Data Analyst & Power BI

An Easy Documentation

28.	What are Summarized Functions? ● SUMMARIZE ● SUMMARIZECOLUMNS	
29.	What are Time Intelligence Functions? ● DATEADD ● DATEBETWEEN	

Q. Why Data Analytics?

Data analytics is the process of storing, organizing, and analyzing raw data to answer questions or gain important insights. Data analytics is a part of business because it allows leadership to create evidence-based strategy (Planning on something by research), understand customers to better target marketing initiatives, and increase overall productivity.

- ➔ Gain greater and helpful insights into target markets
- ➔ Enhance decision making capabilities
- ➔ Create targeted strategies and marketing campaign
- ➔ Identify new product and service opportunities

What does a Data Analyst actually do?

A data analyst is a professional who specializes in collecting, cleaning, and analyzing data to extract valuable insights that inform business decisions. They work with various data sources, such as databases and spreadsheets, to identify trends, patterns, and correlations, ultimately helping organizations optimize performance and achieve their objectives.

What are the Key responsibilities of a data analyst in an organization?

Data Collection: Gathering data from various sources such as databases, spreadsheets, APIs, and external data sources.

Data Cleaning and Preparation: Cleaning and preprocessing raw data to ensure accuracy, consistency, and completeness. This involves tasks like removing duplicates, handling missing values, and standardizing formats.

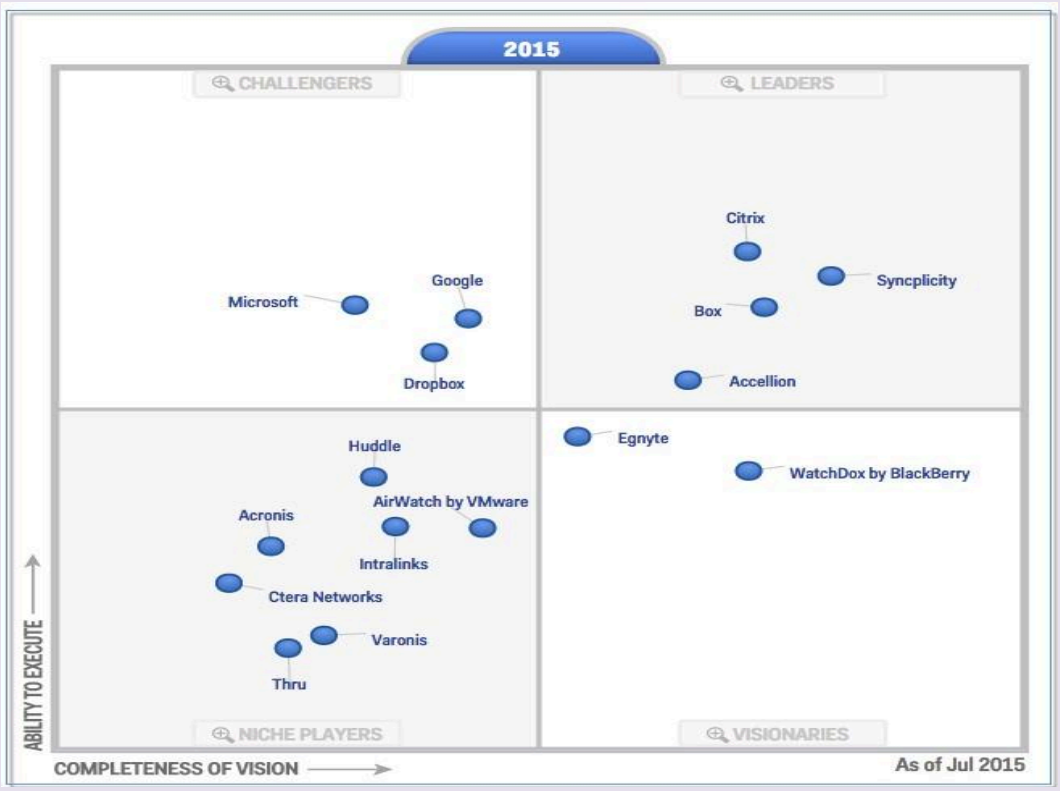
Data Analysis: Analyzing data using statistical methods, querying languages (e.g., SQL), and data analysis tools to identify patterns, trends, and correlations.

Data Visualization: Creating visualizations, reports, and dashboards to present data analysis findings in a clear and understandable manner. This helps stakeholders interpret the insights and make informed decisions.

Insights Generation: Deriving actionable insights from data analysis to inform business decisions, strategies, and initiatives. This may involve identifying opportunities for optimization, growth, or risk mitigation.

Q. Gartner BI Tools, and Competitor of Power BI

ABI also known as Analytic Business Intelligence platforms empower non-technical users with self-service access to approved data, analysis, visualization, and reporting tools. This accessibility allows users to effortlessly interpret and share insights. Consequently, organizations can evaluate performance and decide on strategic directions confidently.



Some Competitor BI Tools of Power BI

- ➔ Tableau
- ➔ SAP SAC
- ➔ SAP BO
- ➔ Qlik
- ➔ IBM
- ➔ AWS

Competitors of Power BI

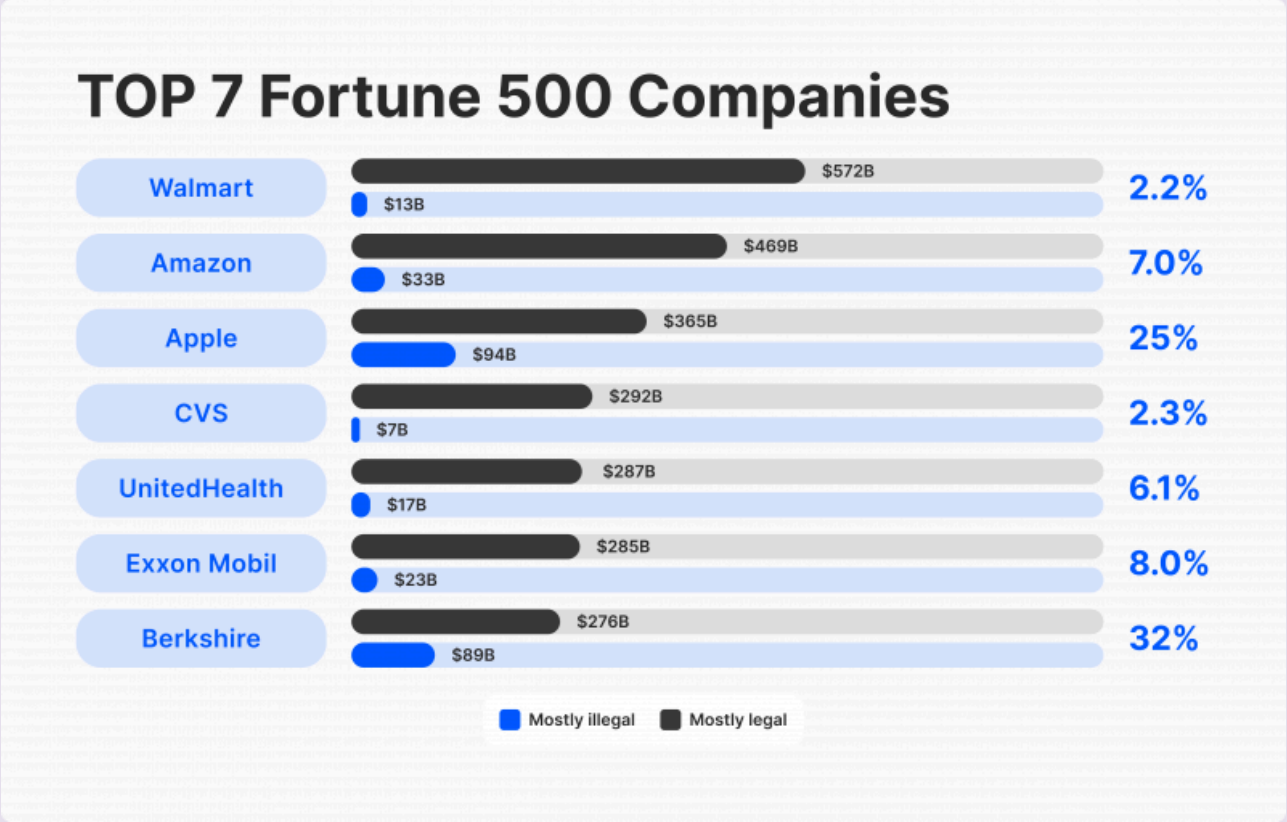
Power BI	Tableau
Developed By Microsoft.	Developed By Tableau Software(now part of Salesforce.
Familiar for Excel users.	Advanced analytics.
Self-service analytics.	Interactive interface.
Strong data modeling.	Flexible and customizable.
Cost-effective for Microsoft users.	Preferred for complex needs.

Power BI	SAP
Developed By Microsoft.	Developed By SAP.
Familiar for Excel users.	Cloud-native BI solution.
Self-service analytics.	Focuses on analytics, planning, and predictive.
Strong data modeling.	Emphasizes collaboration and integration.
Cost-effective for Microsoft users.	Growing adoption in mid-size to large enterprises.

There are many more tools available in the market but currently power bi is the market leader because of its variety of services.

Q. What are Fortune 500 Companies?

The Fortune 500 is a list of the 500 largest companies in the United States, based on revenue, published annually by Fortune magazine. The list includes public and private companies, and uses publicly available revenue data. The Fortune 500 is a comprehensive and influential guide to the current state of the American economy. Investors use the list to track the rise and fall of American companies, and companies use it as a way to assess its growth and competitive edge from year to year. 99% of those companies use BI tools to enhance their business.

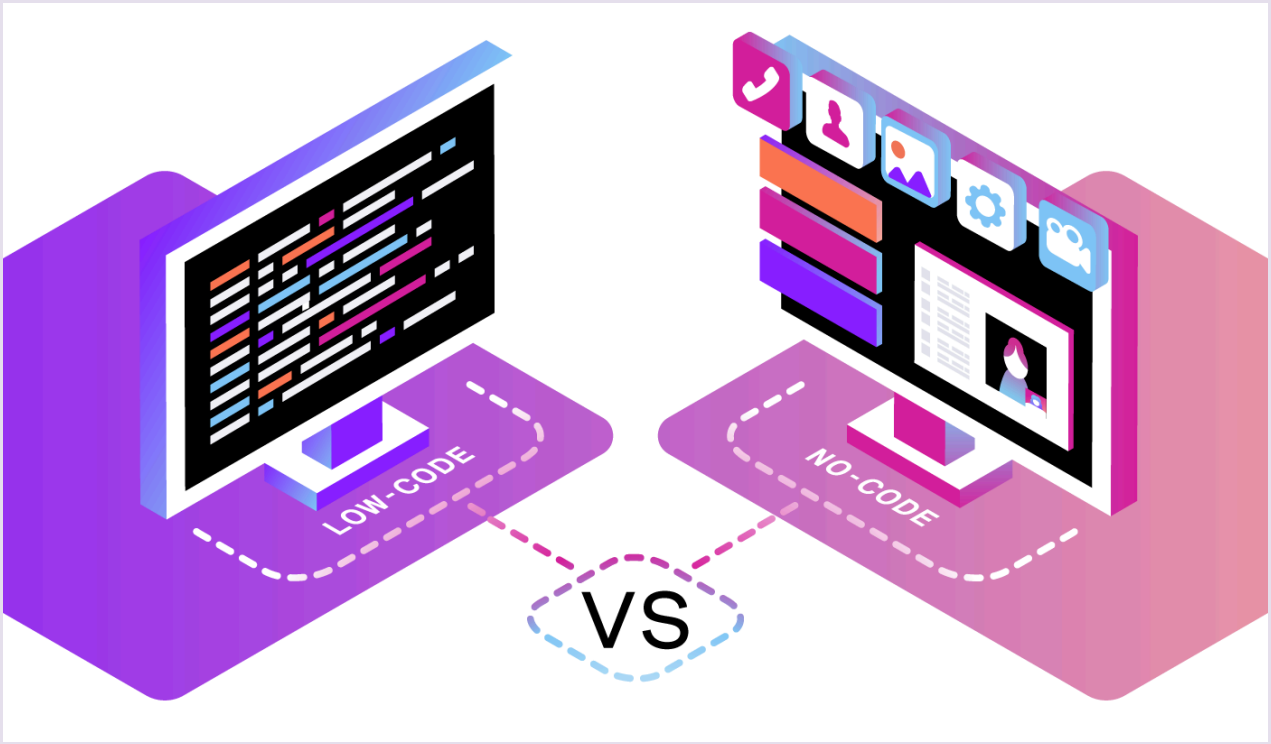


➔ Fortune 500 is an annual list ranking the largest US corporations by revenue.
➔ Companies are ranked based on total revenue for their respective fiscal years.
➔ Eligible companies must be US-incorporated and file financial statements with a government agency.
➔ Private companies are included if they file reports with the SEC.
➔ The list is published annually in Fortune magazine.
➔ Being on the list can attract investors and enhance a company's reputation.

Q. What are Low Code/ No Code Platforms?

Low-code and no-code platforms can be useful for different purposes. A low-code platform is most often used by IT professionals with some coding skills to create custom applications, while no-code platforms typically allow business users without any knowledge of how coding works to address their own development needs.

Low code includes the coders like software engineers, developers, designers who use the code to create something.
On the other side there is no code platform used to display, present something without the requirement of any coding side. Power BI is a LCNC Platform.



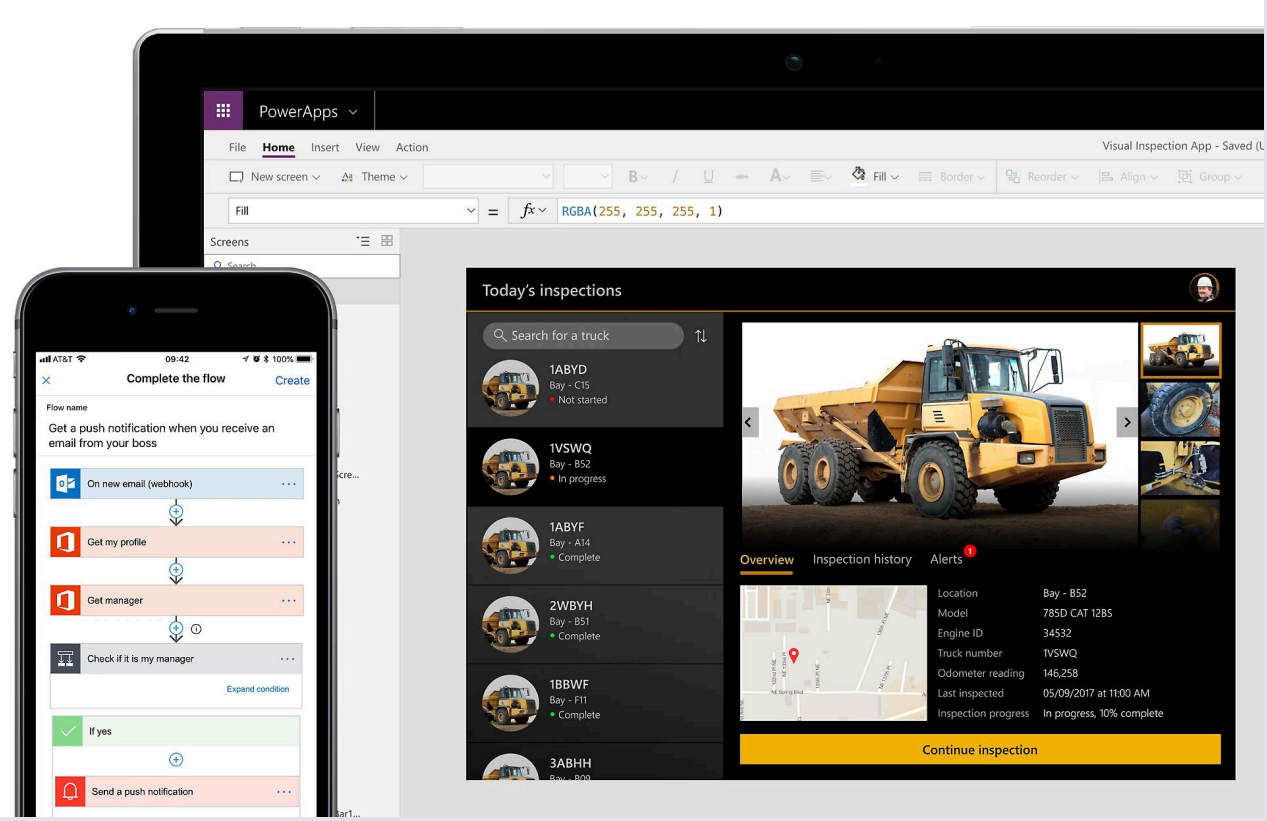
Q. Power Platforms (Power BI, Power Apps, Power Automate, Power Pages)?

The Microsoft Power Platform is a suite of low-code and no-code tools designed to empower users to create custom business solutions and automate processes without extensive programming knowledge. It consists of four main components.

Power BI: Power BI is a powerful business analytics tool used to visualize and analyze data from various sources. It allows users to create interactive reports and dashboards to gain insights into their data, enabling informed decision-making.

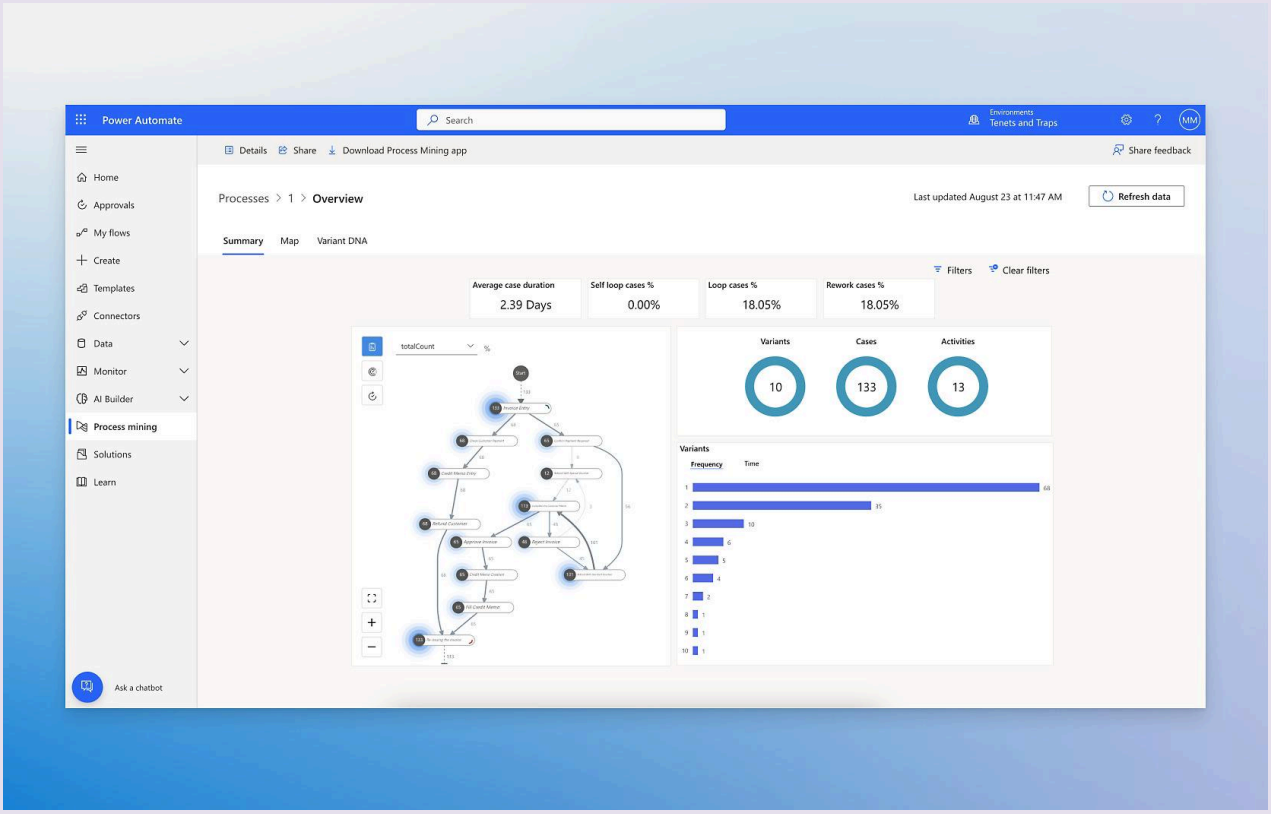
- **Connects to the different data sources.**
- **ETL (Extract, Transformation, Load).**
- **Data Visualization.**
- **Create KPI/Calculations.**
- **Share / publish the reports.**
- **Power BI Desktop/ Service / Mobile.**

Power Apps: Power Apps enables users to build custom applications for web and mobile devices without writing extensive code. Users can create apps using a drag-and-drop interface, connecting to data sources such as SharePoint, Excel, or Dynamics 365, and then deploying them within their organization.



- ➔ Quick creation of custom business apps
- ➔ Works on web browsers, mobile devices, and tablets
- ➔ Integrates with Microsoft services like SharePoint, Office 365, and Dynamics 365
- ➔ Connects to various data sources (SQL Server, SharePoint, Excel, etc.)
- ➔ Customize UI, workflows, and business logic
- ➔ Automates workflows with Power Automate
- ➔ Integrates AI capabilities

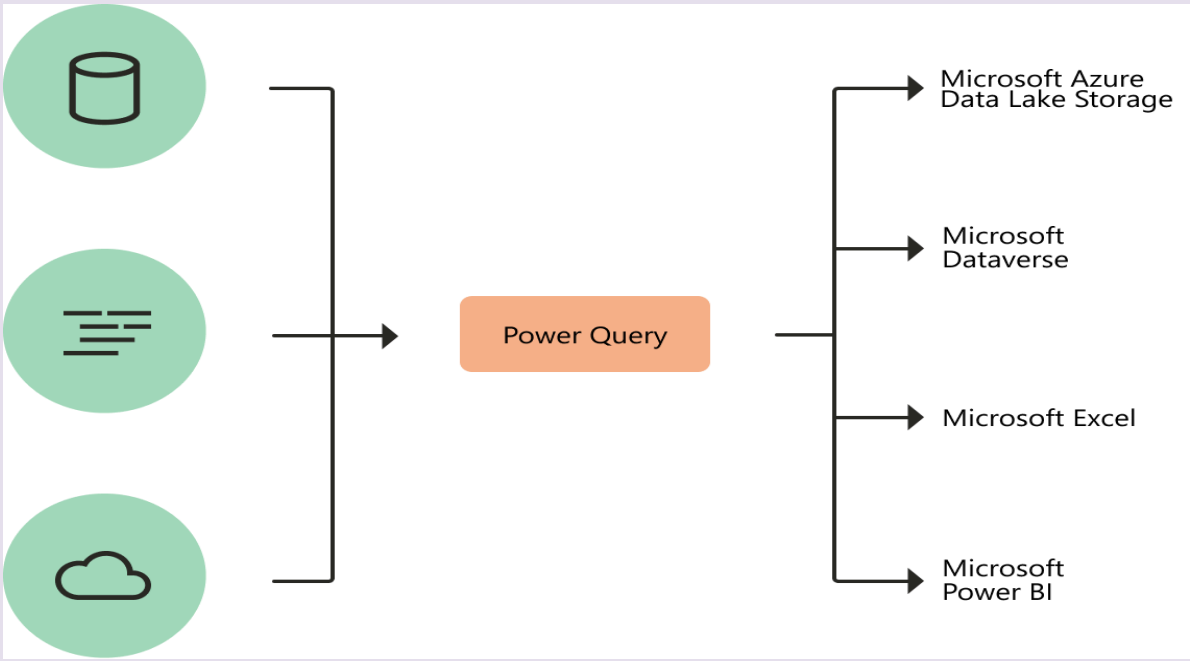
Power Automate (formerly Microsoft Flow): Power Automate is a workflow automation tool that allows users to automate repetitive tasks and business processes across various applications and services. Users can create automated workflows by connecting different apps and services, triggering actions based on predefined conditions.



- ➔ Automates repetitive tasks and processes
- ➔ Integrates with various apps and services (Microsoft and third-party)
- ➔ Creates workflows without coding knowledge
- ➔ Triggers actions based on predefined conditions
- ➔ Streamlines approvals and notifications
- ➔ Connects to data sources for data processing and manipulation
- ➔ Monitors and analyzes processes for optimization
- ➔ Provides templates for common automation scenarios

Q. What is a Power Query?

Power Query is a data preparation and transformation engine that allows users to connect, combine, and refine data sources for analysis. It's available in many Microsoft products, including Excel, Power BI, Power Apps, and Power Automate. Using Power Query, you can perform the extract, transform, and load (ETL) processing of data.



What Power Query can do in Power BI

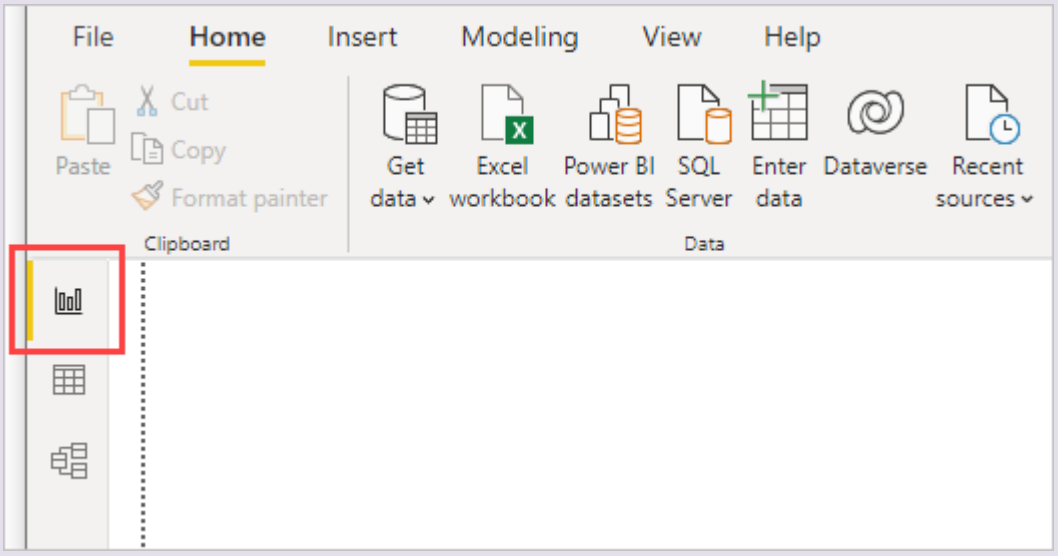
- **Data Connection:** Connects to various data sources like databases, files, websites, and APIs.
- **Data Transformation:** Cleans, reshapes, and combines data from multiple sources using intuitive and powerful transformations.
- **Data Enrichment:** Augments raw data with additional information through merging, appending, or lookup operations.
- **Data Cleansing:** Removes errors, duplicates, and inconsistencies from datasets using built-in cleaning functions.
- **Custom Data Queries:** Allows users to write custom queries using M language for advanced data manipulation.
- **Data Modeling:** Supports creating relationships between tables, adding calculated columns, and defining measures for analysis.

Q. What is Transformation?

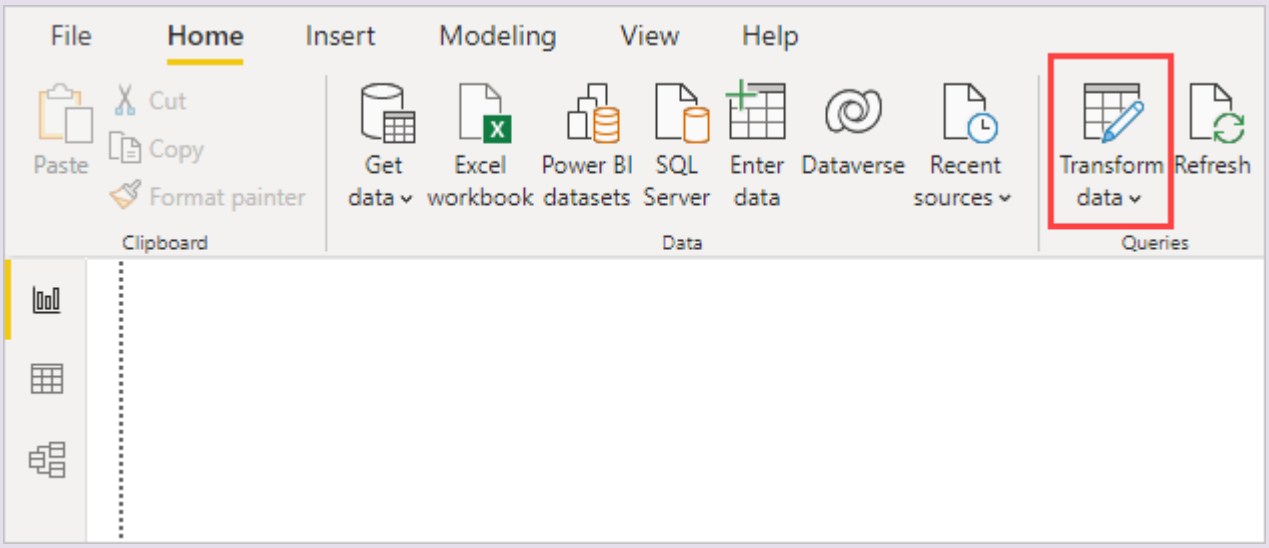
Transformation in Power BI refers to the process of modifying and structuring raw data to make it suitable for analysis and visualization, involving tasks like cleaning, formatting, filtering, aggregating, merging, and splitting data.

- **Concatenation**
- **Merging Columns**
- **Duplicate Columns**
- **Splitting Column into two or more columns**
- **Extracting the specific requirement like date, month, day or any other string also**

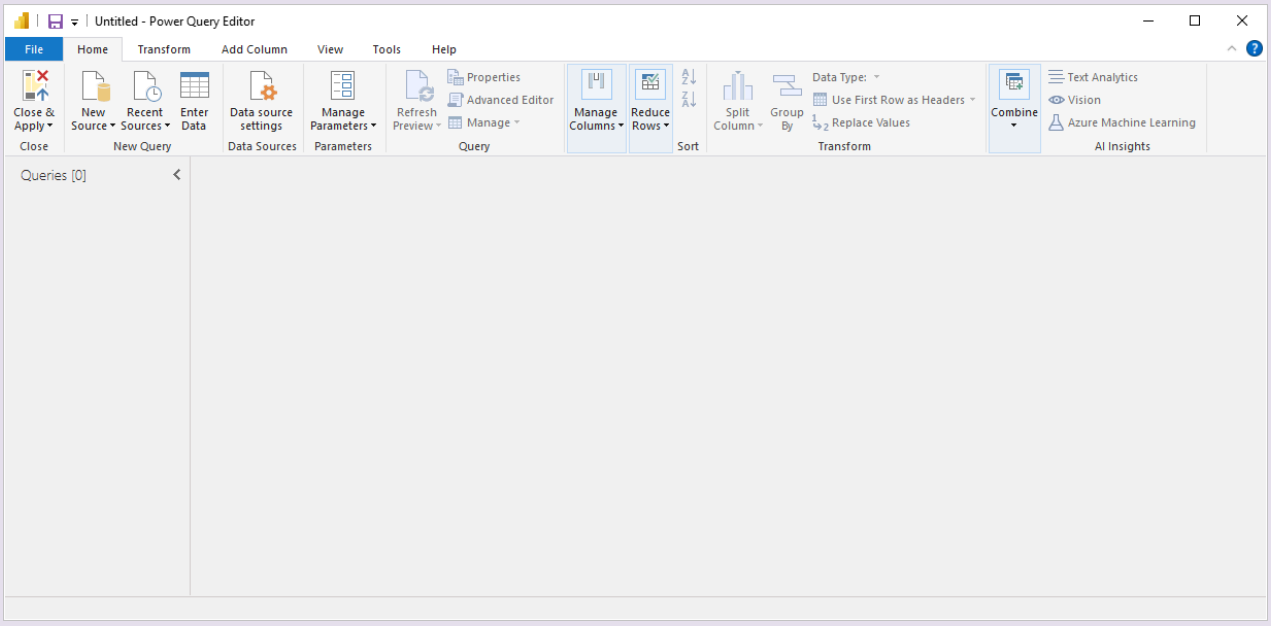
Here The steps you can follow to do transformation of your data



Then



And then you will be able to do transformation of your data accordingly.



Then here you will find these Options in Power Query (Transform).

- **Group By:** The "Group By" operation in Power BI aggregates and summarizes data based on specified criteria, creating groups and calculating aggregate values for each group.
- **Use First Row as Header:** This will use the first rows of each table and make it as the Header of each column.
- **Transpose:** Transpose in Power BI reorganizes data by converting rows into columns and columns into rows, facilitating data pivoting for analysis and visualization.
- **Reverse Rows:** This will reverse the whole row from up to down.
- **Count Rows:** This is used to count the number of rows in the table.
- **Data type:** You can change the data type of the column with this.

- **Detect Data Type:** This function usually detects the data type on any column.
- **Rename:** You can rename the table or column name accordingly.
- **Replace value:** With this you can replace the values of a column like from “United States” to “USA”.
- **Fill Up/Down:** This is used to fill the empty rows with a selected value Up or Down.

- **Pivot Column:** Pivot column rotates unique values from a column into new columns, summarizing data across those new columns.
- **Unpivot Columns:** Unpivot column transforms multiple columns into two columns: an attribute column containing the original column headers and a value column containing the corresponding values, allowing normalization of data.

- **Move:** You can move the column left or right or anywhere you want.
- **Convert to list:** This will convert the column into a list.

- **Split Column:** This will split the column into two or more columns on the basis of a condition like if there is a value in the column like “CA-2014” this will split into two columns storing in first “CA” and second one “2014”.(We splits it by(-) this).
- **Format:** In this we get many options to change the values of the column into LOWERCASE, UPPERCASE and many more.
- **Extract:** We can extract the length, first character, last character etc.
- **Statics:** This allows us to perform tasks on the column such as Sum, Count, Average, Minimum, Max etc.
- **Date Time**: This is the one of the most important things in power BI as it is used to extract the date and time, also we may perform such other tasks related to date and time also.

Options in Power Query (Home)

- **Close and apply:** This will apply all the selection, operation, filters and close the power query.
- **New Source:** You can connect to the new data sources with this.
- **Recent Source:** You can check which data sources you’re connected to.
- **Enter Data:** With this you can create a table manually on power query.
- **Manage Parameter:** You can create and manage the parameter here.

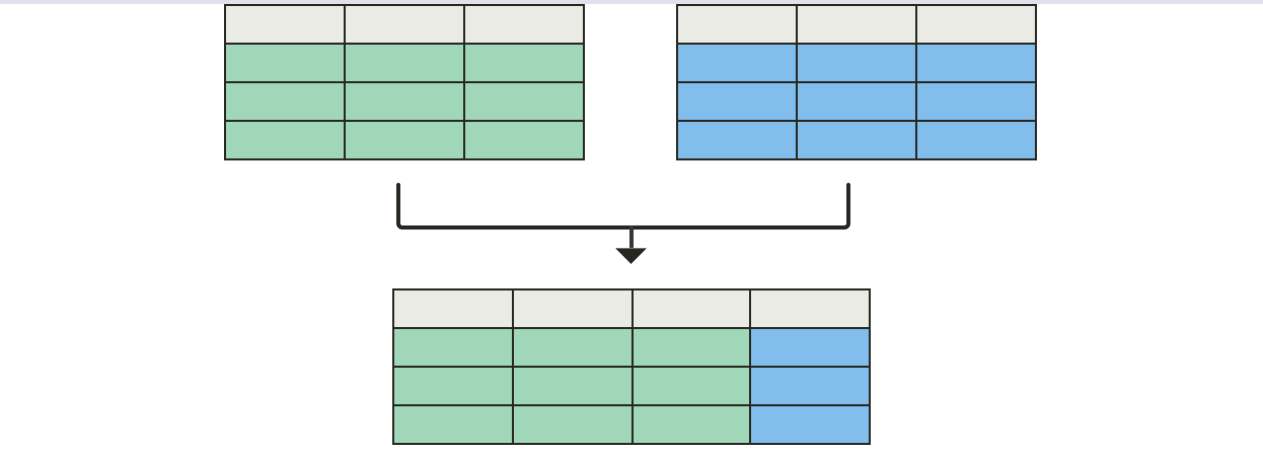
Q. What is an Append and Merge Query?

Merging queries in Power BI combines columns from two different tables into a single table based on a related column (a join operation).

You can find the Merge queries command on the **Home** tab, in the Combine group. From the drop-down menu, there are two options:

Merge queries: Displays the Merge dialog box, with the selected query as the left table of the merge operation.

Merge queries as new: Displays the Merge dialog box without any pre-selected tables for the merge operation.



There are some rules to use merge Query

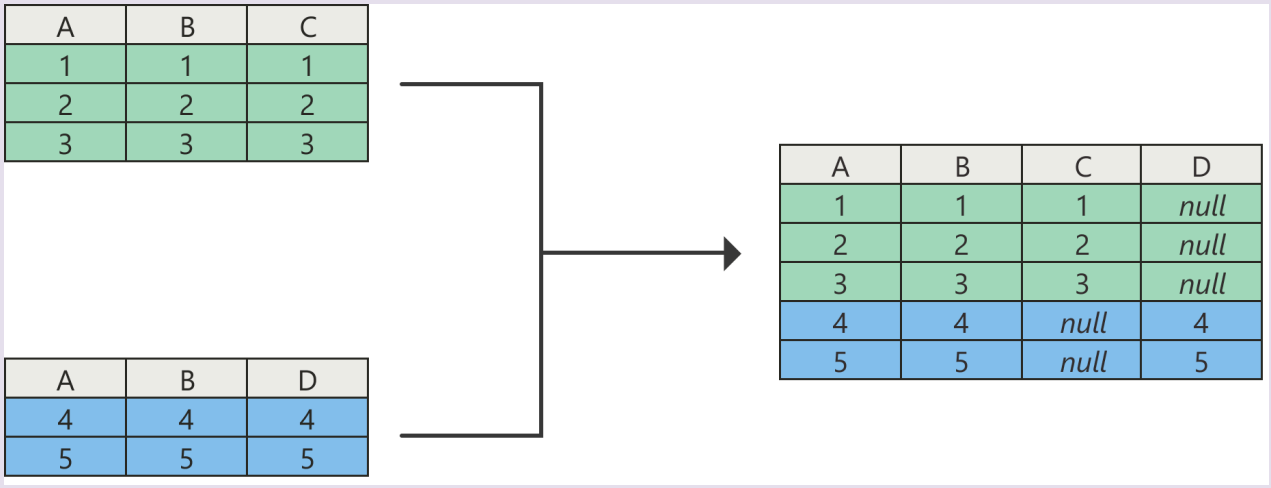
- ➔ **Understand Match Criteria:** Clearly define the key columns for merging tables.
- ➔ **Choose Merge Type:** Select merge type (inner, left/right outer, full outer) based on analysis needs.
- ➔ **Check Data Types:** Ensure compatibility of merging columns' data types.
- ➔ **Cleanse Data:** Clean and transform data before merging for consistency.
- ➔ **Preview Merge:** Review merged results for accuracy, noting any anomalies.
- ➔ **Optimize Performance:** Optimize merge queries for efficiency, especially with large datasets.

While **Appending** queries in Power BI combine rows from two or more tables into a single table by stacking them on top of each other (a union operation).

You can find the Append queries command on the Home tab in the Combine group. On the drop-down menu, there are two options:

Append queries displays the Append dialog box to add more tables to the current query.

Append queries as new displays the Append dialog box to create a new query by appending multiple tables.



Rules:-

- ➔ **Ensure Consistent Structure:** Verify tables have matching column numbers and compatible data types.
- ➔ **Cleanse Data:** Preprocess tables to ensure consistency before appending.
- ➔ **Order Columns:** Arrange columns in the same order for seamless appending.
- ➔ **Preview Results:** Review the appended dataset to confirm desired structure and completeness.
- ➔ **Handle Duplicates:** Decide on duplicate handling strategy (retain, remove, or merge) during append.
- ➔ **Manage Data Types:** Check for data type mismatches and ensure appropriate conversions.
- ➔ **Consider Incremental Loading:** Design queries for efficient appending, especially for incremental data updates.

Q. What is Business KPI (Key Performance Indicator/ Matrices)?

Business KPI stands for Key Performance Indicator. It's a measurable value that demonstrates how effectively a company is achieving key business objectives. KPIs are used to evaluate the success or performance of an organization in relation to its strategic goals. These indicators can vary widely depending on the industry, business model, and specific objectives of the organization, but they often include metrics related to revenue, profitability, customer satisfaction, market share, efficiency, and other critical aspects of business performance.

- ➔ Measuring Success
- ➔ Focus on Priorities
- ➔ Performance Monitoring.

When to use KPI's

KPI's greate choice:

- ➔ To measure the progress, Answer the questions "**What i am ahead or behind**"
- ➔ To measure distance to goal, Answers the question "**How far ahead or behind i am**"

KPI's requirement

A designer bases a KPI visual on a specific measure. The intention of the KPI is to help you evaluate the current value and status of a metric against a defined target. A KPI visual requires a base measure that evaluates to a value, a target measure or value, and a threshold or goal.

A KPI semantic model needs to contain goal values for a KPI. If your semantic model doesn't contain goal values, you can create them by adding an Excel sheet with goals to your data model or PBIX file.

For more information click below
https://learn.microsoft.com/en-us/power-bi/visuals/power-bi-visualization-kpi?tabs=powerbi-desktop#how-to-create-a-kpi

Q. Data Visualization?

Every day your business generates more data on sales revenue, marketing performance, customer interactions, inventory levels, production metrics, staffing levels, costs, and other KPIs. But with so much data to sift through, it can be difficult for people to see the story it tells.

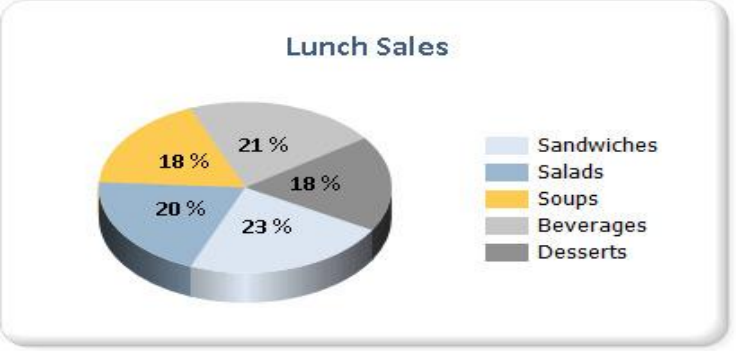
Data visualization helps you turn all that granular data into easily understood, visually compelling and useful business information. By tapping into external data sources, today's data visualization tools don't simply let you see your KPIs more clearly, they unify data and apply AI-driven analytics to reveal relationships between your KPIs, the market, and the world.

Why data visualization is important

Hidden within your data lie important insights that can help drive business forward. But the challenge is that you can't always connect the dots by looking at raw numbers alone. When you look at your data presented in a visual format, patterns, connections, and other "a-ha" insights emerge that would otherwise remain out of sight.

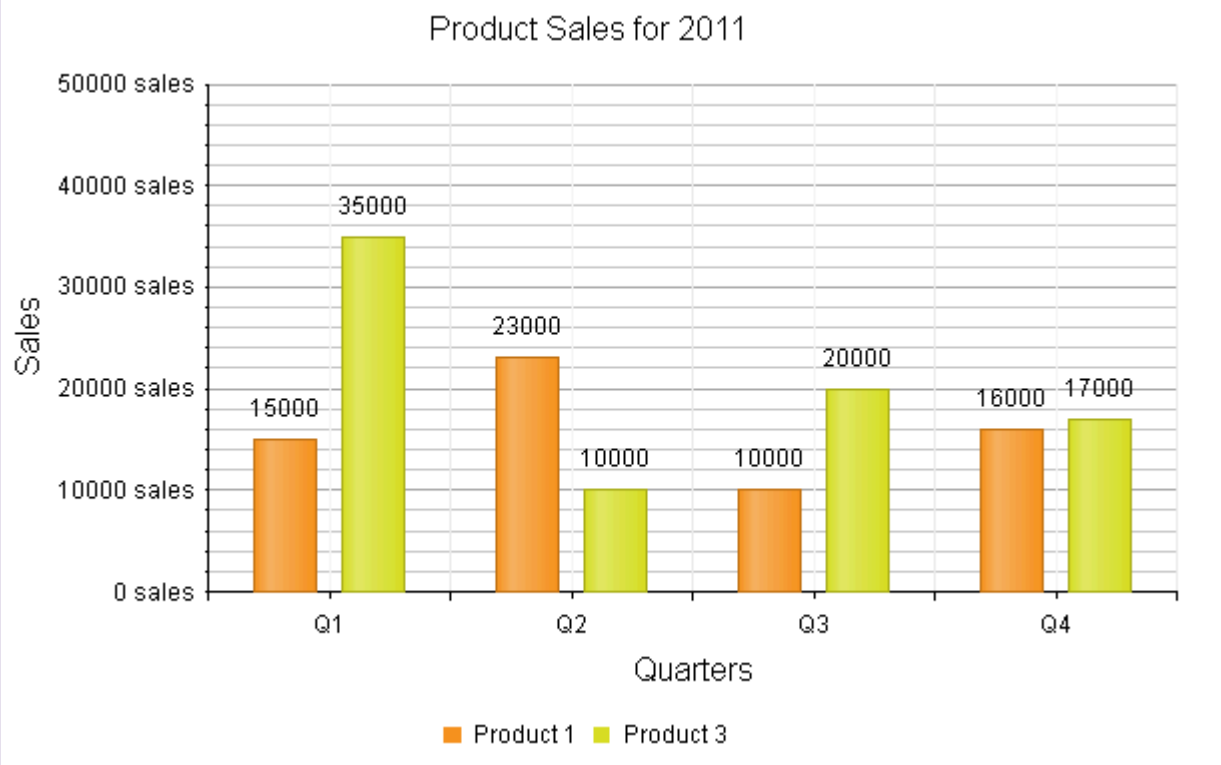
Different Charts:-

Pie Charts: A pie chart is a circular graphical representation that divides data into slices to show the proportion or percentage of each category relative to the whole.



- ➔ **Show Proportions:** Pie charts effectively display proportions or percentages of a whole. Each slice represents a portion of the total, making it easy to compare relative sizes.
- ➔ **Highlight Distribution:** They're useful for showcasing the distribution of categories within a dataset. Each slice represents a category, allowing viewers to see how each category contributes to the whole.
- ➔ **Easy Comparison:** Pie charts allow for easy visual comparison of categories. Viewers can quickly identify which categories are larger or smaller relative to each other.

Column Chart: A column chart is a type of graphical representation that uses vertical bars to display data values for different categories or groups, allowing for easy comparison and analysis of data distribution within those categories.



- ➔ Comparison: Quickly compare data across categories.
- ➔ Clarity: Provide a clear and straightforward visualization.
- ➔ Visual Impact: Grab attention with visually distinct columns.
- ➔ Trend Spotting: Identify trends or variations among categories.
- ➔ Simple Representation: Easily understand data distribution within categories.

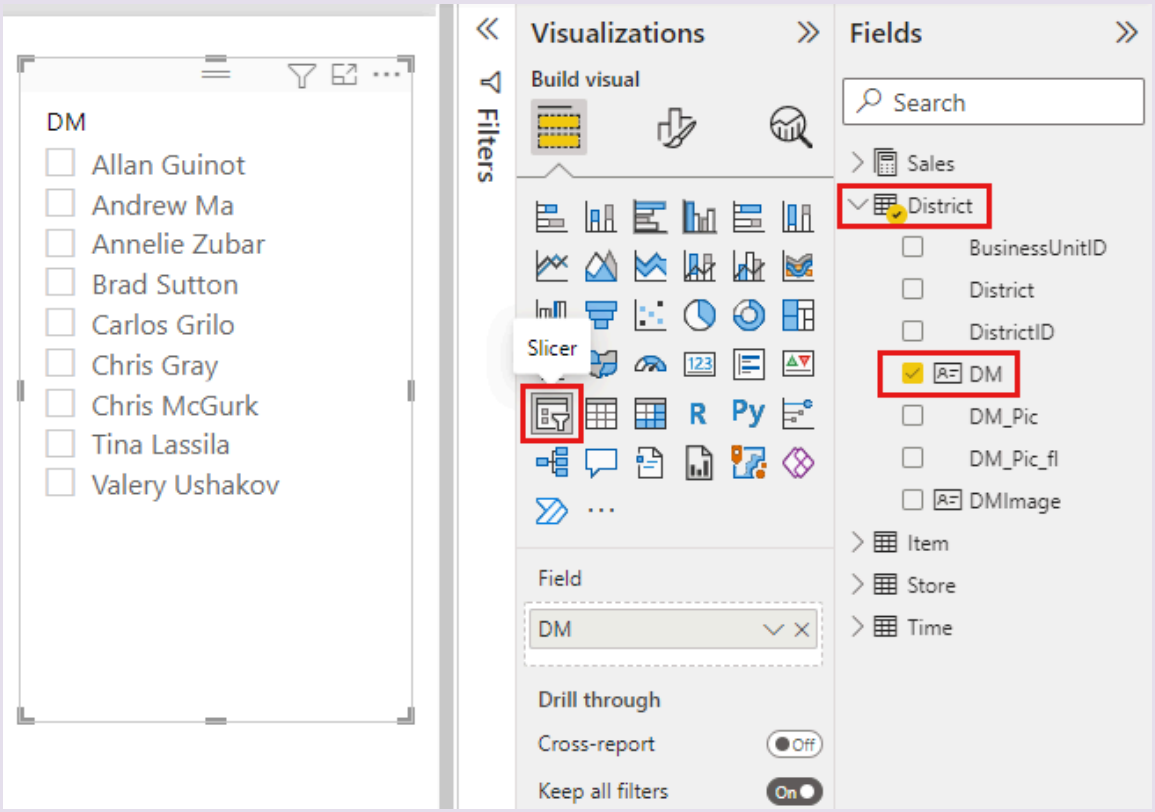
Slicers:-

A slicer in Power BI is a visual filter that allows users to interactively select and filter data displayed in other visuals on a report or dashboard.

Why to use Slicers

To enable users to dynamically filter and analyze data in Power BI reports and dashboards, making it easier to focus on specific subsets of data, identify trends, and gain insights quickly.

You can create the slicer like this



Types of Slicers:-

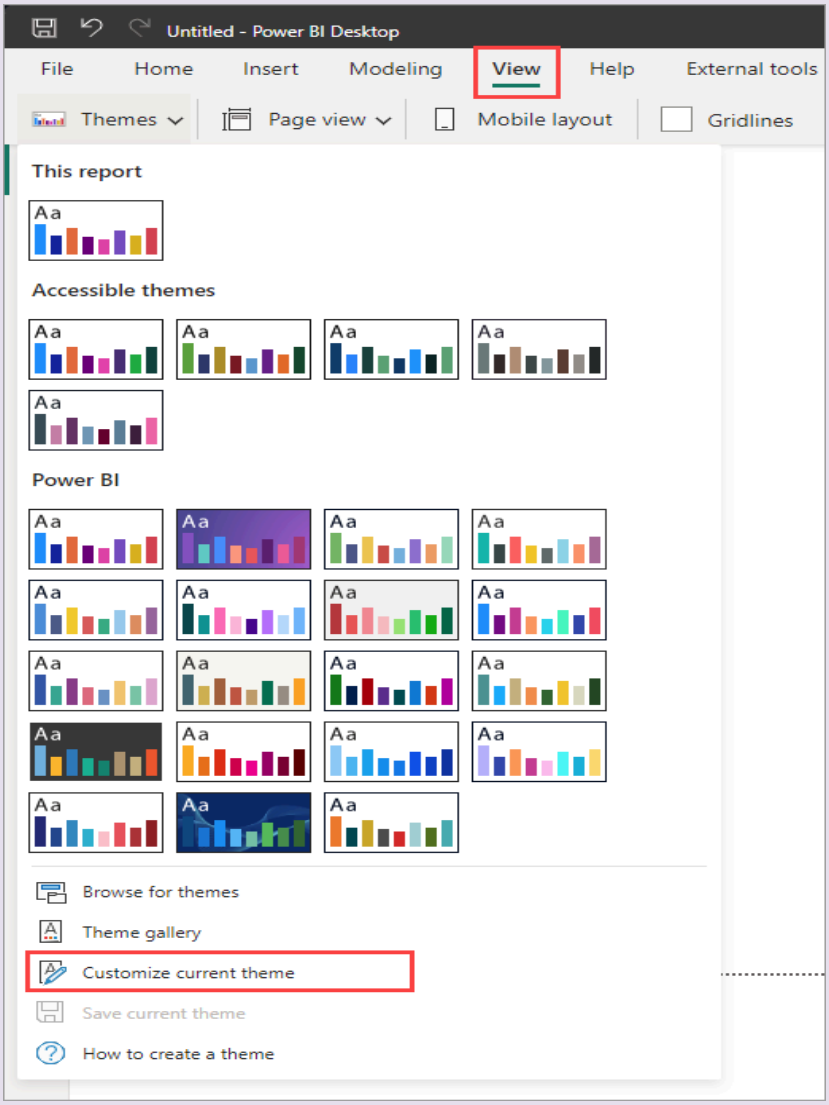
List Box: A list box slicer allows users to select one or more items from a list to filter the data in a report.

Dropdown: A dropdown slicer provides a compact list of options that users can select from to filter data in a report.

Tiles: Tiles in Power BI are individual visualizations or KPIs that are pinned to a dashboard for easy access and overview.

Color Theme (Custom and in built Theme)

A color theme in Power BI is a predefined set of colors that can be applied to visuals for consistent and visually appealing reports. In-built themes are ready-made color schemes provided by Power BI that users can apply to their reports.

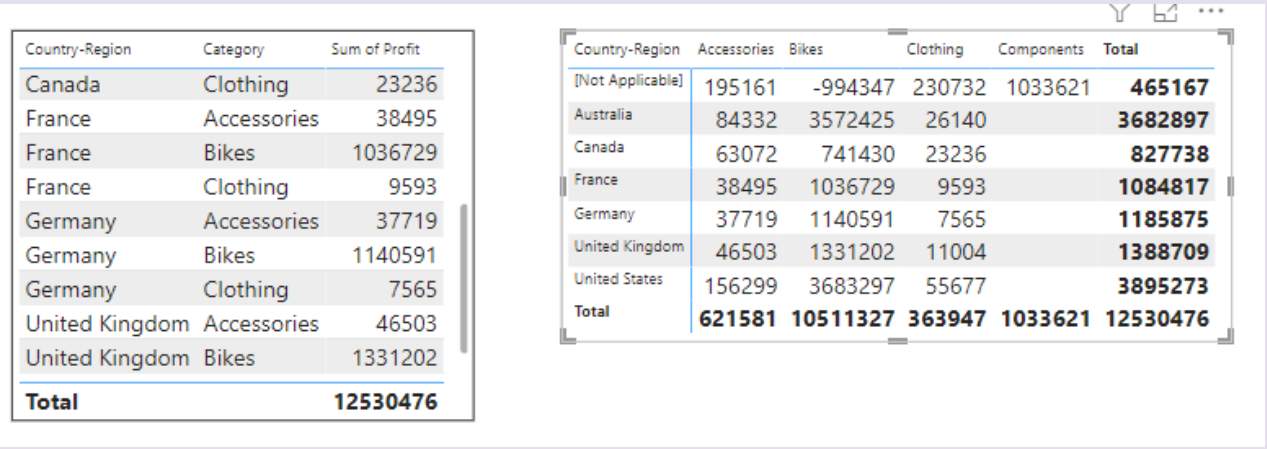


For more information
https://learn.microsoft.com/en-us/power-bi/create-reports/desktop-report-themes

Table VS Matrix:

Table: A table displays data in a simple grid format with rows and columns, showing each data point individually.

Matrix: A matrix is similar to a pivot table, allowing for data summarization and aggregation across multiple dimensions, with both rows and columns potentially having hierarchies.



Country-Region	Category	Sum of Profit
Canada	Clothing	23236
France	Accessories	38495
France	Bikes	1036729
France	Clothing	9593
Germany	Accessories	37719
Germany	Bikes	1140591
Germany	Clothing	7565
United Kingdom	Accessories	46503
United Kingdom	Bikes	1331202
Total		**12530476**

Country-Region	Accessories	Bikes	Clothing	Components	Total
[Not Applicable]	195161	-994347	230732	1033621	**465167**
Australia	84332	3572425	26140		**3682897**
Canada	63072	741430	23236		**827738**
France	38495	1036729	9593		**1084817**
Germany	37719	1140591	7565		**1185875**
United Kingdom	46503	1331202	11004		**1388709**
United States	156299	3683297	55677		**3895273**
Total	**621581**	**10511327**	**363947**	**1033621**	**12530476**

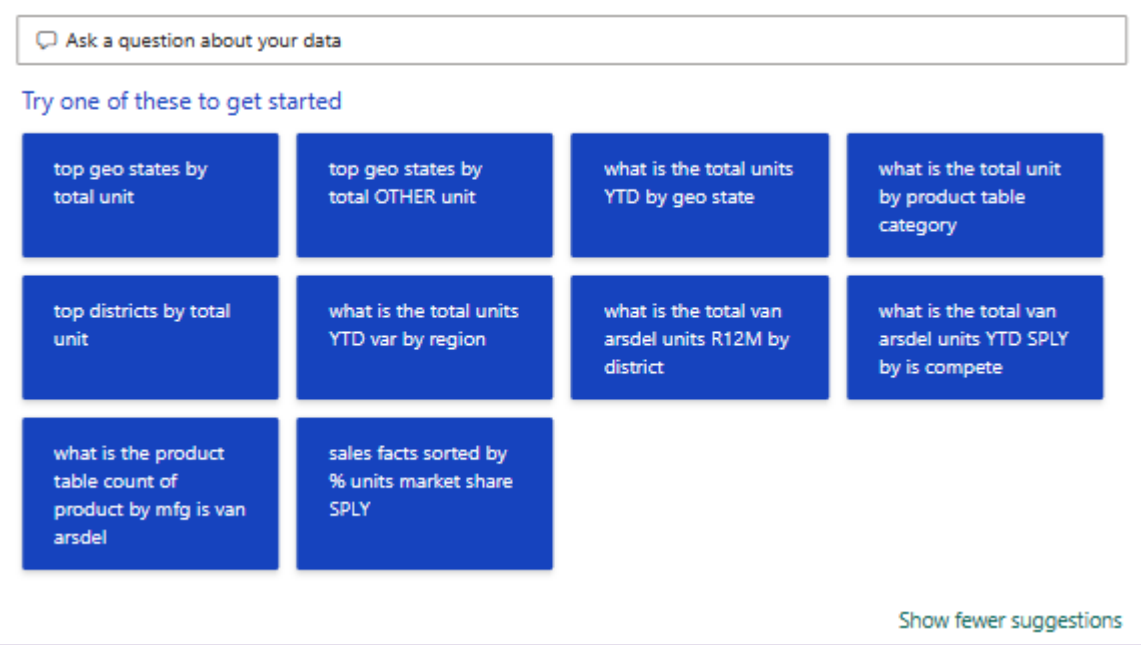
Table	Matrix
Single measure display	Multiple measures
Vertical layout	Cross-tabular view
Basic aggregation	Flexible aggregation
Limited formatting	Advanced formatting
Compact presentation	Hierarchical analysis

Q&A:

Q&A (Question and Answer) in Power BI is a natural language querying feature that allows users to ask questions about their data using everyday language, rather than writing complex queries. It enables users to interact with their data by typing questions or queries directly into a search box, and Power BI generates visualizations or answers based on the data model and underlying dataset.

Why to use Q&A

- ➔ Natural language querying feature in Power BI enabling users to ask questions and receive instant visualizations or answers.
- ➔ Facilitates intuitive data exploration without the need for complex queries, promoting self-service analytics and user engagement.
- ➔ Accelerates insight discovery and enhances accessibility by allowing users to interact with data using everyday language.



Decomposition Tree:

A decomposition tree in Power BI is a visual that breaks down a measure into its contributing factors, allowing for hierarchical exploration of data to understand underlying patterns and impacts.

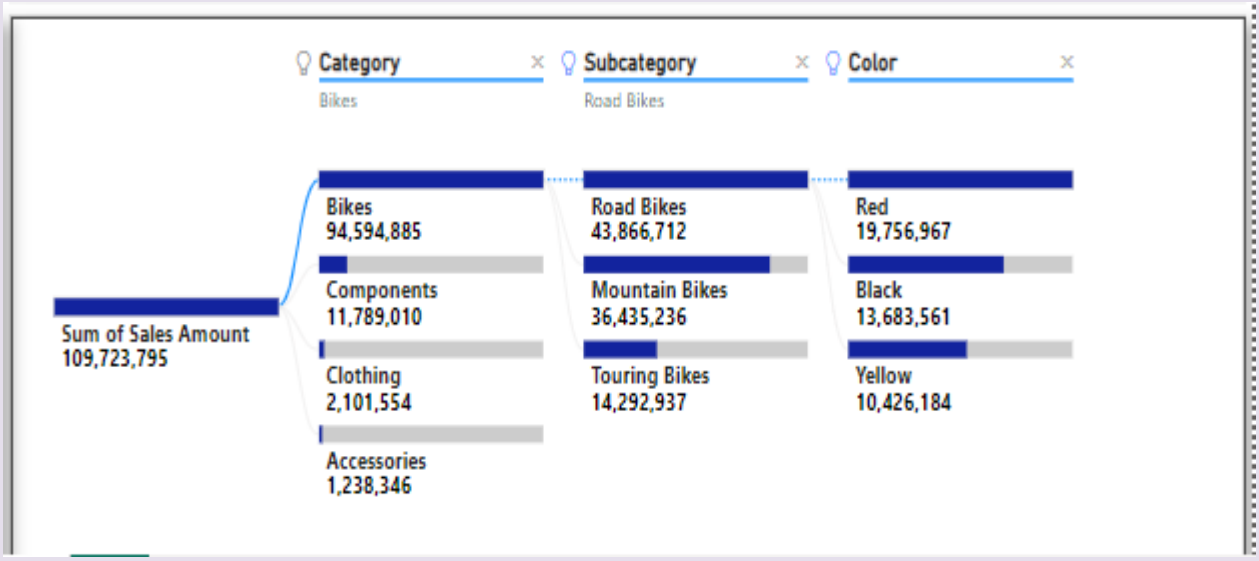
Why to use Decomposition Tree

Provides a visual way to explore hierarchical data relationships and analyze contributions to a total value.

Allows users to decompose data into its constituent parts, enabling deeper insights and understanding of data breakdowns.

Facilitates root cause analysis by visually identifying factors contributing most significantly to a given metric or outcome.

Offers an interactive and intuitive interface for exploring complex data structures and identifying key drivers of performance or trends.

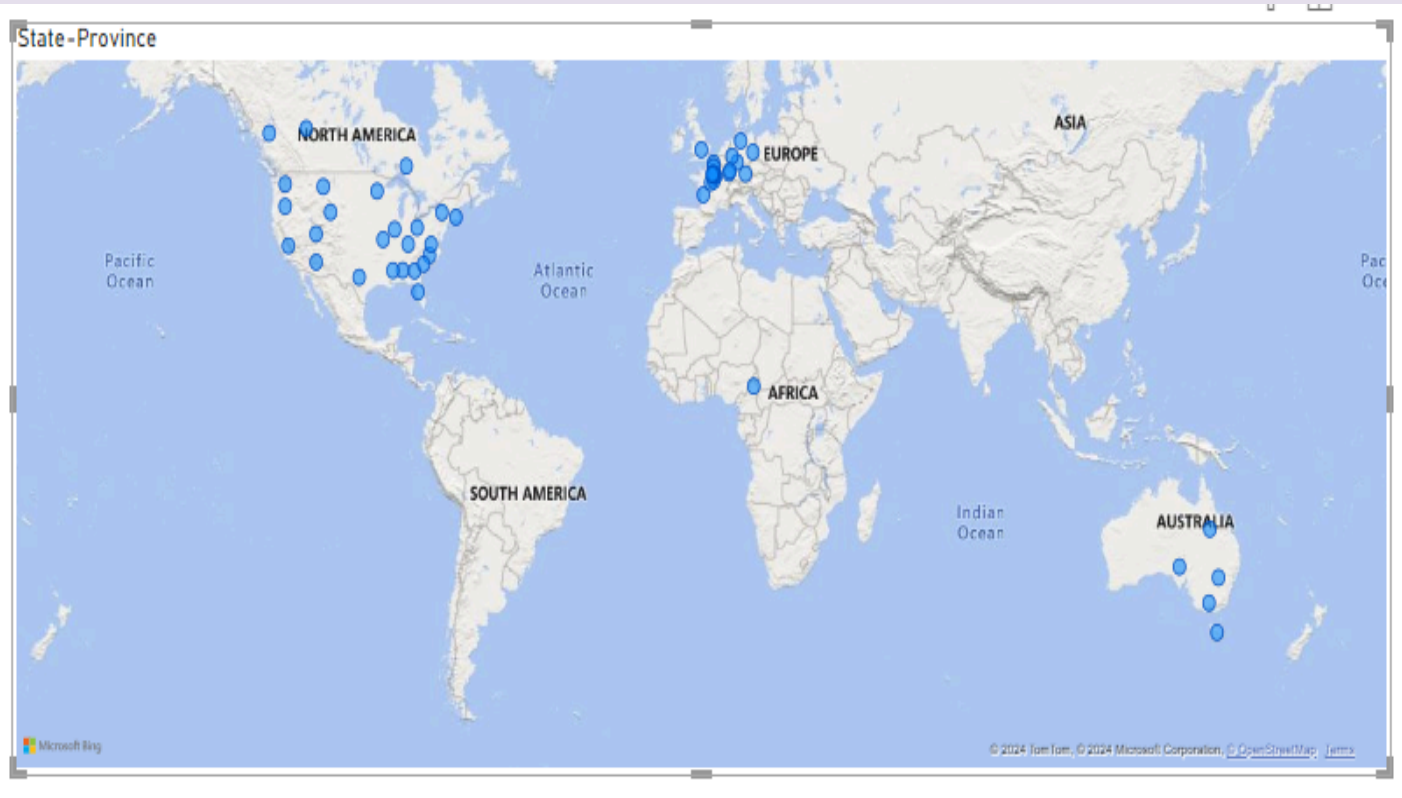


Maps:

Maps in Power BI are visualizations that display geographical data on a map layout, allowing users to see spatial relationships and trends across different locations. They can use various map types, such as filled maps, bubble maps, and shape maps, to represent data points and areas.

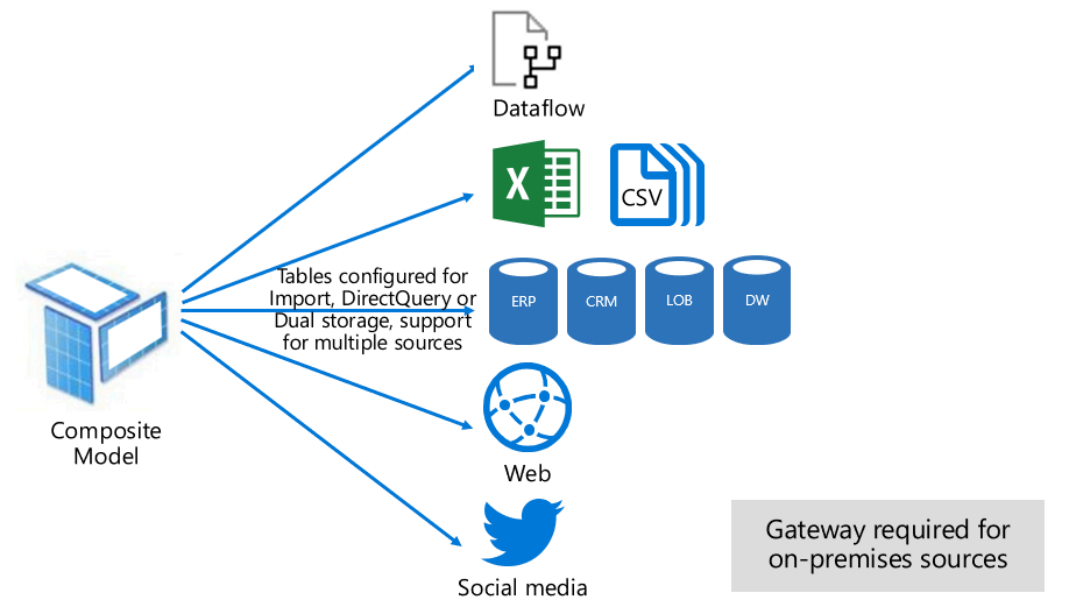
Why to use Maps

- ➔ Provides a visual representation of geographical data, enabling users to analyze data patterns and trends across locations.
- ➔ Facilitates spatial analysis by overlaying data onto maps, allowing users to identify geographic correlations and insights.
- ➔ Supports visualization of data points, regions, or routes, enhancing understanding of location-based information.
- ➔ Enables interactive exploration of data through zooming, panning, and filtering functionalities on the map.



Q. What are the Connectivity Options in Power BI?

Power BI provides various connectivity options to connect to data sources, including Import, DirectQuery, Live Connection, Hybrid, and Dual Connection, each catering to different data access and performance needs.



Import, Direct (Live Connectivity, Hybrid, Dual Connection)

- **Import**: Data is loaded into Power BI's in-memory storage, allowing fast query performance but requiring scheduled refreshes.
- **DirectQuery**: Data is queried directly from the source in real-time, keeping the dataset size small but potentially impacting performance.
- **Live Connection**: Similar to DirectQuery, but specifically used for connecting to data models in Analysis Services.
- **Hybrid**: Combines both Import and DirectQuery modes within a single dataset, allowing flexibility in data access.
- **Dual Connection**: Enables a table to operate in both Import and DirectQuery modes, optimizing performance based on usage context.

For more information
https://learn.microsoft.com/en-us/power-bi/connect-data/service-dataset-modes-understand

Q. Difference between Import and Direct Connection (Benefits, Drawback, Limitations)?

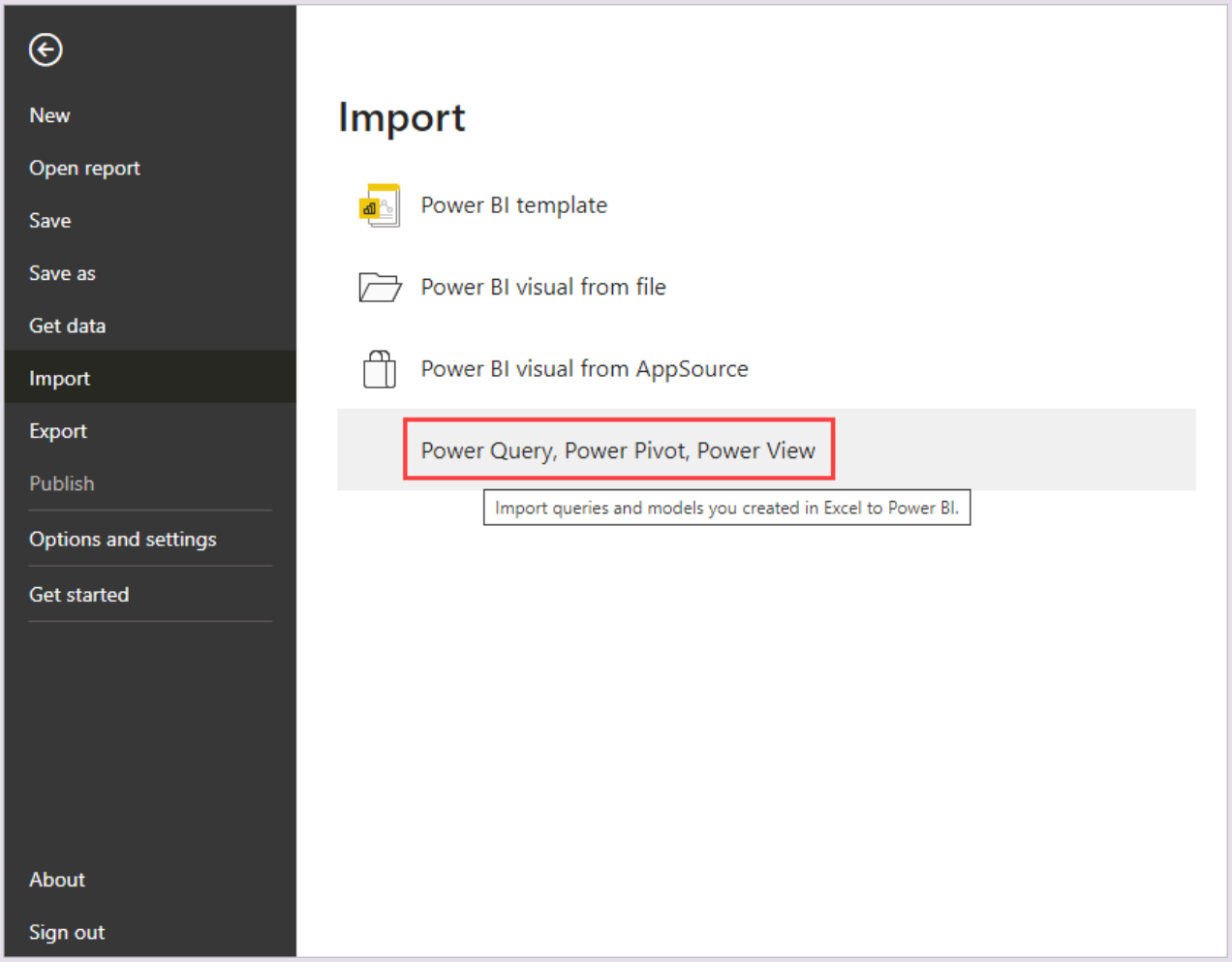
Import:

An "import query" in Power BI is the process of bringing external data into Power BI for analysis and visualization. It involves using Power Query to clean and shape the data from various sources like databases or files. Once imported, this data can be used to create reports and dashboards.

Benefits: Fast performance, offline access, full Power BI functionality.

Drawbacks: Requires scheduled refresh, can consume significant storage.

Limitations: Data is as current as the last refresh.



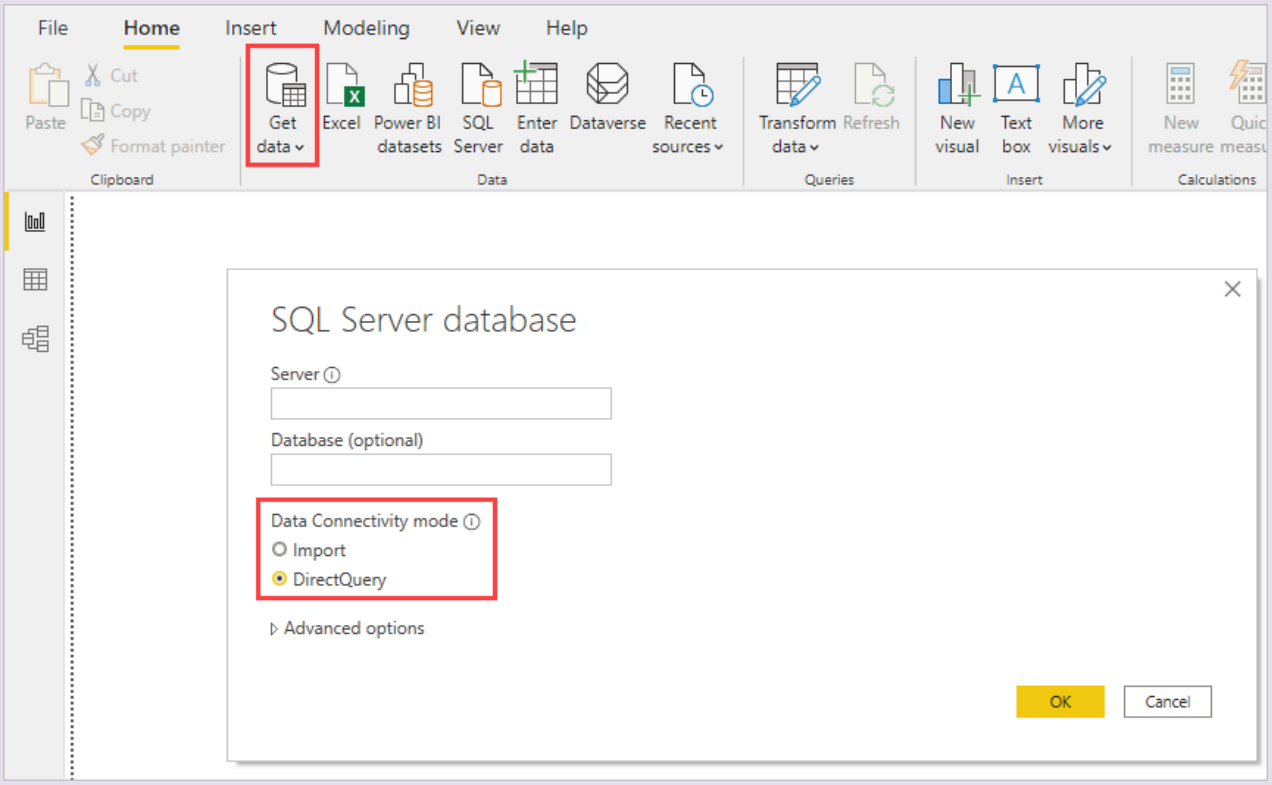
DirectQuery:

Direct Query in Power BI is a method of connecting to a data source in real-time, allowing Power BI to query the data source directly without importing the data into the Power BI model. This means that the data displayed in visualizations is always up-to-date with the data source. Direct Query is useful when working with large or frequently updated datasets, as it reduces the need to store and manage large amounts of data within Power BI.

Benefits: Real-time data, no storage limits in Power BI, up-to-date data without refresh.

Drawbacks: Potentially slower performance, limited Power BI functionality, depends on source performance.

Limitations: Some DAX functions and features are restricted.



Q.What is PBI Service how to publish reports there(Pro License)?

Power BI Service is a cloud-based platform provided by Microsoft as part of the Power BI suite. It allows users to publish, share, and collaborate on Power BI reports and dashboards over the internet. Key features of Power BI Service include.

- ➔ Publish reports online.
- ➔ Share and collaborate on reports and dashboards.
- ➔ Schedule data refreshes.
- ➔ Manage access permissions and security.
- ➔ Edit reports directly in the web browser.
- ➔ Access reports on mobile devices.

Publishing Report to PBI Service

Publishing a Power BI report to the Power BI Service with a Pro License involves uploading your report from Power BI Desktop to the online Power BI workspace, enabling sharing, collaboration, and further interaction with your reports.

Here, how you can publish your report to power bi service

Create Report: Build your report in Power BI Desktop with your desired visualizations and data connections.

Save Report: Save your report (.pbix file) on your computer.

Sign in to Power BI Service: Open your web browser and sign in to Power BI Service with your Microsoft account or organizational account.

Navigate to Workspace: Go to the workspace where you want to publish the report.

Upload Report: Click on "Upload" and select your saved .pbix file from your computer.

Confirm Upload: Once the upload is complete, you'll see your report listed in the workspace.

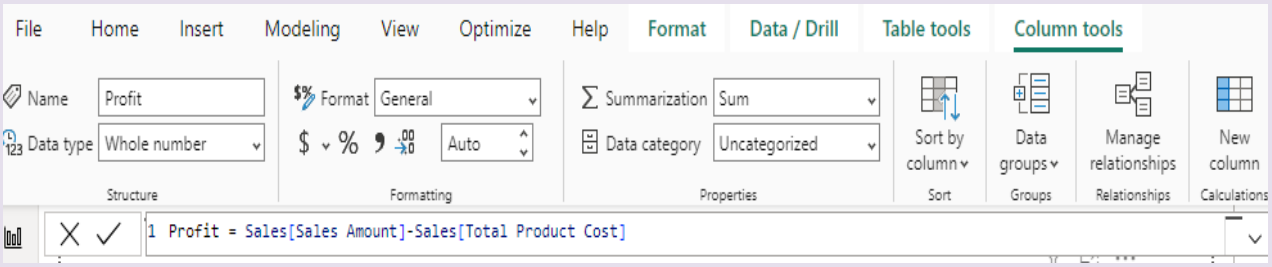
Open Report: Click on the report to open and view it in Power BI Service.

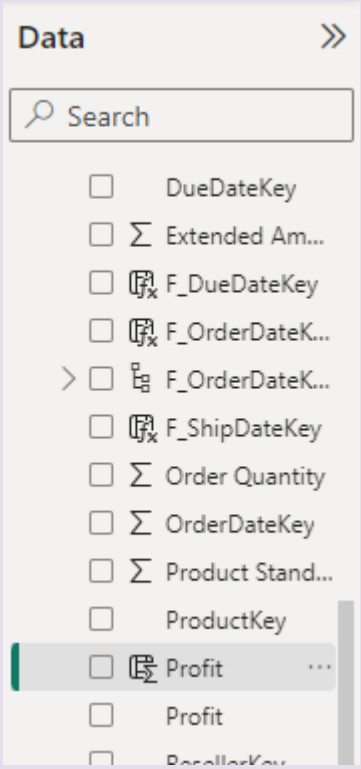
Q. What is Measure?

A measure is a dynamic calculation in Power BI that performs aggregations and computations based on the filter context, often used for creating summaries and KPIs.

Why to use Measures

- ➔ Dynamic calculations
- ➔ Aggregations
- ➔ Reusable logic
- ➔ Complex calculations
- ➔ Performance optimization



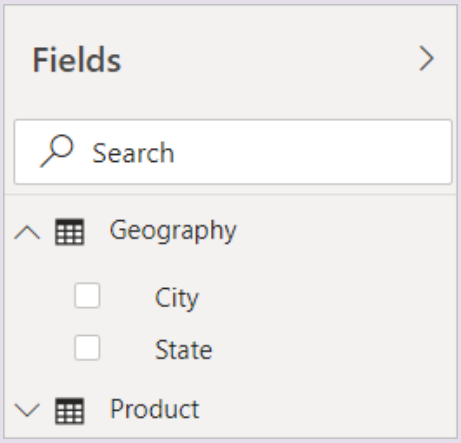


Q. What is a Calculated Column?

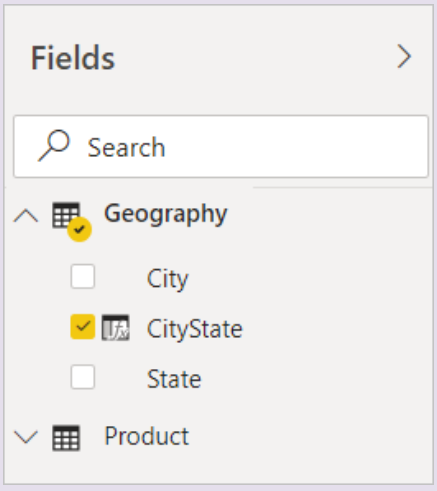
A calculated column is a new column added to a table in Power BI using a DAX formula, with values computed row-by-row and stored in the data model.

Why to use Calculated Column

- ➔ Static calculations
- ➔ Data enrichment
- ➔ Permanent data storage
- ➔ Filtering and sorting
- ➔ Row-level calculations




```
Apply DAX Formula <> CityState = [City] & "," & [State]
```



For more information
https://learn.microsoft.com/en-us/power-bi/transform-model/desktop-calculated-columns

What's the difference between measure and calculated column?

Measure:

Dynamic: Calculated on-the-fly based on filter context.

Not Stored: Values are not stored in the model, only the formula is.

- ➔ Computes dynamic aggregations and calculations based on user interactions and filter context within visuals.
- ➔ Utilizes DAX (Data Analysis Expressions) formulas.
- ➔ Performs calculations at query time.
- ➔ Best suited for aggregations and dynamic calculations in visuals.

Calculated Column:

Static: Calculated once per row and stored in the data model.

Stored: Values are stored in the model.

- ➔ Computes static values for each row in a table based on a formula.
- ➔ Utilizes DAX formulas.
- ➔ Stores calculated values in the dataset permanently.
- ➔ Best suited for enriching data, performing row-level calculations, and enabling filtering and sorting.

Q. What is DAX?

DAX (Data Analysis Expressions) is a formula language used in Power BI, Excel, and Analysis Services Tabular models for data modeling and calculations. It's designed for creating custom calculations, aggregations, and manipulating data within these tools. DAX functions are used to perform a wide range of operations, including filtering, sorting, aggregating, and creating calculated columns and measures.

Why to use DAX Functions

- ➔ **Flexible Calculations:** DAX allows for the creation of custom calculations and measures to meet specific analytical needs.
- ➔ **Aggregations:** It enables the aggregation of data across multiple rows or columns, providing insights into summarized data trends or metrics.
- ➔ **Data Modeling:** DAX is used for data modeling tasks such as defining relationships between tables, creating calculated columns, and managing hierarchies.
- ➔ **Performance Optimization:** DAX can improve report performance by pre-calculating results and aggregations, reducing the workload on data sources and improving responsiveness.
- ➔ **Dynamic Analysis:** DAX enables dynamic calculations that respond to user interactions and filter context changes within reports, providing real-time insights.

Can we write the same formula or expression in measure and calculated column?

Yes, the same DAX formula can often be written in both a measure and a calculated column, but their context and performance implications will differ. Measures are dynamic and calculated based on filters, while calculated columns are static and stored in the data model.

Here are some DAX Formulas:-

AVERAGE

- **Definition:** The **AVERAGE** function calculates the arithmetic mean of a column of numbers.
- **Syntax:** AVERAGE(column)
- **Example:** Average_Sales = AVERAGE(Sales[Amount])

AVERAGE X

- **Definition:** The **AVERAGEX** function calculates the arithmetic mean of an expression evaluated over a table.
- **Syntax**: AVERAGEX(table, expression)
- Example: AveragePricePerUnit = AVERAGEX(Sales, Sales[TotalPrice] / Sales[Quantity])

COUNT

- **Definition**: The **COUNT** function counts the number of non-blank values in a column.
- **Syntax**: COUNT(column)
- **Example:** TotalOrders = COUNT(Sales[OrderID])

COUNTA

- **Definition**: The **COUNTA** function counts the number of non-blank values in a column, including text, numbers, and other types.
- **Syntax**: COUNTA(column)
- **Example:** NonBlankEntries = COUNTA(Sales[CustomerName])

COUNTX

- **Definition**: The **COUNTX** function counts the number of rows that result from evaluating an expression for each row of a table.
- **Syntax**: COUNTX(table, expression)
- **Example:** OrdersWithDiscount = COUNTX(Sales, IF(Sales[Discount] > 0, 1, BLANK()))

COUNTROWS

- **Definition**: The **COUNTROWS** function counts the number of rows in a table.
- **Syntax**: COUNTROWS(table)
- Example: TotalSalesRows = COUNTROWS(Sales)

SUM

- **Definition**: The **SUM** function adds all the numbers in a column.
- **Syntax**: SUM(column)
- **Example:** TotalRevenue = SUM(Sales[Revenue])

SUMX

- **Definition**: The **SUMX** function iterates over a table, evaluates an expression for each row, and sums the results.
- **Syntax**: SUMX(table, expression)
- **Example:** TotalProfit = SUMX(Sales, Sales[Quantity] * (Sales[UnitPrice] - Sales[CostPrice]))

DATEDIFF

- **Definition**: The **DATEDIFF** function returns the difference between two dates in the specified time unit (e.g., days, months, years).
- **Syntax**: DATEDIFF(start_date, end_date, unit)
- **Example:** DaysBetweenOrders = DATEDIFF(Sales[OrderDate], Sales[DeliveryDate], DAY)

TODAY

- **Definition**: The **TODAY** function returns the current date.
- **Syntax**: **TODAY()**
- **Example:** CurrentDate = TODAY()

NOW

- **Definition**: The **NOW** function returns the current date and time.
- **Syntax**: NOW()
- **Example:** CurrentDateTime = NOW()

YEAR

- **Definition**: The **YEAR** function returns the year from a date.
- **Syntax**: YEAR(date)
- **Example:** OrderYear = YEAR(Sales[OrderDate])

MONTH

- **Definition**: The **MONTH** function returns the month from a date.
- **Syntax**: MONTH(date)
- **Example:** OrderMonth = MONTH(Sales[OrderDate])

CALCULATE

- **Definition:** The **CALCULATE** function in DAX is used to modify the filter context for a calculation in a DAX expression. It allows you to apply filters to specific columns or tables within a calculation, enabling dynamic analysis and aggregation of data.
- **Syntax:** CALCULATE(Expression, Filter1, Filter2, ...)
- **Example**: CALCULATE(SUM(Sales[Amount]), Sales[Region] = "North")

RANKX:

- **Definition**: The **RANKX** function assigns a rank to each row of a result set based on a specified expression or column. It's commonly used in DAX to rank items within a dataset based on certain criteria.
- **Syntax**: RANKX(Table, Expression, [Value], [Order], [Ties])
- **Example**: RANKX(Products, Products[Sales], , DESC)

CONCATENATEX:

- **Definition**: **CONCATENATEX** is a DAX function that concatenates the result of an expression evaluated for each row in a table, using a specified delimiter to separate the values. It's useful for creating concatenated strings from values in a table.
- **Syntax**: CONCATENATEX(Table, Expression, [Delimiter], [OrderBy], [Order], [Filter])
- **Example**: CONCATENATEX(Products, Products[Product Name], ", ")

FILTER:

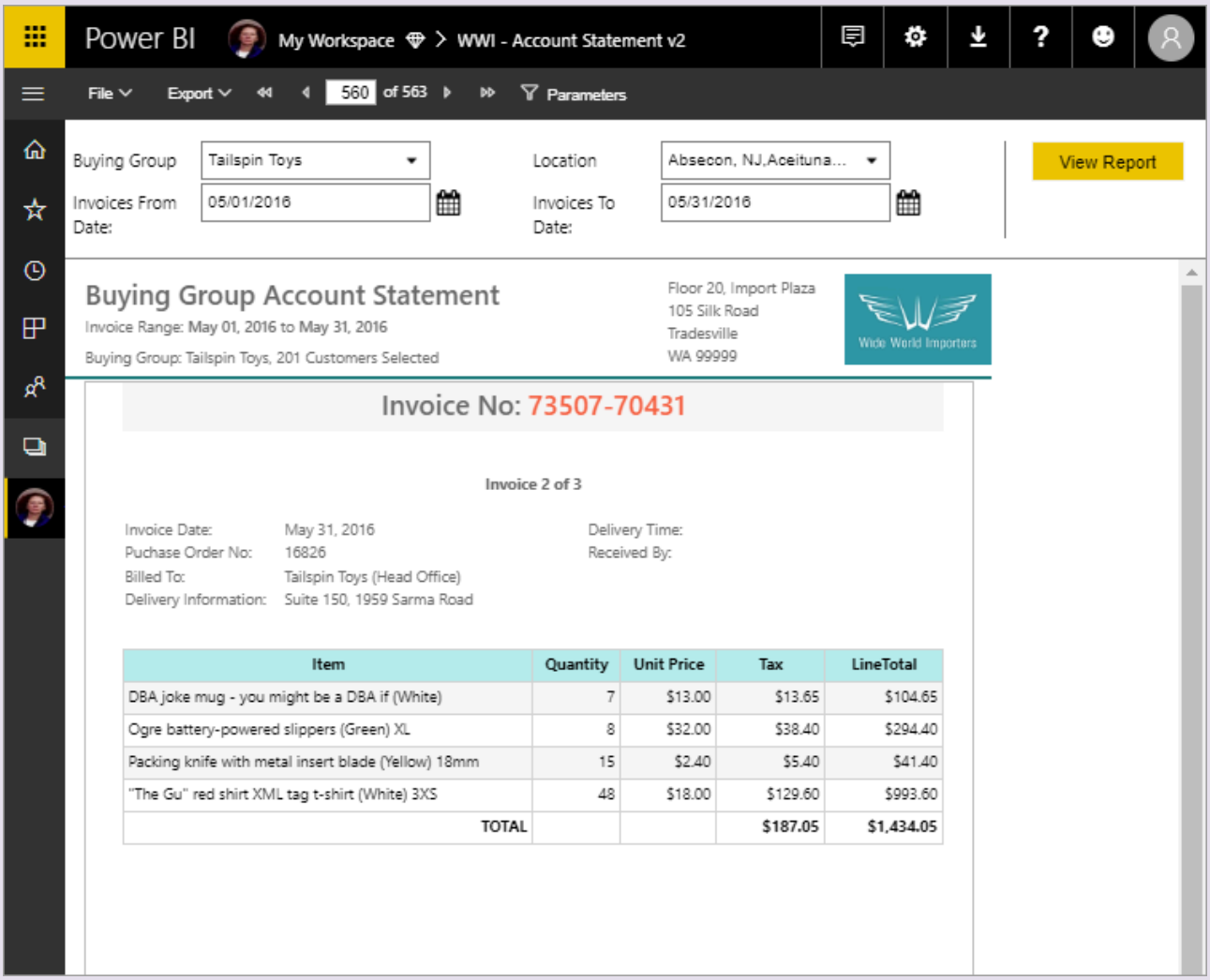
- **Definition**: **FILTER** is a DAX function that returns a subset of data from a table based on specified criteria. It's commonly used to filter rows based on certain conditions.
- **Syntax**: FILTER(Table, Condition1, Condition2, ...)
- **Example**: FILTER(Sales, Sales[Amount] > 1000)

SWITCH:

- **Definition**: **SWITCH** is a DAX function that evaluates a list of conditions and returns the result corresponding to the first condition that evaluates to TRUE. It's similar to a series of IF statements but can be more concise and easier to read in some cases.
- **Syntax**: SWITCH(Expression, Value1, Result1, Value2, Result2, ...)
- **Example**: SWITCH(Products[Category], "Electronics", "High-Tech", "Clothing", "Fashion", "Other")

Q. What is a Paginated Report?

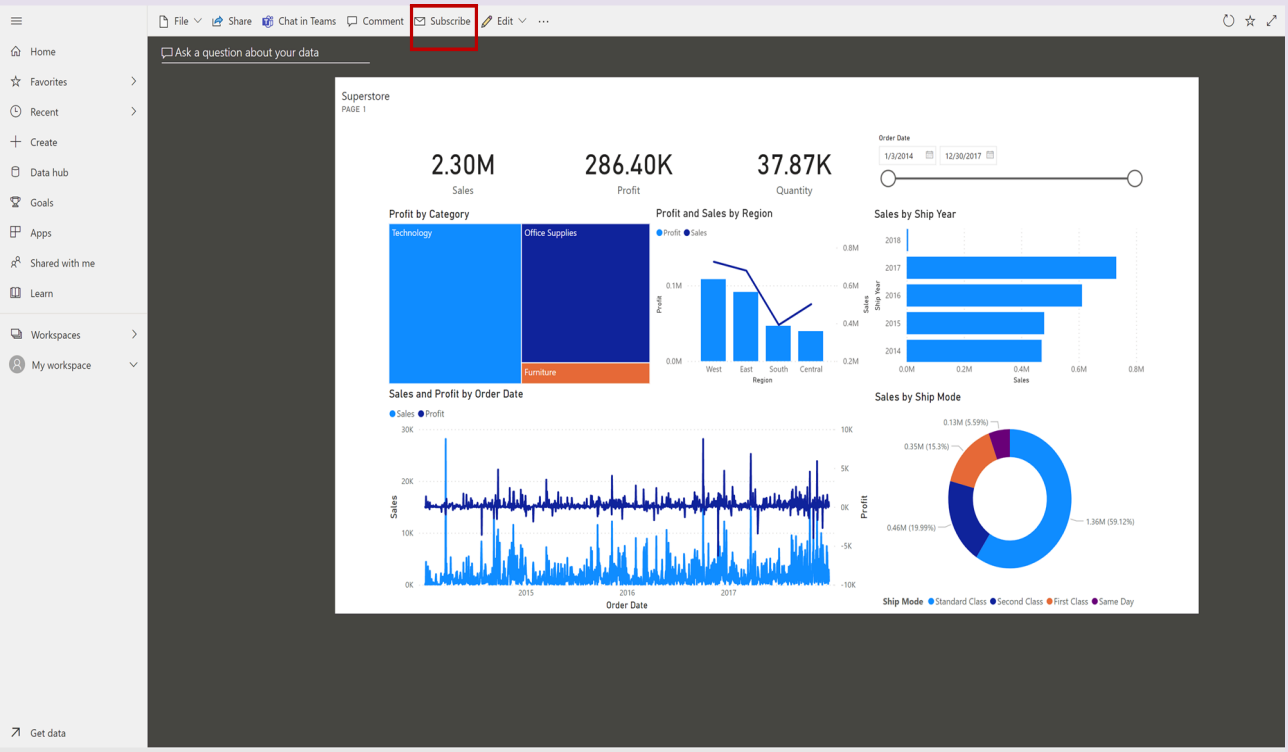
A paginated report is a type of report format that's designed for optimal printing or sharing electronically as a document. Unlike interactive reports, paginated reports are structured to fit neatly on a page, with fixed layouts for elements like tables, charts, and text. They're often used for documents like invoices, statements, or operational reports where precise formatting and consistent layout are important. Paginated reports are commonly created using tools like SQL Server Reporting Services (SSRS) or Power BI Report Builder.



- In a paginated report, you can't click around or play with the data like you can in a dashboard.
- They're good for printing or sharing data in a neat, organized way.
- You can’t click, filter, and explore data interactively.

Q. What is a Dashboard?

A dashboard is like a control center for data. It's a visual display of important information, often in the form of charts, graphs, and numbers, all in one place. Dashboards help people understand complex data quickly by presenting it in an easy-to-read format. They're used in businesses, organizations, and even in personal life to track metrics, monitor progress, and make decisions based on data. Think of it as a snapshot of key insights at a glance.



With dashboards, you can interact with data in real-time, clicking, filtering, and exploring details dynamically. They're flexible, letting you customize layouts and visualize data in various ways. Dashboards are perfect for monitoring trends, tracking metrics, and making quick decisions based on live data. Unlike paginated reports, you can't do these things with dashboards. Paginated reports are more like static documents, showing fixed information without interactive features.

Difference Between Paginated Report and Dashboard

Dashboards are dynamic displays of data, offering interactive features like filtering and drilling down into details, making them ideal for quick data analysis and decision-making. They present information visually, using charts and graphs to convey insights at a glance.

Q. What is Work Space and Roles?

Workspace roles refer to the permissions and access levels assigned to members within a workspace in tools like Microsoft Power BI or similar collaboration platforms. These roles determine what actions users can perform and what data they can access within the workspace. Common workspace roles may include:

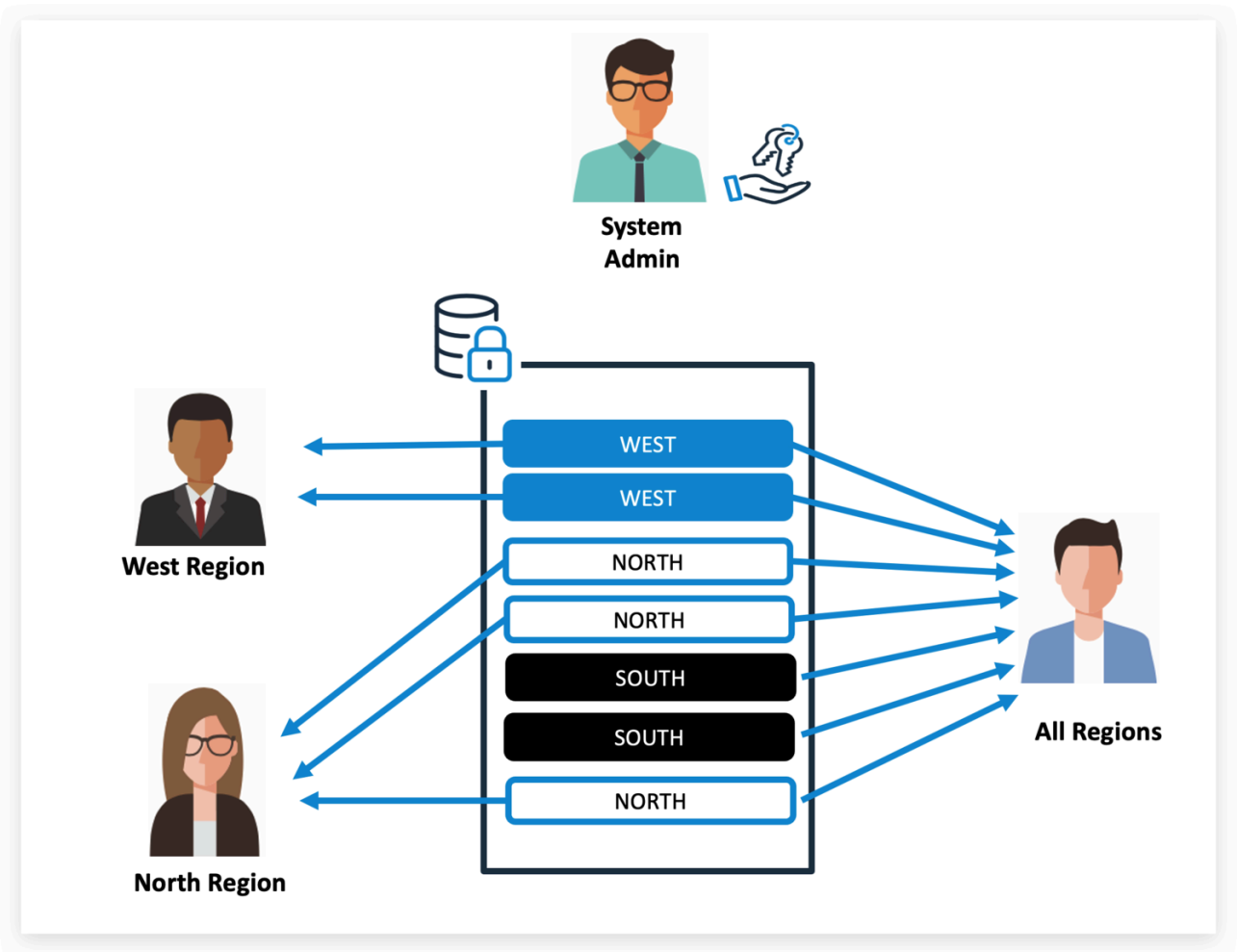
PERMISSION	ADMIN	MEMBER	CONTRIBUTOR	VIEWER
Update and delete workspace	✓	✗	✗	✗
Add/remove people, including other admins	✓	✗	✗	✗
Allow Contributors to update the workspace app	✓	✗	✗	✗
Add members or others with lower permissions	✓	✓	✗	✗
Publish, unpublish, and change permissions for an app	✓	✓	✗	✗
Update a workspace app	✓	✓	If allowed[1]	✗
Share an item or share an app[2]	✓	✓	✗	✗
Allow others to reshare items[2]	✓	✓	✗	✗
Feature apps on colleagues' Home	✓	✓	✗	✗
Manage dataset permissions[3]	✓	✓	✗	✗
Feature dashboards and reports on colleagues' Home	✓	✓	✓	✗
Create, edit, and delete content in workspace	✓	✓	✓	✗
Publish reports to the workspace, delete content	✓	✓	✓	✗
Create a report in another workspace based on a dataset in this workspace[3]	✓	✓	✓	✗
Copy a report[3]	✓	✓	✓	✗
Create goals based on a dataset in the workspace[3]	✓	✓	✓	✗
Schedule data refreshes via the on-premises gateway[4]	✓	✓	✓	✗
Modify gateway connection settings[4]	✓	✓	✓	✗
View and interact with an item[5]	✓	✓	✓	✓
Read data stored in workspace dataflows	✓	✓	✓	✓

Q. What is RLS(Row Level Security)?

RLS stands for Row-Level Security. It's a feature commonly found in database management systems, analytics platforms, or business intelligence tools. RLS allows administrators or data owners to control access to data at the row level based on certain criteria or rules.

For example, in a business context, RLS could be used to ensure that sales representatives can only access data for customers in their assigned region or territory. This ensures that users only see the data that is relevant to their role or permissions, maintaining data privacy and security.

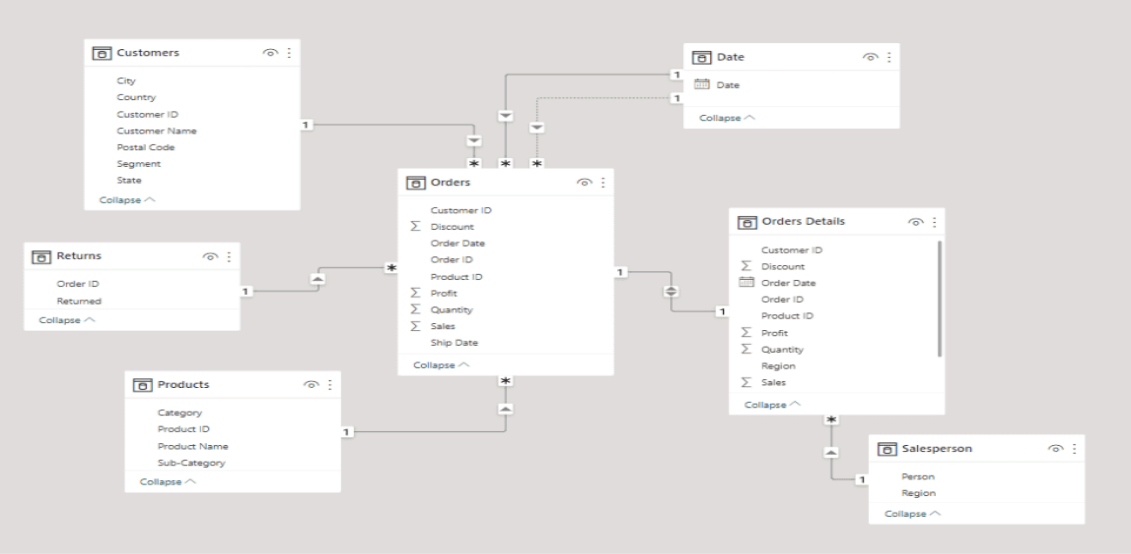
RLS is particularly useful in multi-tenant environments or scenarios where sensitive data needs to be protected from unauthorized access. It helps organizations comply with regulations such as GDPR or HIPAA by ensuring that only authorized users can access specific rows of data.



Q. What is Data Modelling In Power BI?

Data modeling involves structuring and organizing data in a way that facilitates analysis, reporting, and decision-making. This process typically includes defining relationships between different data tables, cleaning and transforming data to ensure accuracy and consistency, creating calculated columns and measures to derive new insights, and optimizing the data model for performance. The goal of data modeling is to provide a clear and logical representation of data that enables users to extract meaningful insights and make informed decisions based on the data.

- ➔ **Data Import:** Bring data from various sources into Power BI Desktop.
- ➔ **Table Relationships:** Define relationships between tables based on common fields to establish data connections.
- ➔ **Data Transformations:** Use Power Query to clean, reshape, and enrich data to suit analysis requirements.
- ➔ **Calculated Columns and Measures:** Create calculated columns and measures using DAX (Data Analysis Expressions) for additional data insights and calculations.
- ➔ **Hierarchies:** Establish hierarchies to organize data into logical levels for easier analysis and navigation.
- ➔ **Optimization:** Optimize data model performance by minimizing data redundancy and ensuring efficient data retrieval.
- ➔ **Data Security:** Implement security measures to restrict access to sensitive data within the model.

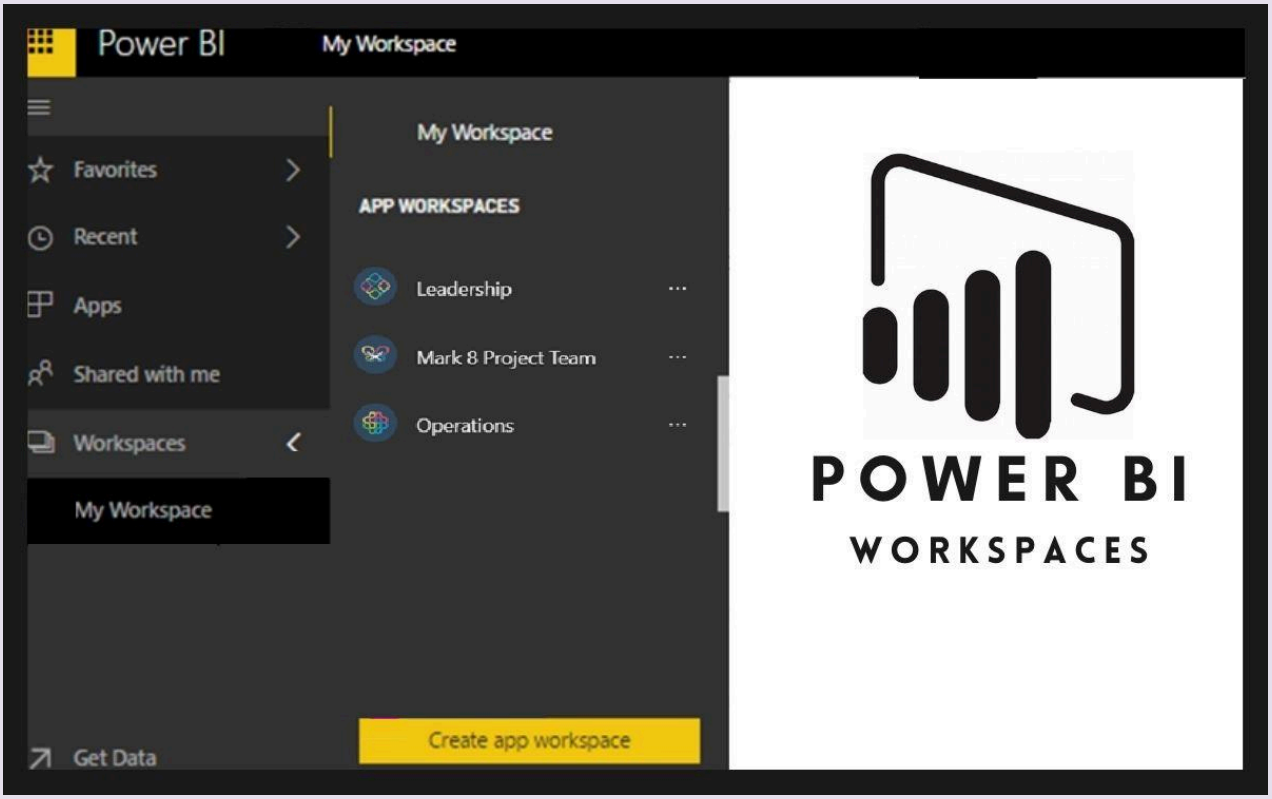


Q. What is Power BI WorkSpace?

A Power BI workspace is a collaborative environment within the Power BI service where users can create, collaborate on, and share Power BI content such as reports, dashboards, datasets, and dataflows. Workspaces provide a centralized location for teams to work together on projects, access shared datasets, and manage access permissions. There are different types of workspaces in Power BI, including:

- **My Workspace:** A personal workspace for individual users to develop and test Power BI content before sharing it with others.
- **App Workspaces:** Collaborative workspaces where teams can create and share Power BI apps containing reports and dashboards for broader consumption.
- **Workspace Permissions:** Administrators can manage access permissions for workspaces, allowing them to control who can view, edit, and publish content within each workspace.

Overall, Power BI workspaces facilitate collaboration, content sharing, and centralized management of Power BI assets within organizations, enabling teams to work more efficiently and effectively with their data.



What is Bookmark and Sync Slicers?

In Power BI, a bookmark is a feature that captures the current state of a report page, including filters, slicers, and the visibility of objects. Bookmarks are used to create interactive reports and enhance the user experience by allowing users to quickly navigate to specific views or states of the report.

Why to use bookmark:-

Bookmarks in Power BI are used to capture and save the current state of a report page, including filters, slicers, and the visibility of objects. They enable report creators to design interactive and dynamic reports that enhance user experience by allowing quick navigation to specific views or scenarios.

- **Enhanced Navigation**: Create custom navigation experiences within a report.
- **Interactive Reports**: Enable dynamic switching between different views and scenarios.
- **Preset Views**: Save specific filter and slicer configurations for quick access.
- **Guided Storytelling**: Lead users through a data narrative or analysis process.
- **Interactive Presentations**: Smoothly transition between different parts of a report during presentations.
- **Reset and Clear Filters**: Provide users with an easy way to reset filters and slicers to a default state.
- **Highlight Key Insights**: Capture and emphasize specific insights or findings in the report.

How to Create a Bookmark:-

Open Bookmarks Pane:

- Go to the **View** tab on the ribbon.
- Click on **Bookmarks Pane** to open it.

Set Up the Report Page:

- Configure the report page as desired (apply filters, slicers, adjust visuals, set visibility of objects).

Add a Bookmark:

- In the bookmarks pane, click on **Add** to create a new bookmark.

Rename the Bookmark:

- Click the ellipsis (three dots) next to the new bookmark.
- Select **Rename** and give it a descriptive name.

Update Bookmark (Optional):

- If you change the report page later, click the ellipsis next to the bookmark.
- Select **Update** to capture the new state.

Configure Bookmark Options (Optional):

- Choose which elements to capture: **Data** (filters/slicers), **Display** (visuals), or **Current Page**.

Use the Bookmark:

- Click on the bookmark to navigate to the saved state.
- Optionally, create buttons or shapes and link them to bookmarks for interactive navigation.

Q. What are Sync Slicers?

Sync Slicers in Power BI is a feature that allows you to synchronize slicers across multiple report pages. This means that when a slicer is changed on one page, it can automatically apply the same filtering to slicers on other pages. This feature is particularly useful for maintaining consistent filtering across different views of the same dataset.

Why to use Sync Slicers:-

- **Consistent Filtering**: Apply the same filters across multiple report pages.
- **Enhanced User Experience**: Avoid manually reapplying filters on each page.
- **Time Efficiency**: Save time by synchronizing slicers.
- **Data Integrity**: Ensure accurate and consistent data views.
- **Simplified Navigation**: Maintain context when switching between report pages.

How to Create Sync Slicers:-

Add a Slicer:

- Insert a slicer visual on the desired report page.

Open Sync Slicers Pane:

- Go to the **View** tab.
- Click on **Sync slicers** to open the pane.

Configure Sync Slicers:

- In the sync slicers pane, check the **Sync** box for pages where you want the slicer to apply.
- Check the **Visible** box for pages where you want the slicer to be visible.

Test the Synchronization:

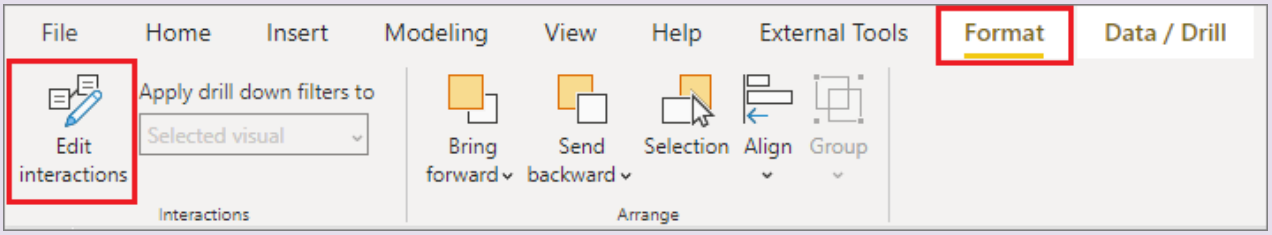
- Change the slicer value on one page and verify it updates on the other synchronized pages.

Q. What is Edit Interaction?

Edit Interactions in Power BI is a feature that allows you to control how visuals on a report page interact with each other when one visual is filtered or selected. This feature lets you specify whether a visual should respond to a selection in another visual, and if so, how it should respond.

Why to use Edit Interaction:-

- **Customized User Experience**: Tailor visual interactions for a better user experience.
- **Focus on Relevant Data**: Highlight or filter data to emphasize important information.
- **Control Data Insights**: Manage which visuals are affected by a filter for clearer insights.
- **Enhanced Interactivity**: Fine-tune visual responses to increase report interactivity.



Q. What is Gateway?

In Power BI, a **Gateway** is a bridge that connects on-premises data sources (such as databases, files, and other data repositories) to the Power BI service in the cloud. It enables Power BI to access and refresh data stored in these on-premises sources securely and efficiently. The gateway acts as a mediator, facilitating data transfer between the cloud-based Power BI service and the on-premises data sources.

Why Gateway is important:-

Access On-Premises Data: Enables Power BI to access and refresh data stored in on-premises data sources, extending the capabilities of Power BI to include data from behind corporate firewalls.

Real-time Data: Provides the ability to refresh data in near real-time, ensuring that reports and dashboards always reflect the latest information.

Security and Compliance: Maintains data security and compliance by securely transferring data between on-premises sources and the cloud-based Power BI service.

Centralized Management: Allows for centralized management of data connections, refresh schedules, and monitoring through the Power BI service.

Q. What are Summarized Functions?

Summarize:

The **SUMMARIZE** function in Power BI is used to create a summary table by grouping data based on specified columns and calculating aggregate values for each group. It returns a table that includes the grouped columns and the calculated summaries.

Syntax:-

```
SUMMARIZE(
    Sales,
    Sales[Product],
    Sales[Year],
    "Total Sales", SUM(Sales[Amount]),
    "Average Quantity", AVERAGE(Sales[Quantity])
)
```

SummarizeColumns:

The **SUMMARIZECOLUMNS** function in Power BI is similar to **SUMMARIZE**, but it allows you to specify additional expressions to be calculated for each group. It returns a table with the specified columns and calculated summaries.

Syntax:-

```
SUMMARIZECOLUMNS(
    'Sales'[Product],
    'Sales'[Year],
    "Total Sales", SUM(Sales[Amount]),
    "Average Quantity", AVERAGE(Sales[Quantity])
)
```

Q. What are Time Intelligence Functions?

Time Intelligence functions in Power BI are specialized functions used for analyzing data over time periods, such as year-to-date, month-to-date, or comparing data between different time periods. These functions help in creating dynamic and insightful reports by performing calculations based on dates or time-related information. Here are the definitions and syntax of some common Time Intelligence functions.

Here are some functions of time intelligence:-

DATEADD:

Returns a table of dates shifted by a specified number of intervals (e.g., days, months, years) from the original dates.

Syntax:-

DATEADD(<dates>, <number>, <interval>)

DATEBETWEEN:

The DATEBETWEEN function in Power BI allows you to filter a table of dates to a specified range. It returns a table of dates that fall between the specified start and end dates, inclusive.

Syntax:-

DATESBETWEEN(<dates>, <start_date>, <end_date>)