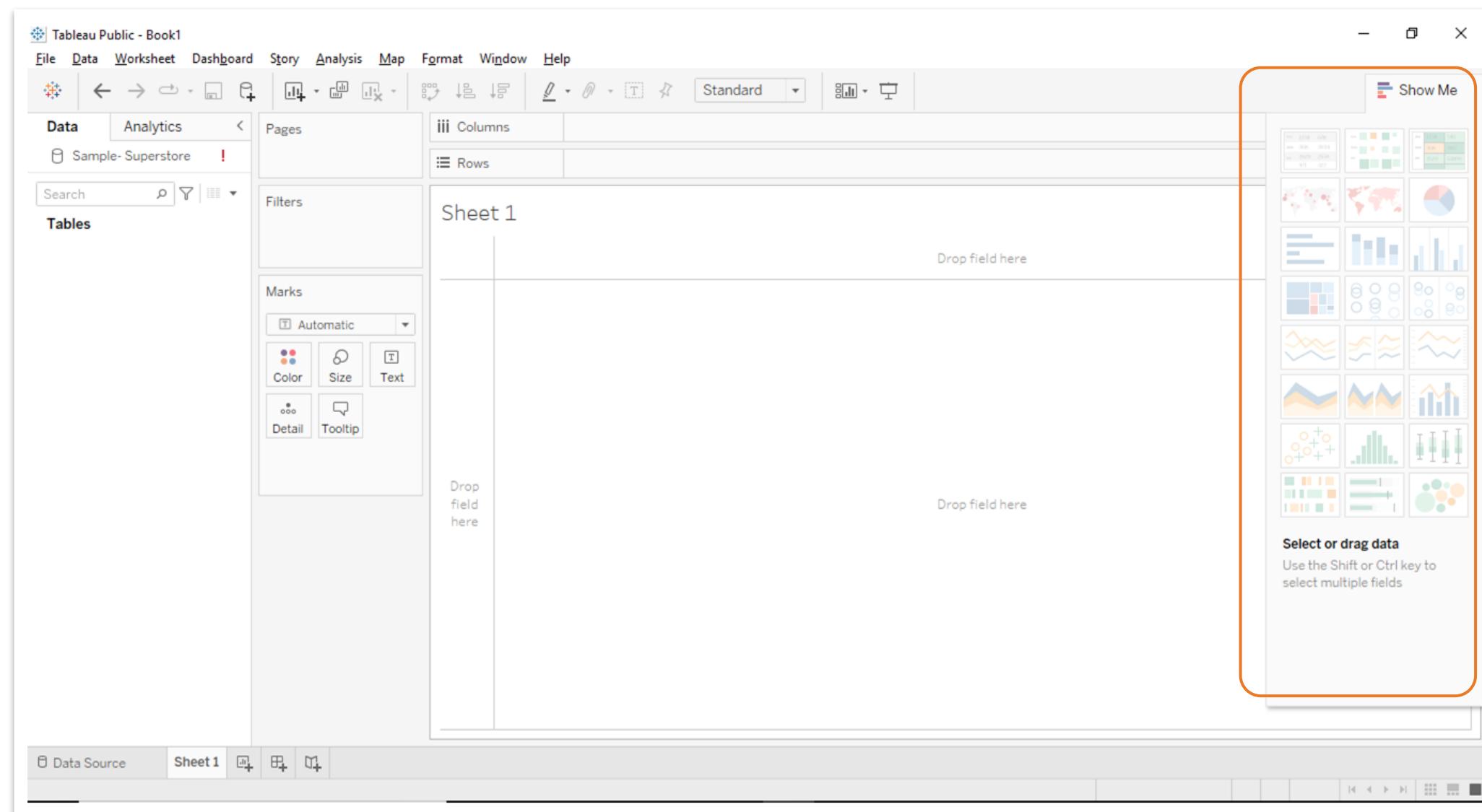
# Canvas

This is the actual area where the visualization is created and displayed.



# Show Me

This contains all the built-in charts and tables in Tableau and provides an easier way to create any visualization.



# Assisted Practice: Getting Started with Tableau



Duration: 20 minutes

## Problem statement:

Ray Hann, the sales supervisor of the retail industry, is expected to present a report to the senior sales managers every year to analyze sales achieved by categories and segments. He needs to develop a plan for showcasing sales across categories and segments across all the years.

ASSISTED PRACTICE

# Assisted Practice Guidelines



## Steps to follow:

- Step 1: Plot Sales against category, segment, and order date
- Step 2: Change the marks type to the line
- Step 3: Use color encoding at the yearly level

ASSISTED PRACTICE

## Key Takeaways

- Business Intelligence is a combination of business analytics, data mining, data visualization, data tools, and infrastructure.
- Data visualization is at the heart of business intelligence and data analytics tools.
- Tableau recognizes the column headers and sheets from Excel.
- Tableau's user interface is simple compared to other BI tools.





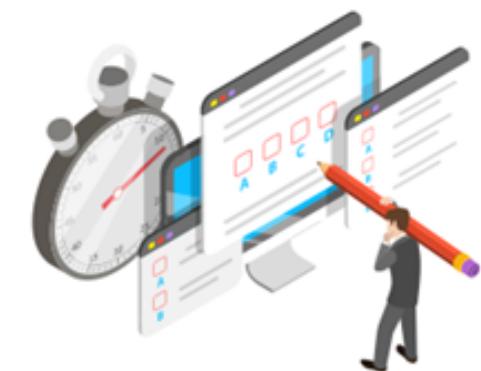
## Knowledge Check

**Knowledge  
Check**

1

**Business intelligence is a combination of \_\_\_\_\_**

- A. Business analytics, data mining, data visualization, data tools, and infrastructure
- B. Data mining, data tools, and infrastructure
- C. Business analytics, data mining, data visualization, and infrastructure
- D. Business analytics and infrastructure

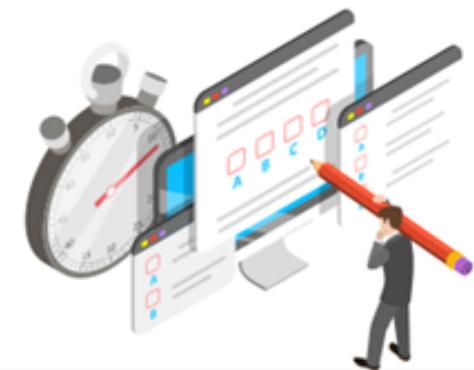


**Knowledge  
Check**

1

**Business intelligence is a combination of \_\_\_\_\_**

- A. Business analytics, data mining, data visualization, data tools, and infrastructure
- B. Data mining, data tools, and infrastructure
- C. Business analytics, data mining, data visualization, and infrastructure
- D. Business analytics and infrastructure



The correct answer is **A**

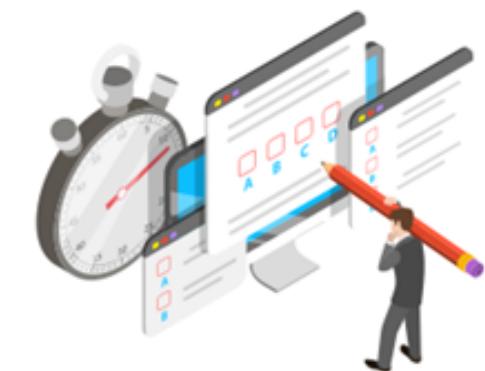
**Business intelligence is a combination of business analytics, data mining, data visualization, data tools, and infrastructure.**

## Knowledge Check

2

\_\_\_\_\_ is a graphical way of representing information and data.

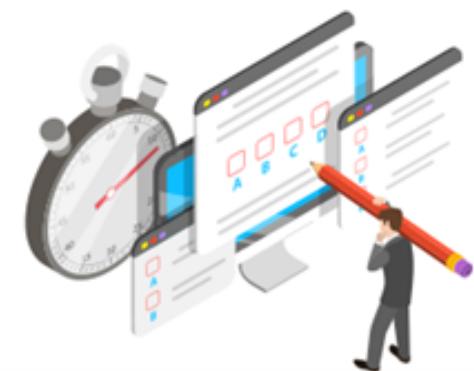
- A. Data pane
- B. Business intelligence
- C. Data visualization
- D. Tableau public



**Knowledge  
Check  
2**

\_\_\_\_\_ is a graphical way of representing information and data.

- A. Data pane
- B. Business intelligence
- C. Data visualization
- D. Tableau public



The correct answer is **C**

**Data visualization is a graphical way of representing information and data. It uses pictures to represent data.**

**Knowledge  
Check**  
**3**

**Which of the following is NOT an advantage of business intelligence?**

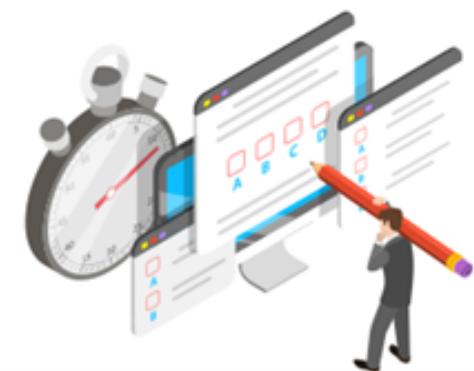
- A. It enables better decision-making.
- B. It provides the right information to the right people.
- C. It showcases insights through pictorial representation.
- D. It enables batch processing.



**Knowledge  
Check  
3**

**Which of the following is NOT an advantage of business intelligence?**

- A. It enables better decision-making.
- B. It provides the right information to the right people.
- C. It showcases insights through pictorial representation.
- D. It enables batch processing.



The correct answer is **D**

**Business intelligence involves delivering the right information to the right people at the right time to enable better decision-making.**

**Knowledge  
Check**

**4**

**Which of the following is NOT a part of the Tableau worksheet?**

- A. Sheets
- B. Data pane
- C. Quick access toolbar
- D. Show me

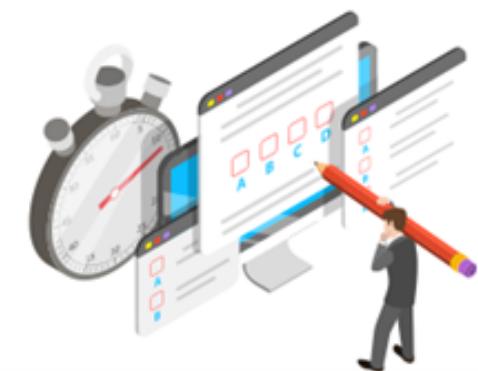


**Knowledge  
Check**

**4**

**Which of the following is NOT a part of the Tableau worksheet?**

- A. Sheets
- B. Data pane
- C. Quick access toolbar
- D. Show me



The correct answer is **A**

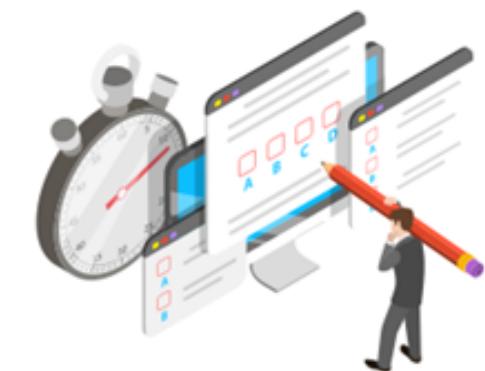
**Sheets are a part of the data source page, not the Tableau worksheet.**

## Knowledge Check

5

**\_\_\_\_\_ helps one to connect with the Tableau community.**

- A. Open pane
- B. Discover pane
- C. Data pane
- D. Metadata

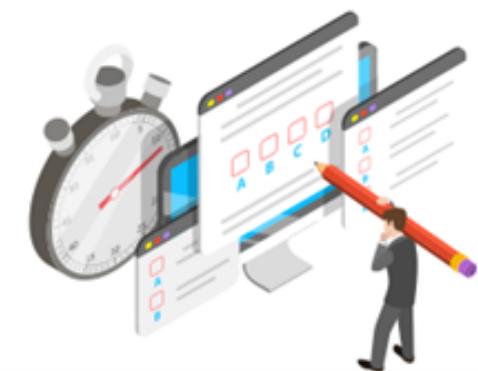


## Knowledge Check

5

\_\_\_\_\_ helps one to connect with the Tableau community.

- A. Open pane
- B. Discover pane
- C. Data pane
- D. Metadata



The correct answer is **B**

**The discover pane helps one to connect with the Tableau community, access training videos, and blogs.**