**INTRODUCTION OF TABLEAU**

Tableau is a Business Intelligence tool for visually analyzing the data. Users can create and distribute an interactive and shareable dashboard, which depict the trends, variations, and density of the data in the form of graphs and charts. Tableau can connect to files, relational and Big Data sources to acquire and process data. The software allows data blending and real-time collaboration, which makes it very unique. It is used by businesses, academic researchers, and many government organizations for visual data analysis.

**Tableau Features**

Tableau provides solutions for all kinds of industries, departments, and data environments. Following are some unique features which enable Tableau to handle diverse scenarios.

* **Speed of Analysis** − As it does not require high level of programming expertise, any user with access to data can start using it to derive value from the data.
* **Self-Reliant** − Tableau does not need a complex software setup. The desktop version which is used by most users is easily installed and contains all the features needed to start and complete data analysis.
* **Visual Discovery** − The user explores and analyzes the data by using visual tools like colors, trend lines, charts, and graphs. There is very little script to be written as nearly everything is done by drag and drop.
* **Blend Diverse Data Sets** − Tableau allows you to blend different relational, semistructured and raw data sources in real time, without expensive up-front integration costs. The users dont need to know the details of how data is stored.
* **Architecture Agnostic** − Tableau works in all kinds of devices where data flows. Hence, the user need not worry about specific hardware or software requirements to use Tableau.
* **Real-Time Collaboration** − Tableau can filter, sort, and discuss data on the fly and embed a live dashboard in portals like SharePoint site or Salesforce. You can save your view of data and allow colleagues to subscribe to your interactive dashboards so they see the very latest data just by refreshing their web browser.
* **Centralized Data** − Tableau server provides a centralized location to manage all of the organizations published data sources. You can delete, change permissions, add tags, and manage schedules in one convenient location. Its easy to schedule extract refreshes and manage them in the data server. Administrators can centrally define a schedule for extracts on the server for both incremental and full refreshes.

**THE TABLE BELOW SHOWS THE APPROPRIATE APPLICATIONS OF THE POPULAR VISUALS:**

|  |  |
| --- | --- |
| Visualization | Application |
| Line Graph | Mainly used for continuous dimensions |
| Bar Graph | Used when the dimension is not continuous |
| Dual Axis Graph | Used to present two different variables or measures together |
| Geographical Graph | Used to measure the sales and other plots on geographical maps |
| Area Graph | Used to compare the measures |
| TreeMap | Used to present the quantities in nested rectangles |
| Heat Map | Used for measuring the variations across various categories |

**Tableau Charts**

[Data scientists](https://intellipaat.com/blog/what-does-data-scientist-do/) utilize Tableau to craft dynamic and engaging reports that are easily understandable by almost anyone. With its variety of charts, graphs, and maps for analyzing business data analysis purposes; Tableau charts help visualize data according to requirements while simultaneously presenting it.

**BELOW IS THE SELECTION OF TABLEAU DESKTOP CHARTS AVAILABLE:**

* Text Label: These charts allow for creating crosstabs or Pivot data by placing dimensions into columns and rows respectively, whilst Heat Maps show data in tabular format using various colors.
* Highlight Table: Highlight tables are used to visually display categorization using color. Symbol Maps: Used to visualize geographical data using bubbles. Maps: Visualizing geographical data displayed on maps.
* Pie Chart: Used to represent data with multiple variables/dimensions. Horizontal
* Bars: Primarily utilized when comparing one dimension against another – for instance, sales over different years.
* Horizontal Bars: Horizontal bars are generally used to compare two dimensions; for instance, charts that compare sales in various years use this format.
* [Stacked Bars](https://intellipaat.com/blog/tableau-stacked-bar-chart/): Extended horizontally to add multiple dimensions. Side-by-Side Bars: Used to compare independent variables by grouping them.
* Circle View: This format displays numerical data in circles instead of bars.
* Line Charts are commonly used to display recent trends, demand, or sales figures for products and services.
* Dual Lines allow comparison between multiple products or trends while an Area Chart graphically represents their quantitive information.
* Discrete Area Charts: Used to display quantitative data in discrete areas. Scatter Plot: Used to visualize relationships between two variables and create regression models. Histogram: Visualizing statistical data within a certain range.
* Gantt Chart: Used to determine the duration of any activity or event.
* [Bullet Chart](https://intellipaat.com/blog/bullet-chart-tableau/): An easy way to compare various measures and dimensions visually.
* Bubble Chart: Used to compare two variables by representing them visually using bubbles, for instance, higher sales in certain regions will appear as larger bubbles than areas with fewer sales.

**TABLEAU MAPS**

Tableau maps are an effective and straightforward way of visualizing geographic data, particularly two or more dimensions simultaneously. Below is a selection of popular Tableau maps used for various applications:

* Proportional Symbol Maps: Proportional symbol maps are an effective way to visualize quantitative data for specific locations. Here, multiple quantities or variables per location may be represented as proportional symbol maps – for instance, Earthquakes that occurred over the past decade with their magnitude might make an effective example.
* Choropleth Maps: Commonly known as filled maps, choropleth maps represent statistical or ratio data of geographic areas in a visual form, sharing patterns with each area represented. They can be used to depict climate changes, pollution levels, gender distribution or literacy rates between various nations or the entire globe.
* Point Distribution Maps: Point Distribution maps depict data points shared among specific locations. They’re also useful in visualizing events that happened at specific times; to create these distribution maps, your data source must contain details about their latitude and longitude coordinates.
* Heat Maps (commonly referred to as density maps) are useful tools for visualizing large volumes of data and spotting trends that help inform better decision-making. You could create one to depict your website data and see where users are accessing your site from different places.
* Flow Maps in Tableau: Flow or path maps in this context depict the journey or path taken by something from one place to another; an ideal illustration would be a hurricane’s flow map from its origination point to completion over a certain period.
* Spider Map: Spider maps are popularly known as origin-destination maps, depicting multiple destinations from one origin or location. An ideal use case would be depicting migrants’ data as they travel between areas or countries.

**TOP TABLEAU FEATURES AND STRENGTHS**

Here we list some of the most important strengths and salient features of Tableau which make it a highly desired tool in the corporate world today:

* Highly interactive tableau data visualization
* Easily implementable
* Handling large amounts of data
* Use of other scripting languages
* Responsive dashboard and support
* Different products for different users
* High-performance technology
* No need for any technical expertise.

**FILTERS IN TABLEAU**

In Tableau, filters allow you to display a subset of your data by selecting or excluding specific data points, enabling focused analysis and visualization. Tableau offers various filter types, including extract, data source, context, dimension, measure, and table calculation filters, each with unique functionalities.

Here's a breakdown of Tableau filters:

Types of Filters:

* **Extract Filters:**

Filter data during the extraction process, improving performance by only including relevant data in the extract.

* **Data Source Filters:**

Filter data directly at the data source level, restricting access to specific rows of data before they are brought into Tableau.

* **Context Filters:**

Filter data in the dataset to effectively work with other filters, influencing the calculations and aggregations in the view.

* **Dimension Filters:**

Filter data based on categories or labels, allowing you to focus on specific groups or segments.

* **Measure Filters:**

Filter data based on measurements or numerical values, enabling you to focus on specific ranges or thresholds.

* **Table Calculation Filters:**

Filter data after table calculations like rankings or percentages, allowing you to focus on specific results of calculations.

* **Date Filters:**

Filter data based on specific dates or relative time periods.

How to Use Filters:

1. **1. Drag and Drop:**

Drag dimensions, measures, and date fields to the "Filters" shelf to create filters.

1. **2. Interactive Filters:**

Display interactive filters in the view, allowing users to interact with the view and change the displayed data.

1. **3. Filter Card Interaction:**

Set options for filter card interaction and appearance, such as filter card modes and customization.

1. **4. Order of Operations:**

Tableau performs filter operations in a specific order, starting with extract filters, then data source filters, context filters, dimension filters, measure filters, and finally table calculation filters.

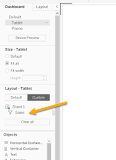
1. **5. Filter Data from Views:**

Use filters to select or exclude data points in your view, allowing you to focus on specific data subsets.

**In short Tableau employs six different types of filters, which are listed in the sequence of execution:**

* Extract Filters.
* Data Source Filters.
* Context Filters.
* Dimension Filters.
* Measure Filters.
* Table Calculation Filters.

**HOW TO CREATE A FILTER IN TABLEAU?**



**Scenario 1: Add a filter to a dashboard**

1. Click on the worksheet on the dashboard to select it.
2. You will see 4 icons in the upper corner of the gray outline. Select the down arrow to expose the options shown below.
3. Select Filters and add the new field to be added as a filter.

***PARAMETERS IN TABLEAU***

In Tableau, parameters are dynamic values, like numbers, dates, or strings, that you can use to replace constant values in calculations, filters, and reference lines, allowing users to interactively change the behavior of visualizations.

Here's a more detailed explanation:

What are Parameters?

* **Workbook Variables:**

Parameters are essentially workbook-level variables, meaning they are global and can be used across all worksheets within a Tableau workbook.

* **Dynamic Values:**

They allow you to create interactive visualizations where users can change values, such as thresholds, dates, or filters, directly from the dashboard.

* **Flexibility:**

Parameters make your visualizations more flexible and adaptable to different user needs and data scenarios.

How to Use Parameters:

1. **1. Create a Parameter:**
   * In the Data pane, click the dropdown arrow in the upper right corner and select "Create Parameter".
   * Name the parameter and specify its data type (e.g., number, string, date).
   * Define the allowable values (e.g., a list of values, a range, or a single value).
   * Specify the current value and how the parameter should be displayed.
2. **2. Use in Calculations:**
   * Reference the parameter in calculated fields to dynamically change calculations based on user input.
   * For example, you can create a calculated field that checks if a value is greater than a parameter value, and then use that calculated field in a filter or visualization.
3. **3. Use in Filters:**
   * Use parameters to create dynamic filters that allow users to select different values or ranges.
   * For example, you can create a parameter that allows users to select a specific year or a range of years to filter data.
4. **4. Use in Reference Lines/Bands:**
   * Use parameters to dynamically change the values of reference lines or bands.
   * For example, you can create a parameter that allows users to set the value of a reference line.
5. **5. Parameter Actions:**
   * Use parameter actions to create interactive dashboards where users can change the behavior of a visualization by clicking on a parameter control.
   * For example, you can create a parameter that allows users to select a different measure to display in a visualization.

Examples:

* **Dynamic Thresholds:**

Use a parameter to allow users to change the threshold for a calculation (e.g., "Show sales above X value").

* **Customizable Filters:**

Use a parameter to allow users to select different categories or regions to filter data.

* **Interactive Reference Lines:**

Use a parameter to allow users to set the value of a reference line or band.

Benefits of Using Parameters:

* **Interactivity:** Make your visualizations more interactive and engaging.
* **Flexibility:** Allow users to customize their view of the data.
* **Reduced Redundancy:** Avoid creating multiple visualizations for different scenarios.
* **Scalability:** Use parameters to scale your Tableau Prep flows to accommodate multiple use cases.

***SETS IN TABLEAU***

In Tableau, sets are custom fields that allow you to define a subset of data based on conditions, enabling you to isolate specific segments of data for analysis and visualization. You can create sets by selecting members from a list or a visualization, or by writing custom conditions.

Here's a breakdown of key aspects of sets in Tableau:

Types of Sets:

* **Dynamic Sets:** Members change when the underlying data changes.
* **Fixed Sets:** Members do not change, even if the underlying data changes.

How to Create Sets:

1. **Right-click a dimension:** In the Data pane, right-click a dimension and select "Create > Set".
2. **Configure the set:** In the "Create Set" dialog box, configure your set by selecting members, writing conditions, or using other options.
3. **Click "OK":** After configuring the set, click "OK" to create it.

Use Cases for Sets:

* **Filtering:** Use sets to filter data based on specific criteria.
* **Calculated Fields:** Use sets in calculated fields for more complex analysis.
* **User Interface Components:** Use sets to create interactive elements in your dashboards.
* **Top N and Others:** Create views that separate data into "Top N" and "All Other" groups.
* **Adding Sets to Hierarchies:** View data in different ways through existing hierarchies.

Key Considerations:

* **Dynamic vs. Fixed:** Choose the appropriate type of set based on your analysis needs.
* **Set Control:** Tableau Set Control allows users to interact with sets by displaying a filter-like dialog, where items selected are "in" the set and unselected items are "out".
* **Group Sets:** Group sets are used to apply permissions based on groups of users.
* **Sets vs. Groups:** While both groups and sets allow you to create subsets of data, sets are more flexible and can be used in more ways, such as filtering and calculated fields.
* **Sets vs. Filters:** Filters are used to narrow down the data shown in a view, while sets are custom fields that define a subset of data based on conditions.

**What are sets and groups in Tableau?**

In Tableau, both groups and sets are tools for creating subsets of data, but they differ in their nature and application: groups are static and combine members of a single dimension into categories, while sets are dynamic and can combine members from multiple dimensions or conditions.

***ARITHEMATIC AND LOGICAL TABLES IN TABLEAU***

In Tableau, "logical tables" are containers for physical tables, allowing you to model relationships between tables and maintain data integrity, while "arithmetic and logical calculations" are used to perform calculations and conditional logic on your data.

Here's a more detailed explanation:

**LOGICAL TABLES:**

* **Containers for Physical Tables:**

Logical tables act as containers for one or more physical tables, which can be joined or unioned.

* **Data Model:**

Tableau's data model uses logical tables to represent the structure of your data, allowing you to define relationships between different data sources.

* **Relationship Definition:**

You can define relationships between logical tables, enabling Tableau to efficiently query and combine data from multiple tables.

* **Data Granularity:**

Tableau queries data in their natural level of detail, preserving granularity and functionality.

* **Extract Size:**

By using logical tables, you can minimize data extract size by dividing the extract into different logical tables/groupings instead of storing redundant data.

* **Double-Click to View:**

Double-click a logical table to see its underlying physical tables.

Arithmetic and Logical Calculations:

* **Calculated Fields:**

Tableau allows you to create calculated fields that perform arithmetic and logical operations on your data.

* **Arithmetic Operators:**

These operators include addition (+), subtraction (-), multiplication (\*), division (/), modulo (%), and power (^).

* **Logical Operators:**

These operators include AND, OR, and NOT.

* **Comparison Operators:**

These operators compare expressions, such as numbers, dates, and strings, and return a boolean value (True or False).

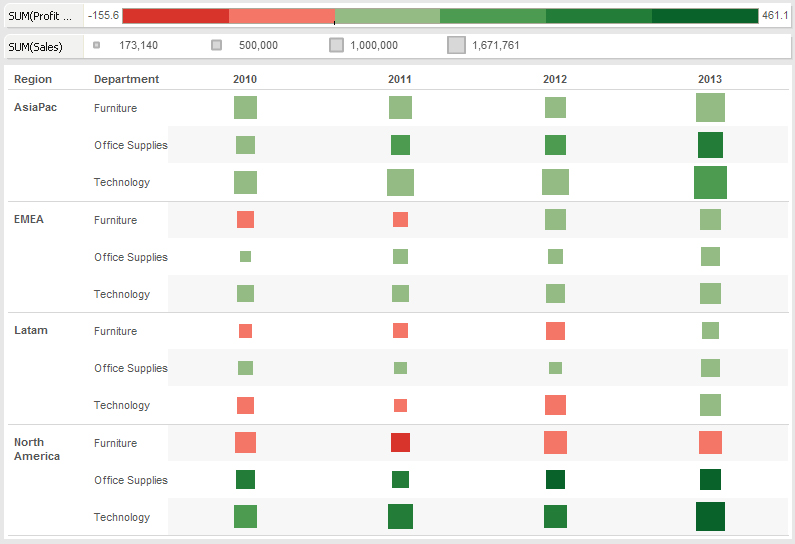
* **Logical Functions:**

Tableau provides functions like IF, CASE, AND, OR, NOT, etc., to perform conditional logic and create calculated fields based on specific conditions.

* **Examples:**
  + Calculate profit margin: (Revenue - Cost) / Revenue.
  + Identify profitable or loss-making subcategories: IF SUM([Profit]) > 0 THEN "Profitable" ELSE "Loss-Making" END.
  + Create a new category based on multiple conditions: IF [Region] = "South" AND [Category] = "Furniture" THEN "High Priority" ELSE "Low Priority" END

***HEAT MAP IN TABLEAU***

Tableau heat maps are a type of data visualization tool that allows users to represent data values for different categories using a color-coded format. Heat maps in Tableau use colors to represent the intensity of data values, with darker colors representing higher values and lighter colors representing lower values.



In Tableau, a heatmap uses color intensity to represent data values across two dimensions, allowing for quick identification of patterns and trends in large datasets.

Here's a more detailed explanation:

What is a Heatmap in Tableau?

* **Purpose:**

Heatmaps are a powerful data visualization tool that uses color-coding to represent data values, particularly useful for identifying patterns and relationships in large datasets.

* **How it works:**

Each cell in the heatmap represents a combination of two dimensions, and the color intensity of the cell indicates the value of a measure or metric. Darker colors often represent higher values, while lighter colors represent lower values.

* **Mark Type:**

The mark type used for a heatmap in Tableau is "Density".

* **Use Cases:**
  + **Identifying trends and patterns:** Heatmaps can quickly reveal areas of high or low concentration of data points.
  + **Analyzing large datasets:** They are effective for visualizing data with multiple dimensions, making it easier to spot relationships.
  + **Web analytics:** You can use heatmaps to track user movement on a webpage and understand user behavior.
  + **Scientific experiments:** Heatmaps can help locate excess or fewer data points in the visualization, finding their usage in various scientific experiments.
* **Customization:**

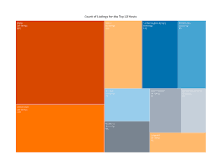
Tableau heatmaps offer flexibility in customization, allowing you to choose color schemes and adjust the size of density data points.

How to Create a Heatmap in Tableau

1. **Prepare your data:** Ensure your data includes two dimensions (e.g., categories or time periods) and a measure or metric to be visualized.
2. **Create the view:** Drag the dimensions to the Rows and Columns shelves, and the measure to the Color shelf.
3. **Choose the mark type:** Select "Density" as the mark type.
4. **Customize the view:** Adjust the color scheme, labels, and other visual elements as needed.
5. **Add interactivity:** Consider adding filters or creating a dashboard to allow users to interact with the data.

***TREE MAP IN TABLEAU***

What is a tree map in tableau?



The treemap functions as a visualization composed of nested rectangles. These rectangles represent certain categories within a selected dimension and are ordered in a hierarchy, or “tree.” Quantities and patterns can be compared and displayed in a limited chart space. Treemaps represent part to whole relationships.

**What is a tree map used for?**

A treemap is a visual method for displaying hierarchical data that uses nested rectangles to represent the branches of a tree diagram. Each rectangle has an area proportional to the amount of data it represents. Network administrators often use treemaps to analyze disk space use.

In Tableau, a treemap visualization displays data in nested rectangles, where each rectangle's size represents a data value, and the structure is hierarchical, allowing for easy comparison of part-to-whole relationships.

Here's a breakdown of how treemaps work and how to create them in Tableau:

How Treemaps Work:

* **Nested Rectangles:**

Treemaps use nested rectangles to represent data, with the area of each rectangle proportional to the value it represents.

* **Hierarchical Structure:**

The rectangles are arranged in a hierarchical structure, allowing you to visualize data at different levels of detail.

* **Part-to-Whole Relationships:**

Treemaps are particularly useful for visualizing part-to-whole relationships, as they clearly show how different categories contribute to the overall total.

* **Color and Size:**

You can use color and size to further enhance the treemap, highlighting different aspects of the data.

Creating a Treemap in Tableau:

1. **Select your data:** Choose the dimensions and measures you want to use in your treemap.
2. **Add dimensions to the "Color" shelf:** Drag the dimensions you want to use to define the structure of the treemap to the "Color" shelf.
3. **Add measures to the "Size" shelf:** Drag the measures you want to use to define the size of the rectangles to the "Size" shelf.
4. **Choose the Treemap chart type:** Select the "Treemap" chart type from the "Show Me" panel.
5. **Customize your treemap:** You can further customize your treemap by adding labels, changing the color palette, and adjusting the size of the rectangles.

Example:

* You can create a treemap to visualize sales by product category, with each rectangle representing a sub-category.
* The size of each rectangle would represent the total sales for that sub-category, and the color could represent the profit margin.

***PARETO IN TABLEAU***

A Pareto chart, also known as a Pareto diagram or Pareto graph, is a visual tool used to identify and prioritize the most important factors contributing to a problem, often based on the 80/20 rule, by displaying data in descending order of frequency or impact.

Why do we use Pareto?

Pareto chart is ideal to use when there are many possible problems/ causes, and you wish to focus on the most significant. The combination of ordered bar chart and cumulative percentage line allows you to analyse where the most impact can be made

Here's a more detailed explanation:

* **Purpose:**

The primary purpose of a Pareto chart is to help identify the "vital few" factors that contribute to the majority of a problem or issue, allowing for focused problem-solving and resource allocation.

* **Structure:**

It consists of a bar chart and a line graph:

* + **Bar Chart:** The bars represent the frequency or cost of different factors, arranged in descending order from left to right, highlighting the most significant factors.
  + **Line Graph:** The line graph shows the cumulative percentage of each factor, visually demonstrating the impact of the "vital few".
* **Applications:**

Pareto charts are commonly used in:

* + **Quality Control:** Identifying the most frequent causes of defects or customer complaints.
  + **Process Improvement:** Pinpointing the most impactful areas for process optimization.
  + **Problem Solving:** Prioritizing issues and focusing efforts on the most significant problems.
* **Pareto Principle:**

The Pareto chart is based on the Pareto principle, also known as the 80/20 rule, which suggests that approximately 80% of the effects come from 20% of the causes.

* **Benefits:**
  + **Prioritization:** Helps focus efforts on the most critical issues.
  + **Resource Allocation:** Enables efficient allocation of resources by targeting the most impactful areas.
  + **Communication:** Provides a clear and visual representation of data, facilitating better communication and understanding.
  + **Problem Solving:** Facilitates a structured approach to problem-solving by identifying the root causes.

[**https://www.projectsmart.co.uk/pareto-principle/pareto-analysis-step-by-step.php**](https://www.projectsmart.co.uk/pareto-principle/pareto-analysis-step-by-step.php)

**INTERACTIVE DASHBOARDS IN TABLEAU**

To create interactive dashboards in Tableau, start by building visualizations, then add them to a dashboard and use actions (like filters, highlights, or navigation) to enable user interaction, allowing users to explore data and gain insights.

Here's a more detailed breakdown:

**1. Create Visualizations**:

* **Connect to your data:** Import your data source into Tableau.
* **Build visualizations:** Create charts, graphs, and maps to represent your data.
* **Add interactivity to visualizations:** Use actions to make visualizations interactive.

**2. Create a Dashboard:**

* **Click the "New Dashboard" button:** This creates a new dashboard canvas.
* **Add visualizations:** Drag and drop your created visualizations onto the dashboard canvas.
* **Add dashboard objects:** Add objects like images, text, or web pages to enhance the dashboard.
* **Set dashboard options:** Customize the dashboard title, size, and layout.

**3. Add Interactivity:**

* **Use dashboard actions:**
  + **Filter actions:** Allow users to filter data by clicking on visualizations.
  + **Highlight actions:** Highlight related data points in other visualizations by clicking on a point in one visualization.
  + **Navigation actions:** Allow users to navigate to other dashboards or web pages by clicking on a visualization or object.
  + **Parameter actions:** Allow users to interact with parameters that control the data displayed in visualizations.
* **Add filters to worksheets:**
  + **Right-click on a field in the sheet and choose "Show Filter"** .
  + **Right-click on the filter and choose "Apply to worksheets"** .
  + **Customize the filter appearance** .
* **Use "Use as Filter" option:**

Click on the "Use as Filter" option on a sheet to make it a filter for other sheets on the dashboard.

* **Add parameters:**

Create parameters to allow users to interact with the data.

**4. Publish and Share:**

* **Publish your dashboard to Tableau Server or Tableau Cloud:** This allows others to access and interact with your dashboard.
* **Share your dashboard with others:** Share the dashboard link or embed it in a web page.

**Tips for creating effective interactive dashboards:**

* **Keep the design simple and easy to read:** Use clear labels and a consistent layout.
* **Focus on key insights:** Highlight the most important data points and metrics.
* **Make it easy for users to explore the data:** Use intuitive actions and filters.
* **Test your dashboard thoroughly:** Make sure that all actions and filters work as expected.

search on google tableau interactive dashboard.