

# POWER BI

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# BUSINESS INTELLIGENCE

Business Intelligence (BI) is a process of analyzing data through technology and presenting it to the end user(s) which helps them to make an informed decision. With the use of **historical and current data**, a BI tool serves predictive view. Usually, a BI tool can perform tasks like **data connection, data mining, data transformation, data modelling** through building **relationships, complex calculations, report building, dashboard creation, online analytical processing and predictive analysis.**

# DATA WAREHOUSE

**A Data warehouse is a centralized system that stores and organizes large amounts of structured and semi-structured data from multiple sources.**

It consists of a huge storage of data gathered from single or many sources to aid the process of making an informed decision at any level of an enterprise. A typical data warehouse follows an **ETL (Extract, Transform, Load)** process.

# PURPOSE

To support business intelligence (BI), reporting, and analytics. Data warehouses help organizations make informed decisions by:

- Providing access to historical data for data mining and visualization
- Enabling ad hoc analysis and custom reporting
- Supporting regulatory requirements
- Building a historical record that can be valuable to data scientists and business analysts

# ETL CONCEPTS

**Extract :-** The first step in using Data Warehousing is to extract data from single or multiple sources to load in its environment.

**Transform :-** The Data which has been extracted, may not come in the desired format or size etc, so there may be the need to transform the incoming data to meet business requirements and objects.

**Load :-** Once the data is being transformed, its ready to be loaded in targeted tables.

# RELATION BETWEEN BUSINESS INTELLIGENCE AND DATA WAREHOUSE

A Business Intelligence tool takes data from a Data warehouse to generate reports and help the end user to make informed decision. By this, we can call Data warehouse as a part of a complete Business Intelligence process.

# BI TOOLS

- Microsoft Power BI
- Tableau
- Sisense
- Looker
- datapine
- Zoho Analytics
- Yellowfin
- Answer Dock
- ReportPlus
- QlikView
- SAP BusinessObjects Lumira
- SAP Crystal Reports
- SAP Business Intelligence
- Vista
- Cloomtrack
- Hotjar

# SOFTWARE REQUIREMENTS

- ➡ **Browser like Google..**
- ➡ **Windows 10 or higher**
- ➡ **4GB Ram or more**
- ➡ **Min 1 GB of available hard disk space**



# INTRO POWER BI

Tool That Helps You **Analyze Data** And Draw The **Business Insights**.

Power BI has four different products i.e., [Power BI Desktop](#), [Power BI Service](#), [Power BI Report Server](#) and [Power BI Mobile app](#) and every product has its own capabilities and limitations.

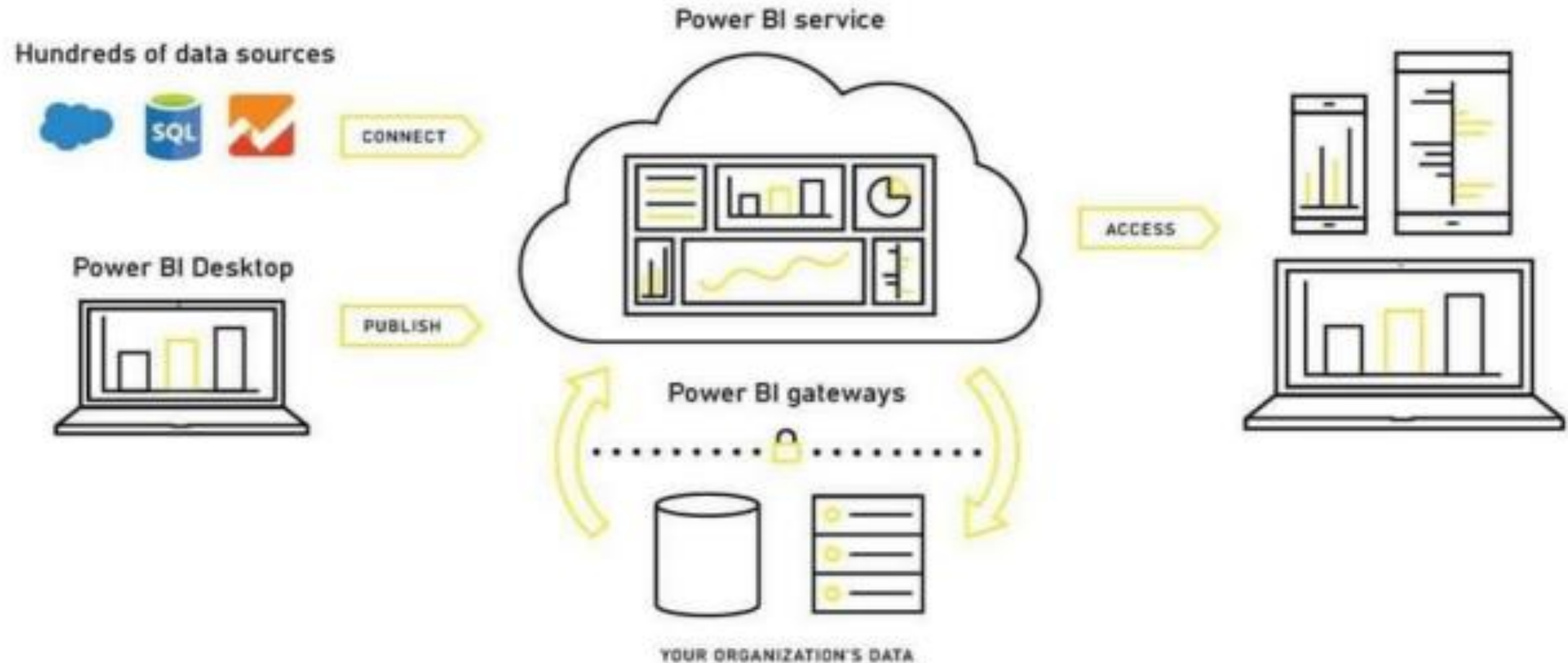
# PARTS OF POWER BI

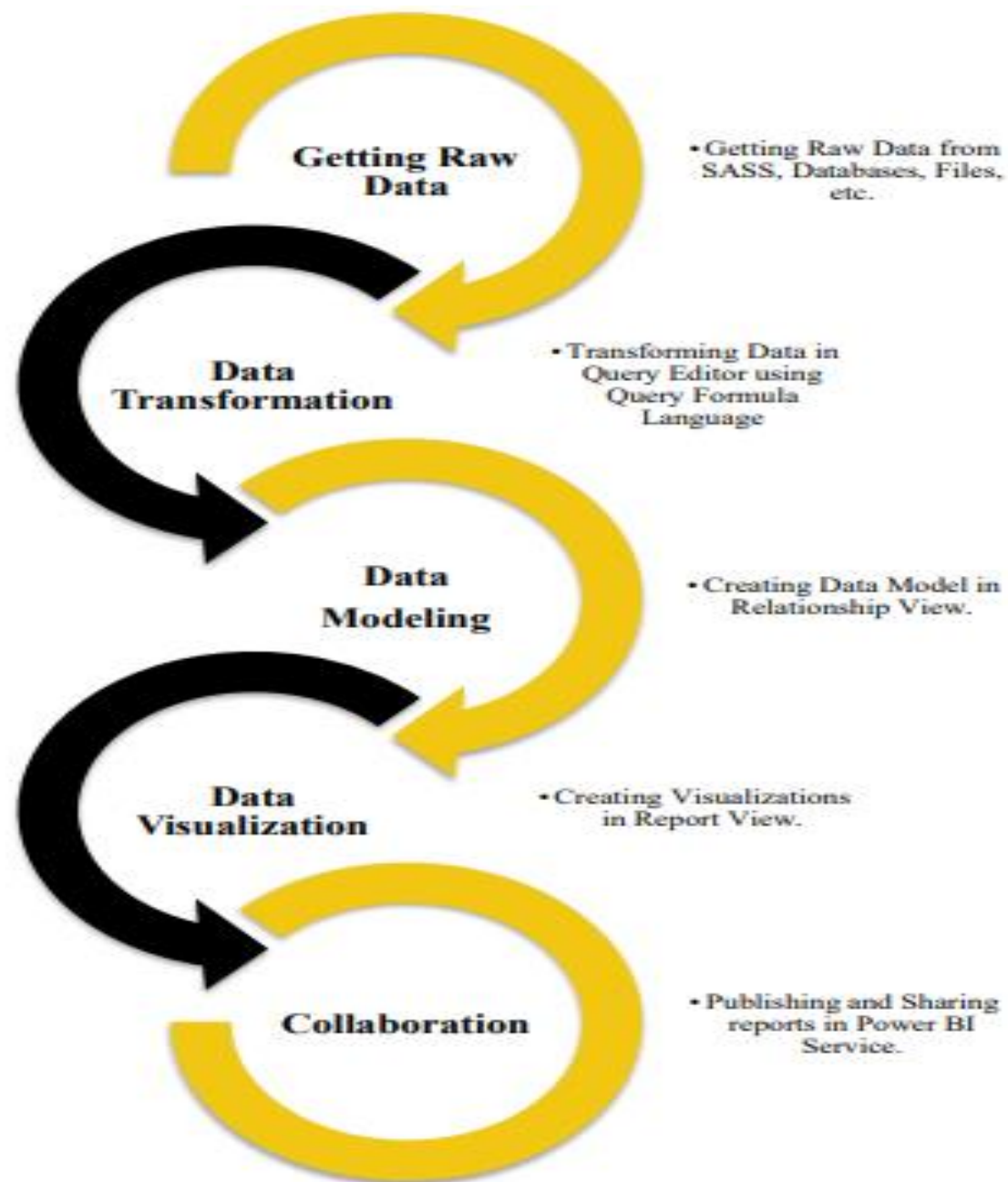
- **Power BI Desktop** - A Windows desktop application
- **Power BI service** - for Windows, iOS, and Android devices
- **Power BI mobile apps** - An online SaaS (Software as a Service) service
- **Power BI Report Server** - to publish Power BI reports to an on-premises report server, after creating them in

# POWER BI FLOW

POWER BI FLOW It starts with connecting to data then transforming it, building relationships and finally creating reports and publishing it to Power BI service. Later it can be shared so that end users in the Power BI service and mobile devices can view and interact with the report.

# ARCHITECTURE





# VIEWS IN POWER BI

## 1. Report View

- **What it is:** The visual layer where you create dashboards and interactive visualizations.
- **Purpose:** Display data insights using visuals like charts, tables, maps, and slicers.
- **User Interaction:** End-users interact with visuals to explore data.

## 2. Model View

- **What it is:** The data relationship layer.
- **Purpose:** Define how tables in the dataset relate to each other (one-to-many, many-to-many).
- **Key Components:**
  - **Relationships:** Connect tables using keys.
  - **Measures & Calculated Columns:** Use DAX to create custom metrics.
  - **Hierarchy & Fields:** Organize fields for visualizations.

### 3. Table View

- **What it is:** A grid-based representation of raw data.
- **Purpose:** Inspect and validate the data loaded into Power BI.
- **Key Features:**
  - Add calculated columns.
  - Spot-check data values for errors or anomalies.



## 4. DAX Queries (Data Analysis Expressions)

- **What it is:** A formula language used in Power BI for creating custom calculations.
- **Purpose:** Enable advanced analytics with calculated columns, measures, and tables.
- **Common Use Cases:**
  - **Calculated Columns:** Row-based calculations (e.g., `Profit = Sales - Cost`).
  - **Measures:** Aggregate or dynamic calculations (e.g., `Total Sales = SUM(Sales)`).
  - **Time Intelligence:** Work with date ranges (e.g., `YTD Sales = TOTALYTD(SUM(Sales), Date[Date])`).

# CONNECT THE VARIOUS DATA SOURCE

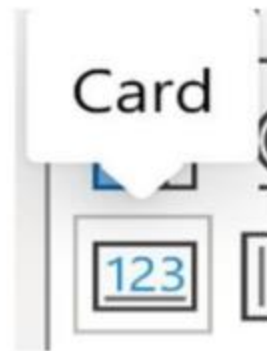
Connecting PowerBI with Different Data sources

- Connect to CSV files.
- Connect to Excel
- Connect to text.
- Connect to SQL Server
- Connect to a Web page.
- Enter data directly.
- Analysis Services Tabular data
- Connect to Direct SQL Query

# TYPE OF VISUALIZATION

## 1.Card:

- **Definition:** Displays a single key metric, such as total sales, profit, or the count of items.
- **Use Case:** Highlight KPIs or summary metrics in dashboards.



## 2. Bar Graph:

- **Definition:** A visual that represents data with horizontal bars to compare values across categories.
- **Use Case:** Comparing sales by region, product performance, etc.



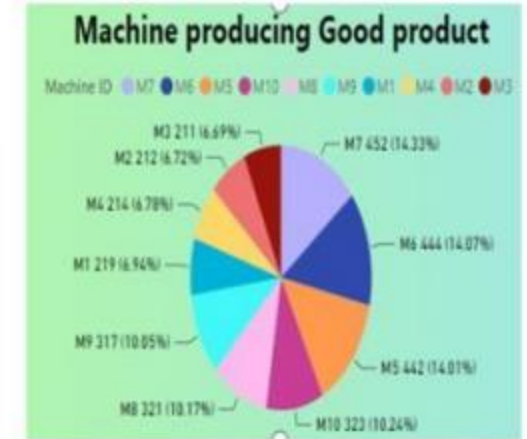
horizontal, vertical, joint-bar, stack-bar, clustered bar



### 3. Pie Chart:

- **Definition:** A circular chart divided into slices representing proportions of a whole.
- **Use Case:** Visualizing market share or distribution of categories.

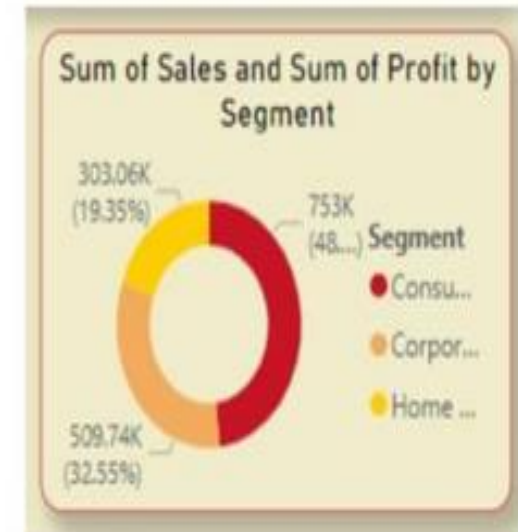
1. **Legend:** Color-coded key showing categories or segments.
2. **Value:** Numerical data associated with each segment.
3. **Tooltip:** Additional info displayed on hover.
4. **Details:** Specific data points or records behind each segment.



## 4. Ring Chart/Donut Chart:

- **Definition:** Similar to a pie chart but with a hole in the center, often used for additional metrics in the middle.
- **Use Case:** Displaying proportions while reserving space for additional context.

1. Legend: Color-coded key showing categories or segments.
2. Value: Numerical data associated with each segment.
3. Tooltip: Additional info displayed on hover.
4. Details: Specific data points or records behind each segment.



## 5. Line Chart:

- **Definition:** Displays data points connected by lines, often used to show trends over time.
- **Use Case:** Visualizing sales trends, stock prices, or performance over months/years.
  - a. Secondary Axis: Allows plotting two measures with different scales on the same chart.
  - b. Small Multiple: Displays multiple charts, each representing a subset of data, for comparison.
  - c. Legend: Color-coded key identifying categories or measures represented in the chart.



Line chart

X-axis

Date X

Day X

+Add date

Y-axis

Sum of Actual X

+Add date

Secondary y-axis

+Add date

Legend

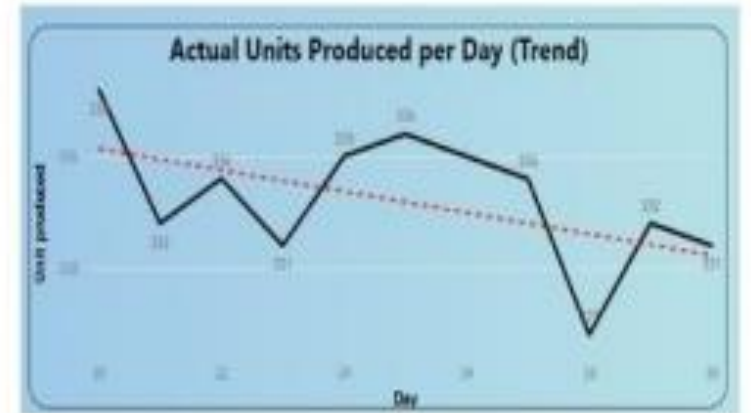
+Add date

Small multiples

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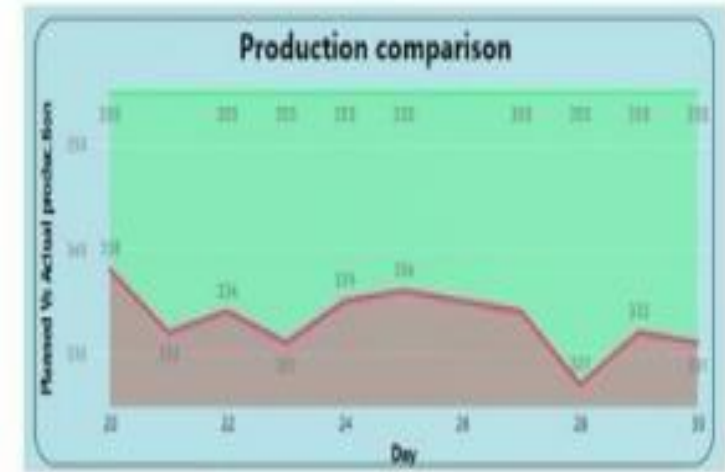
Tooltips

+Add date



## 6. Area Chart:

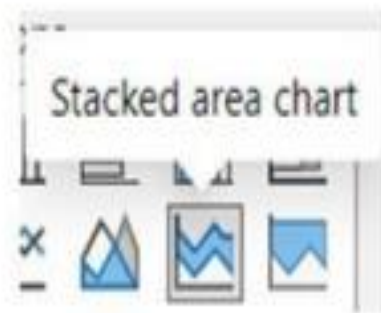
- **Definition:** A line chart with the area under the line filled, emphasizing volume or magnitude.
- **Use Case:** Highlighting trends with an emphasis on quantity or cumulative metrics.
  - a. Secondary Y-axis: Allows plotting two measures with different scales on the same chart.
  - b. Legend: Color-coded key identifying categories or measures represented in the chart.
  - c. Tooltip: Provides additional information when hovering over data points





## 7. Stacked Area Chart:

- **Definition:** Similar to an area chart but with segments stacked, showing the contribution of different components.
- **Use Case:** Comparing sales contributions by categories over time.



## 8. Tree Map:

- **Definition:** A hierarchical visualization where rectangles represent categories, sized proportionally to a value.
- **Use Case:** Displaying large sets of hierarchical data, such as revenue by product category.



## 9. Map:

- **Definition:** A geographic visualization to plot data points or regions on a map.
- **Use Case:** Analyzing data by location, such as sales by country or city.

Map

location

State ✕ | >

+ Add data

legend

+ Add data

latitude

+ Add data

longitude

+ Add data

bubble size

Count of State ✕ | >

tooltips

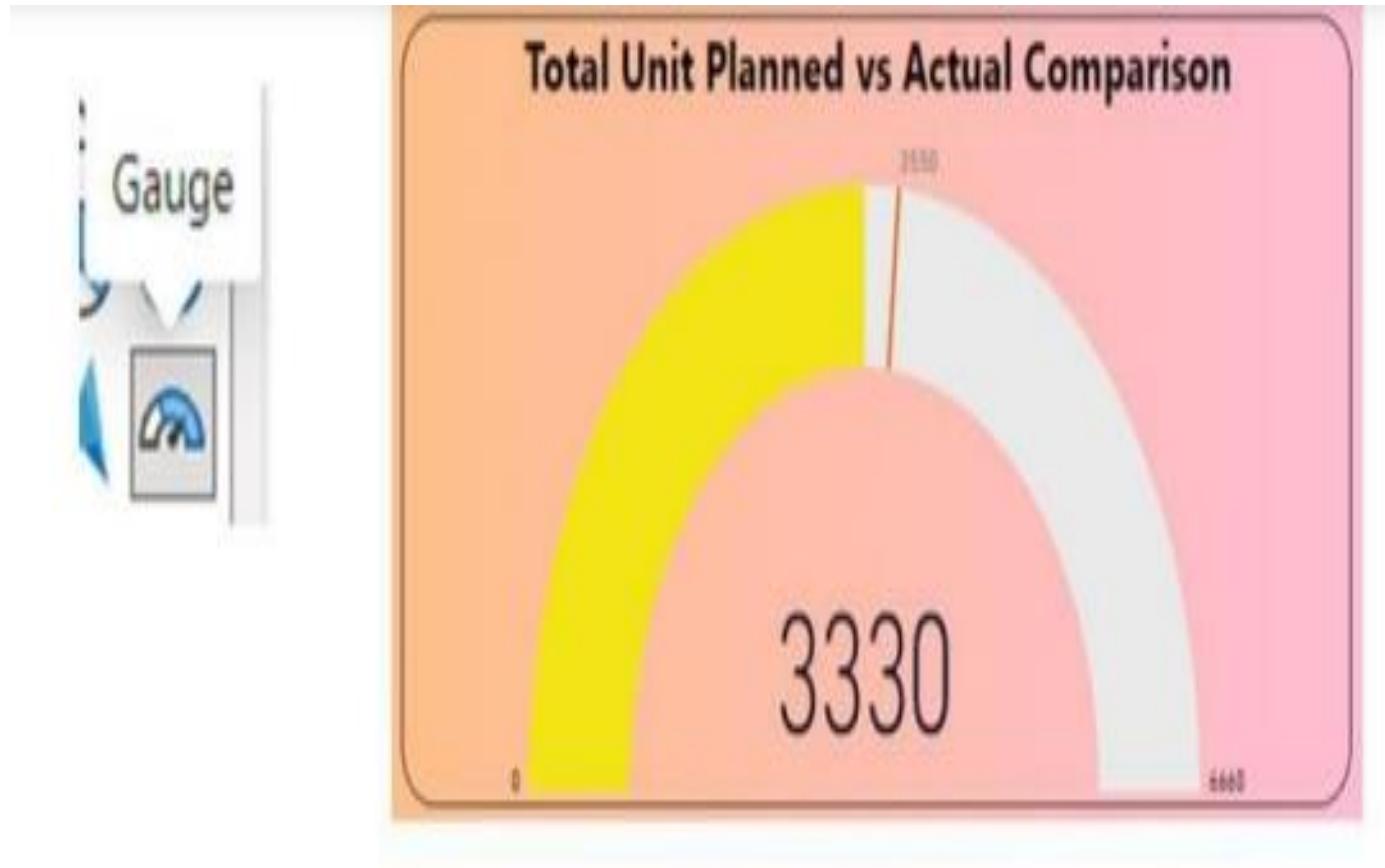
Sum of Sales ✕ | >

+ Add data



## 10. Gauge Chart:

- **Definition:** A semi-circular chart showing progress toward a target value.
- **Use Case:** Tracking performance metrics, such as sales versus target.



## 11. Matrix:

- **Definition:** A tabular visualization with rows, columns, and values, similar to pivot tables in Excel.
- **Use Case:** Summarizing and exploring multi-dimensional data.



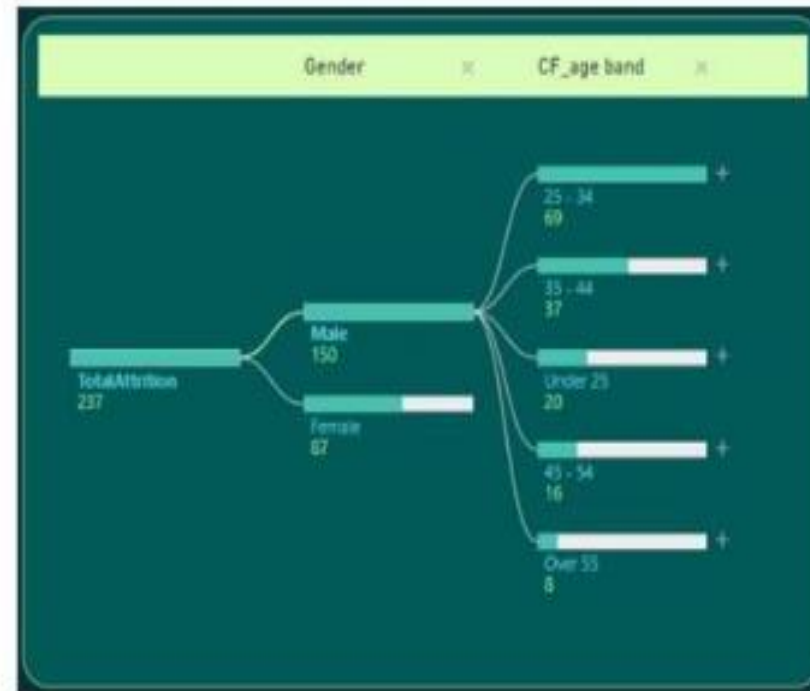
## 12. Slicer:

- **Definition:** A filtering tool allowing users to interactively slice and dice data.
- **Use Case:** Enabling dynamic filtering by time period, categories, or regions.



### 13. Decomposition Tree:

- **Definition:** A tree-like visualization used to break down a metric by multiple dimensions hierarchically.
- **Use Case:** Exploring root causes or contributions to a metric (e.g., profit breakdown by region, then by product).



## 14. Q&A:

- **Definition:** A natural language tool where users can type questions, and Power BI generates relevant visuals.
- **Use Case:** Quick insights without manually building visuals.

## 15. Custom Visualizations (Power BI Online):

- **Definition:** User-created or third-party visuals available in the Power BI marketplace to extend visualization capabilities.
- **Use Case:** Handling specialized or unique visualization needs (e.g., Sankey diagrams, heatmaps).



# DATA TRANSFER

**Remove columns and rows**

**Replace null values**

**Use first row as header**

**Split function**

**Rename columns heading**

**Conditional columns**