



Power BI

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Outlines

- Introducing Power BI.
- Connecting and transforming data with Power BI desktop.
- Build a Relational Data Model.
- Analyzing Data with DAX Calculations in Power BI.
- Visualizing Data with Power BI Reports.
- Power BI Services.



Section 1: Introducing Microsoft Power BI

Business Intelligence

Business Intelligence is a set of techniques and tools where you gather the data from various data sources and store to a data warehouse.

DATA PREPARATION



VISUALIZATION



BUSINESS USER





Self-Service Business Intelligence Tools

Here are few SSBI tools that aims at giving you direct access to all the insights your data can provide.



Figure 1. Magic Quadrant for Analytics and Business Intelligence Platforms



Introduction To Power BI

- Power BI is a cloud-based business intelligence tool which includes Power BI Service , Power BI Desktops, Power BI Mobile App and other components.
- It is a collection of software services, apps, and connectors that work together to turn unrelated sources of data into coherent, visually immersive, and interactive insights



Elements Of Power BI

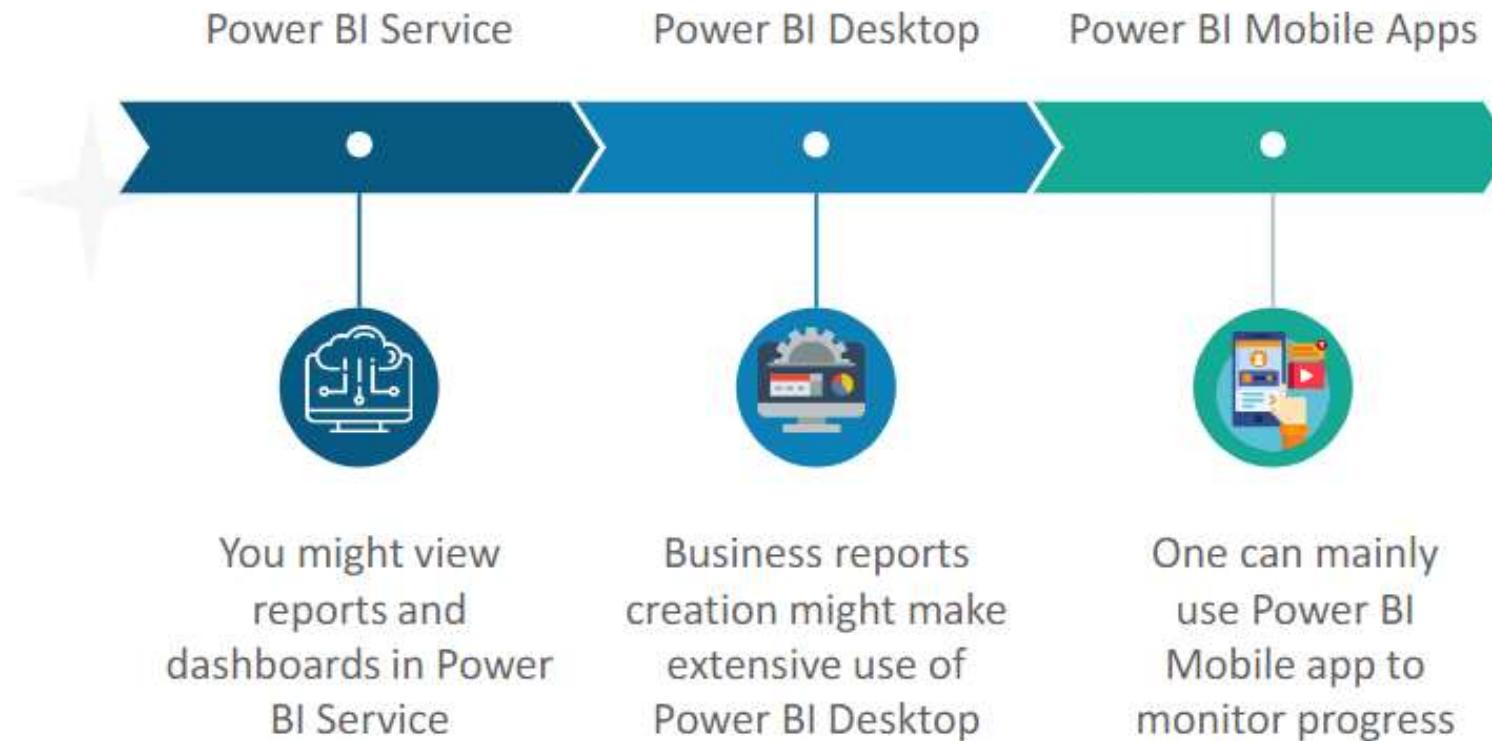


WHY POWER BI?

- **Connect, transform and analyze *millions* of rows of data**
 - *Access data from virtually anywhere (database tables, flat files, cloud services, folders, etc), and create fully automated data shaping and loading (ETL) procedures*
- **Build relational models to blend data from multiple sources**
 - *Create table relationships to analyze holistic performance across an entire data model*
- **Define complex calculations using Data Analysis Expressions (DAX)**
 - *Enhance datasets and enable advanced analytics with powerful and portable DAX expressions*
- **Visualize data with interactive reports & dashboards**
 - *Build custom business intelligence tools with best-in-class visualization and dashboard features*

How Power BI Matches Your Role?

- The use of Power BI depends upon the role on a project



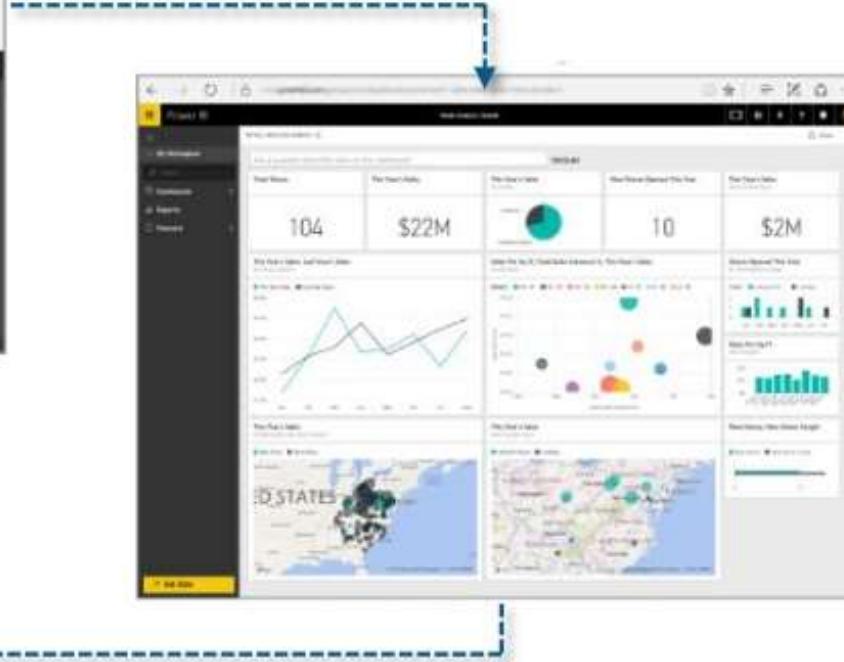
The Flow Of Work In Power BI

A common flow of work in Power BI begins in **Power BI Desktop**, where a report is created. That report is then published to the **Power BI service**, and then shared, so that users of **Power BI Mobile apps** can consume the information

Power BI
Desktop

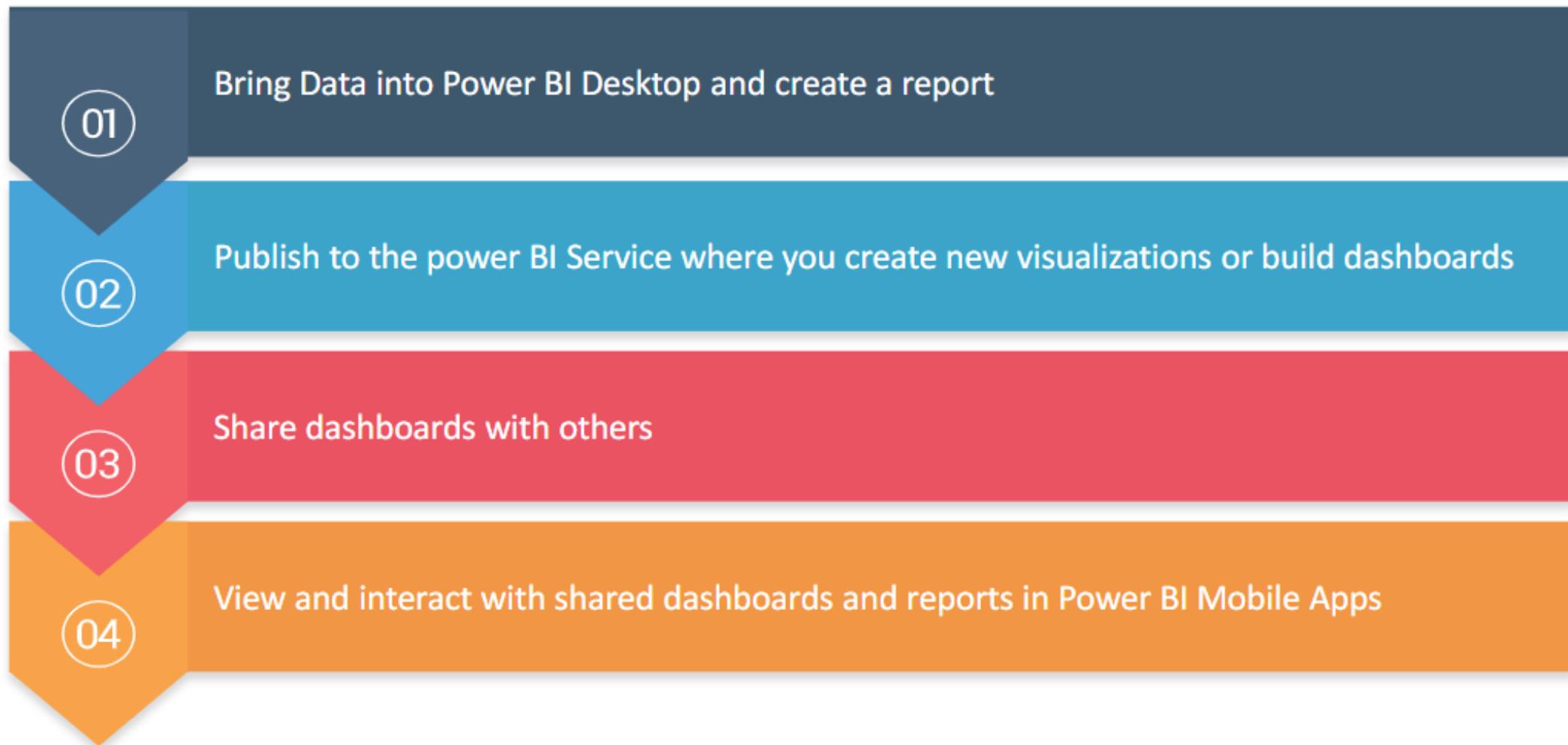


Power BI
Mobile
Apps



Power BI
Service

Common Flow Of Activity In Power BI



Components Of Power BI

Power Query
Search access and transform public and internal data sources with Power Query

Power View
Analyze, visualize and display data as an interactive data visualization tool

Power BI Q&A
Ask questions and get immediate answers with natural language query



Power Pivot
Easy data modelling in memory analytics with Power Pivot

Power BI Service
Share data views and workbooks refreshable from on-premises and cloud based data sources

Power Query

- Power Query is a self-service ETL (Extract, Transform, Load) tool which runs as an Excel add-in
- It allows users to pull data from various sources, manipulate the given data into a form that suits your needs, and load it into Excel

Power Query Transforms Your Data

1. Add data from almost any source



2. Transform it with Power Query

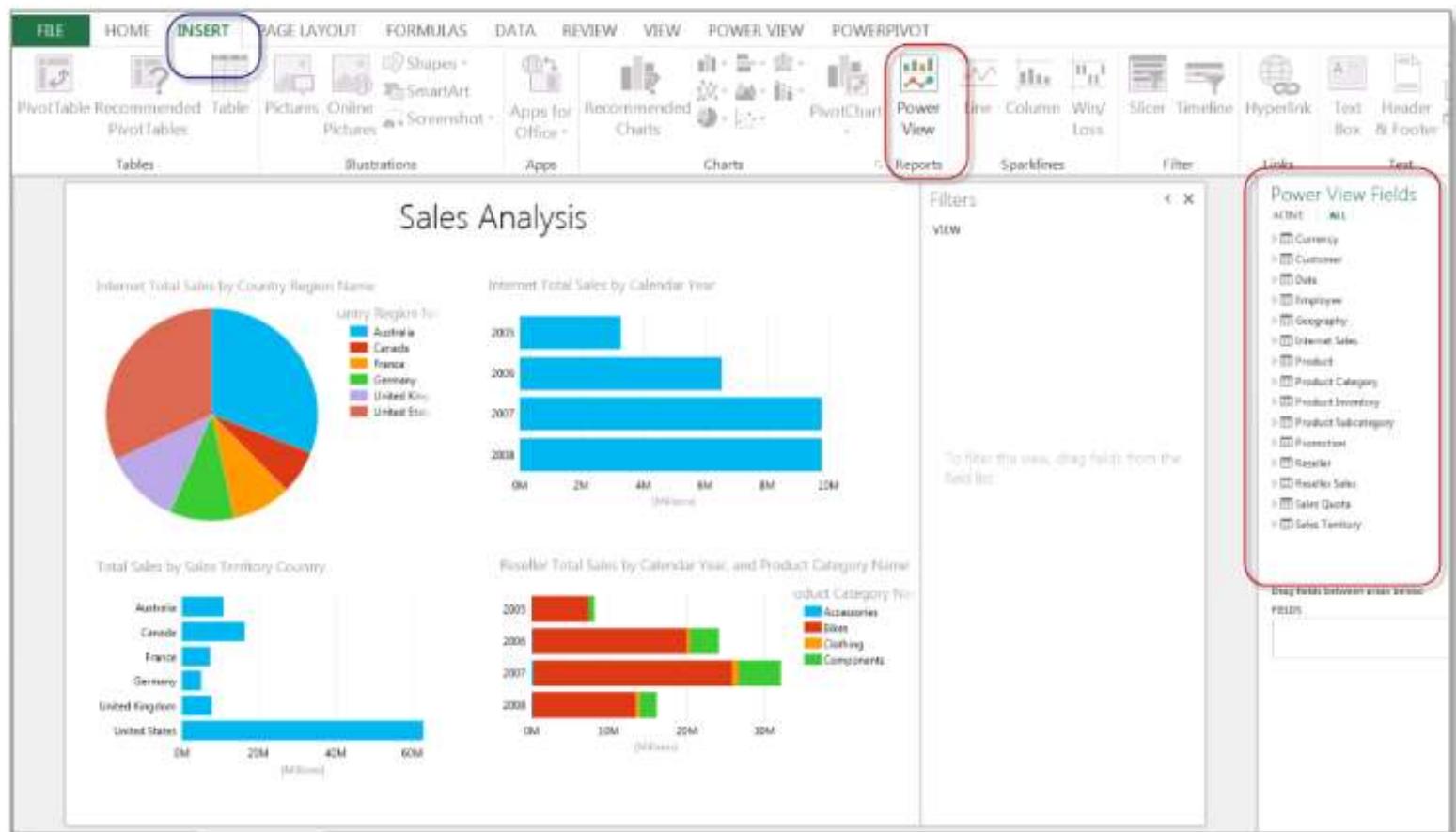
Power Pivot

- Power Pivot is an in-memory data modelling component that enables highly-compressed data storage and extremely fast aggregation and calculation



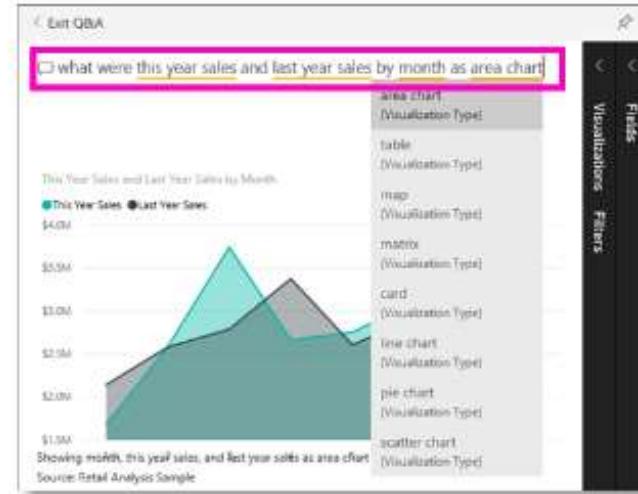
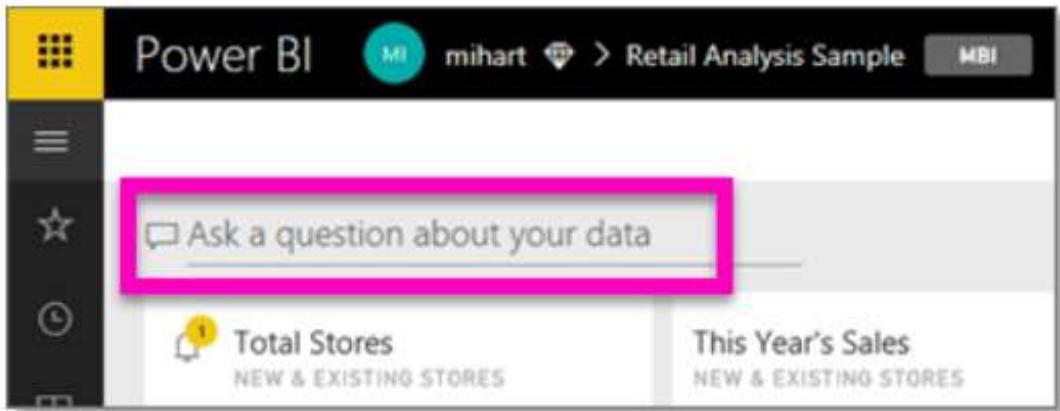
Power View

- Power View is an interactive canvas that allows users with a drag-and-drop interface allowing them to build quick and easy visualizations of the data



Power Q&A

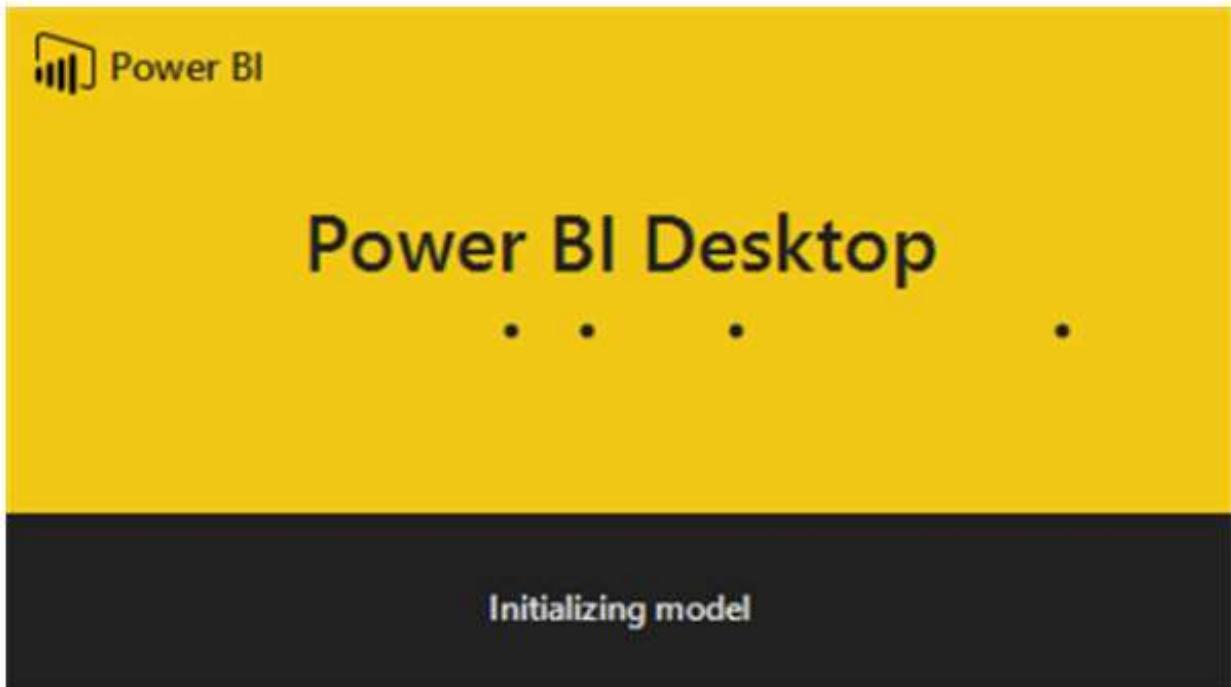
- Power Q&A is used to explore your data using intuitive, natural language capabilities and receive answers in the form of charts and graphs
- The Q&A question box is where you type your question using natural language



- Q&A recognizes the words you type and figures out where (which dataset) to find the answer
- Q&A also helps you form your question with auto-completion, restatement, and other textual and visual aids

Power BI Desktop

Power BI Desktop allows users to *connect to data* (usually multiple data sources), *shape that data* (with queries that build insightful, compelling data models), and use that model to *create reports* (which others can leverage, build upon, and share)

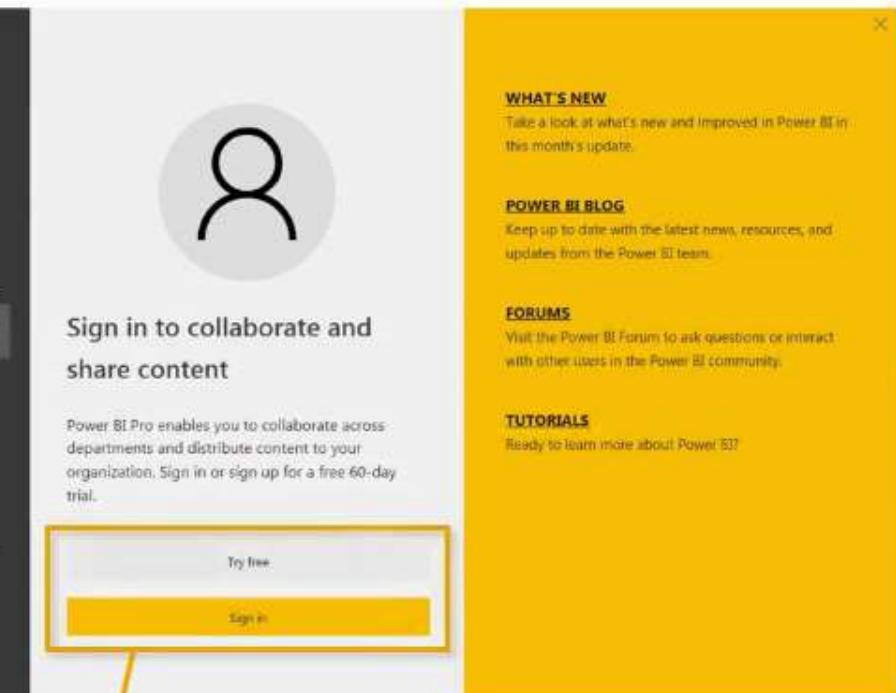
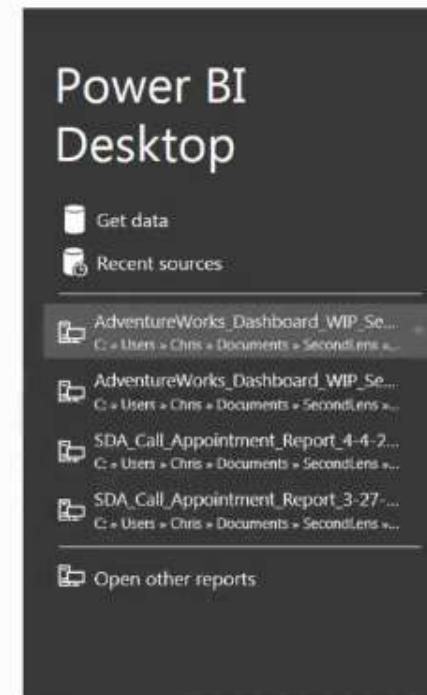
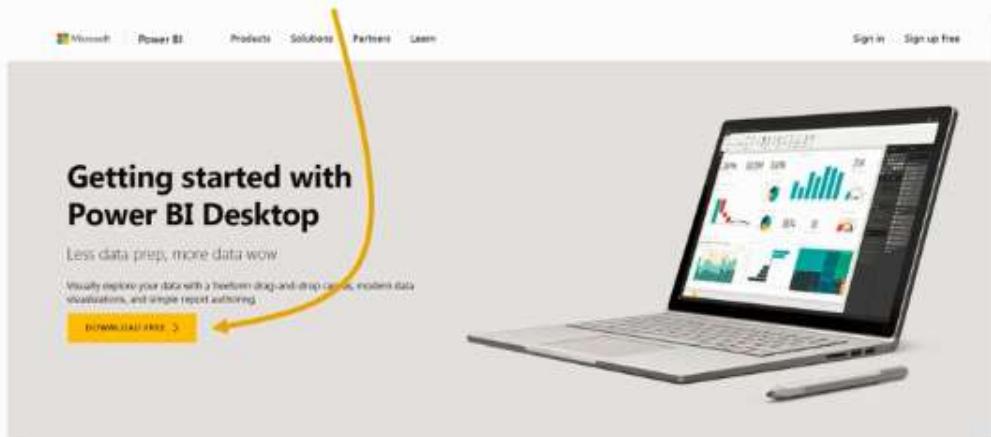


INSTALLING POWER BI DESKTOP

1) Head to powerbi.microsoft.com and click “Sign Up Free”



2) Click “Download Free” to start the Power BI Desktop download

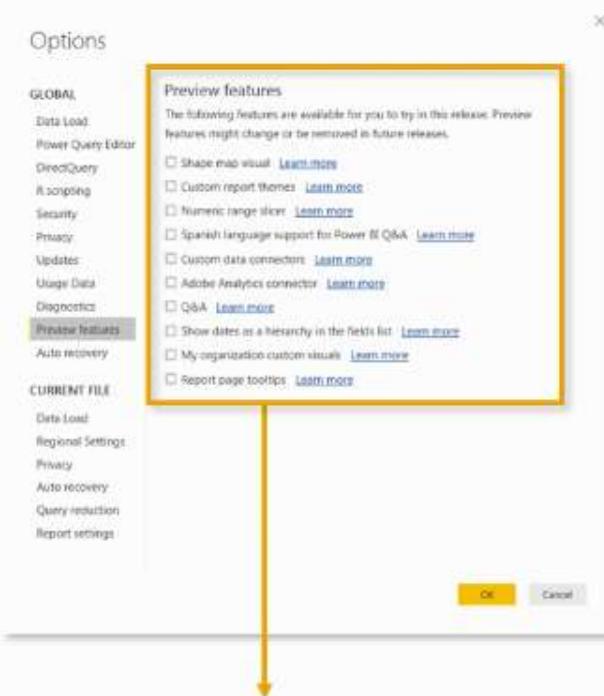


IMPORTANT: You do **not** need to sign in or register for a Power BI Pro account to access Power BI Desktop (*you can simply close this window*)

- Sign-in is only required to access the sharing and collaboration tools available through Power BI Service (app.powerbi.com)
- **Note:** Microsoft requires a **work or school e-mail address**

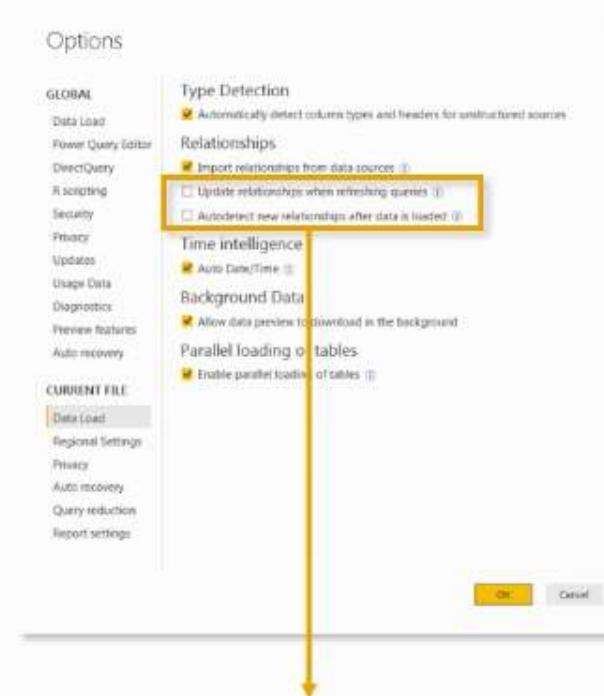
COURSE OPTIONS & SETTINGS

PREVIEW FEATURES



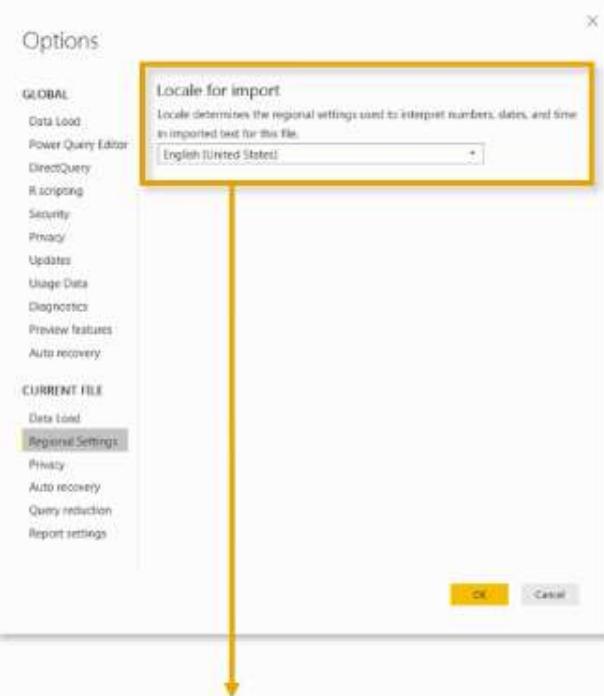
- 1) In the “Preview Features” tab, deselect any active features while you are taking the course

DATA LOAD



- 2) In the “Data Load” tab, deselect the “Update relationships” and “Autodetect new relationships after data is loaded” options

REGIONAL SETTINGS



- 3) In the “Regional Settings” tab, make sure to use the “English (United States)” locale for import

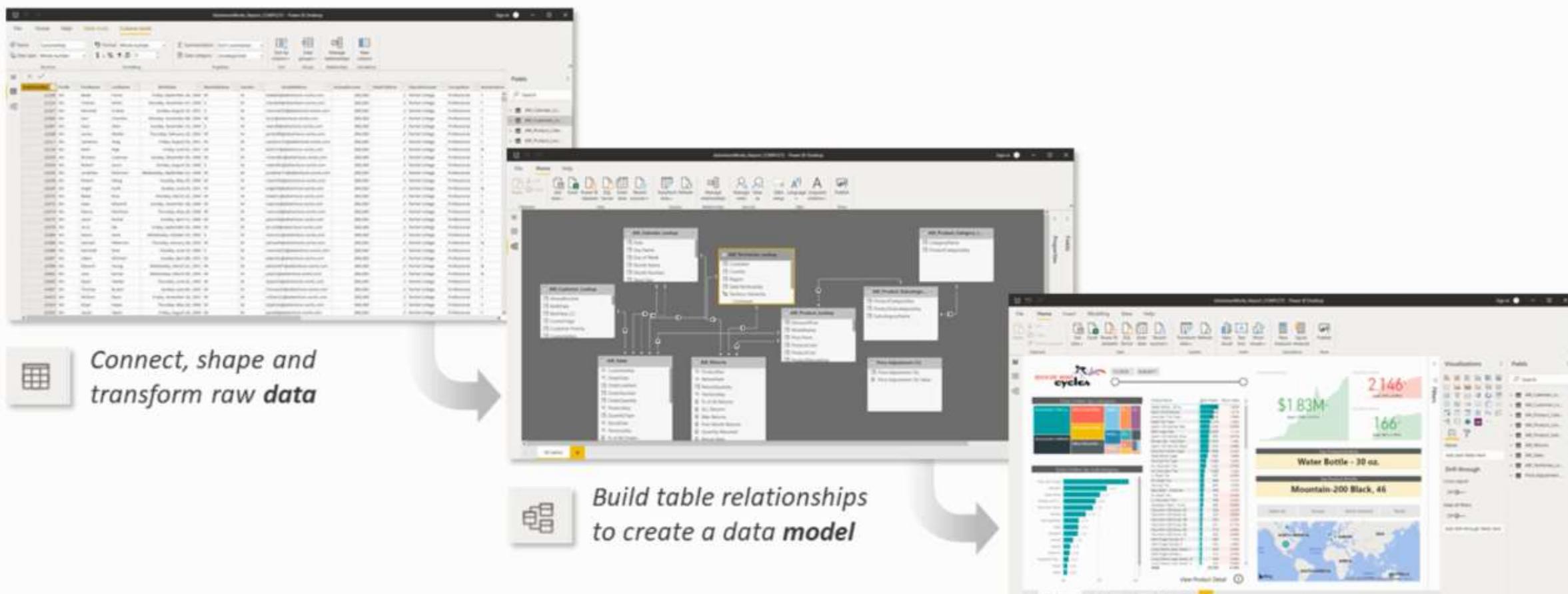
THE POWER BI INTERFACE

Three Core Views:

- Report**
- Data**
- Relationships (aka Model)**

The screenshot illustrates the Power BI Desktop interface. The top navigation bar includes File, Home (selected), Insert, Modeling, View, and Help. Below the ribbon, there are icons for Paste, Cut, Copy, Format painter, Get data (with options for Excel, Power BI datasets, SQL Server, and Enter data sources), Transform (with Refresh data, New visual, New text box, More), Calculations (with New measure, Quick measure, Insert), and Publish. The main workspace displays an exec summary report titled "ADVENTURE WORKS cycles". It features a treemap visualization for "Total Orders by Category" (e.g., Accessories, Helmets, Bikes, Mountain) and a bar chart for "Total Orders by Subcategory" (e.g., Tires and Tubes, Helmets, Road Bikes). To the right, there are two large numerical values: "Monthly Order: 2,146" and "Monthly Revenue: \$1.83M". Below these are two callout boxes: "Top Product (Order): Water Bottle - 30 oz." and "Top Product (Profit): Mountain-200 Black, 46". A world map at the bottom shows regional distribution. The left sidebar lists data sources: AW_Calendar_Lo.., AW_Customer_Lo.., AW_Product_Cate.., AW_Product_Loo.., AW_Product_Sub.., AW_Returns, AW_Sales, AW_Territories_Lo.., and Price Adjustment.. The right sidebar contains sections for Visualizations and Fields, along with filter and drill-through settings.

THE POWER BI WORKFLOW



*Connect, shape and
transform raw data*

*Build table relationships
to create a data model*

*Design interactive **reports** to
explore and visualize data*

Quiz

Q1

You can connect to multiple data sources using Power BI Desktop and create _____ which you can use to create _____ with drag and drop.

- Report, Power Query (Query Editor)
- Dataset, Visualization
- Dashboards, Reports
- Dataset, transformation

Q2

How user will access the Power BI report and dashboard if they are not in office network:

- Using Power BI Desktop
- Using Power Query
- Using Power BI Service
- All of the above

Q3

**Power BI is SaaS and doesn't required to have any server installations.
The main component for developing the Power BI reports which
required to be install is:**

- Power BI Desktop
- Power BI Visualization
- Power Pivot
- Power BI Mobile App

Q4.

In the typical Power BI workflow, which of the following takes place after data is loaded but before reports are built?

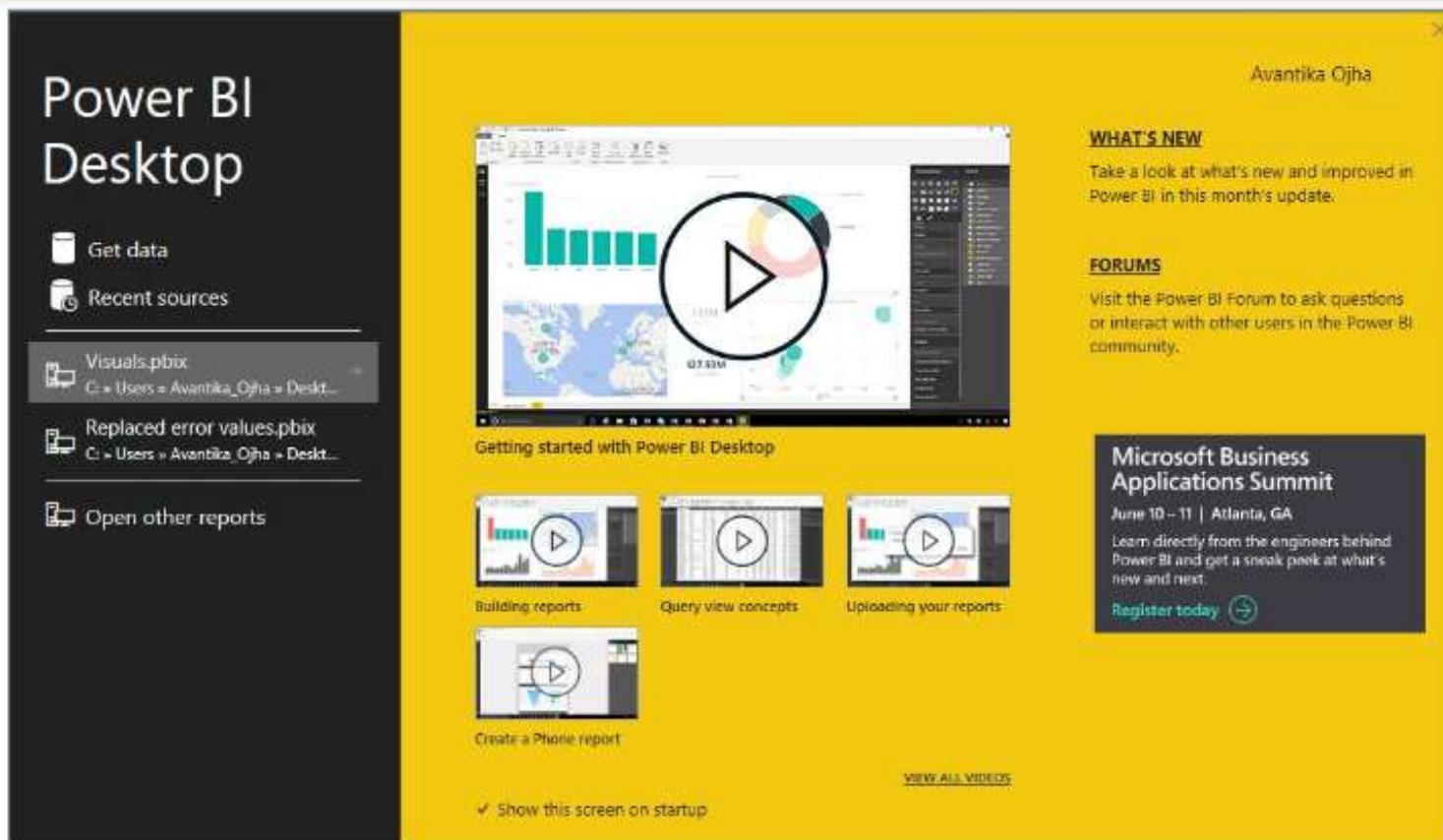
- Table Relationships are formed.
- User-Level permissions are established.
- Parameters and roles are defined
- Lunch break



Section 2: Connecting & Shaping Data with Power BI Desktop

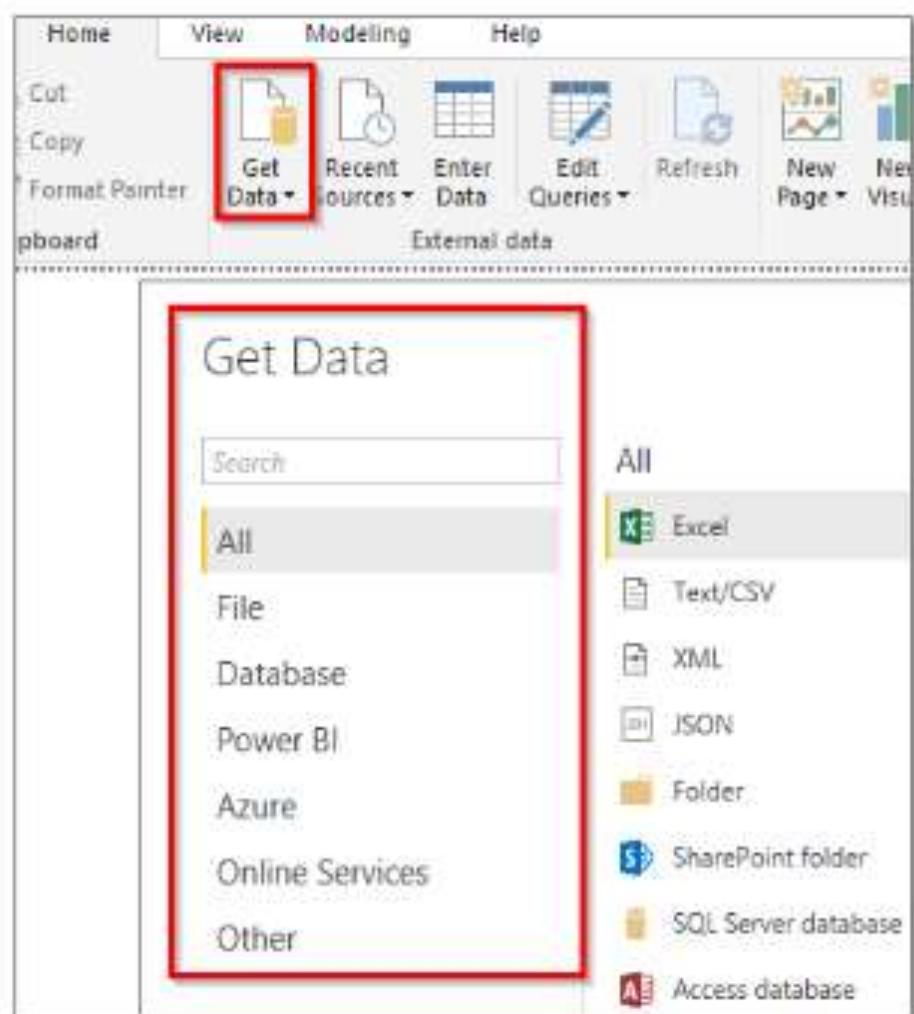
What Is Power BI Desktop?

Power BI Desktop is a tool to connect, to clean and to visualize your data in different ways. It allows you to build advanced queries, data models, create reports and share them by publishing to the Power BI Service



Data Sources In Power BI Desktop

- To connect to data, select Get Data from the Home ribbon
- Selecting the down arrow, or the Get Data text on the button, shows the **Most Common** data types menu as shown in the image.
- Data types are organized in the following categories:
 - All
 - File
 - Database
 - Power BI
 - Azure
 - Online Services
 - Other



Data Connections Under Data Sources

File

- Excel
- Text/csv
- XML
- JSON
- Folder
- Share Point Folder

Database

- Access Database
- SQL Server Analysis Services Database
- Oracle Database
- IBM DB2 Database and IBM
- MySQL Database

Power BI

- Power BI Datasets
- Power BI Data flows

Azure

- Azure SQL Database
- Azure SQL Data Warehouse
- Azure Analysis Services database
- Azure Blob Storage
- Azure Table Storage

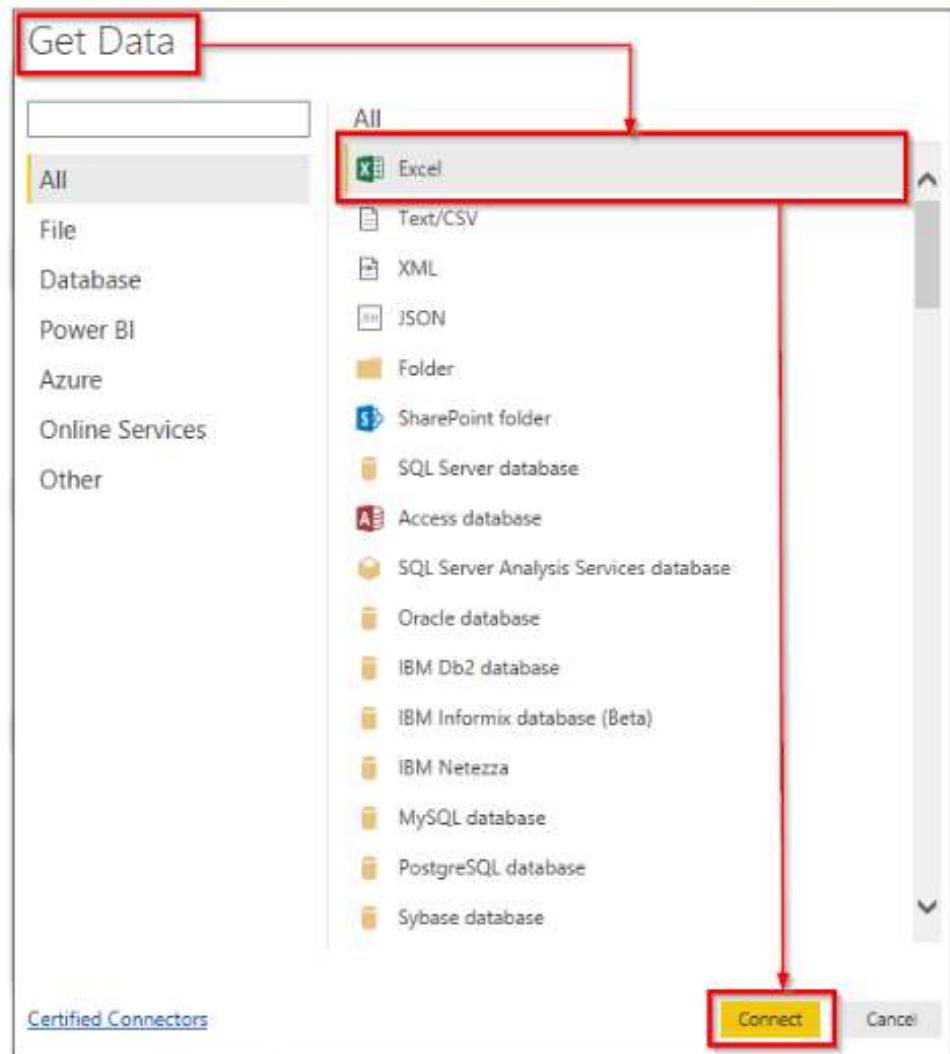
Online Services

- Power BI Service
- SharePoint Online List
- Microsoft Exchange Online
- Dynamics 365 (online)
- Dynamics NAV (Beta)
- Dynamics 365 for Financials

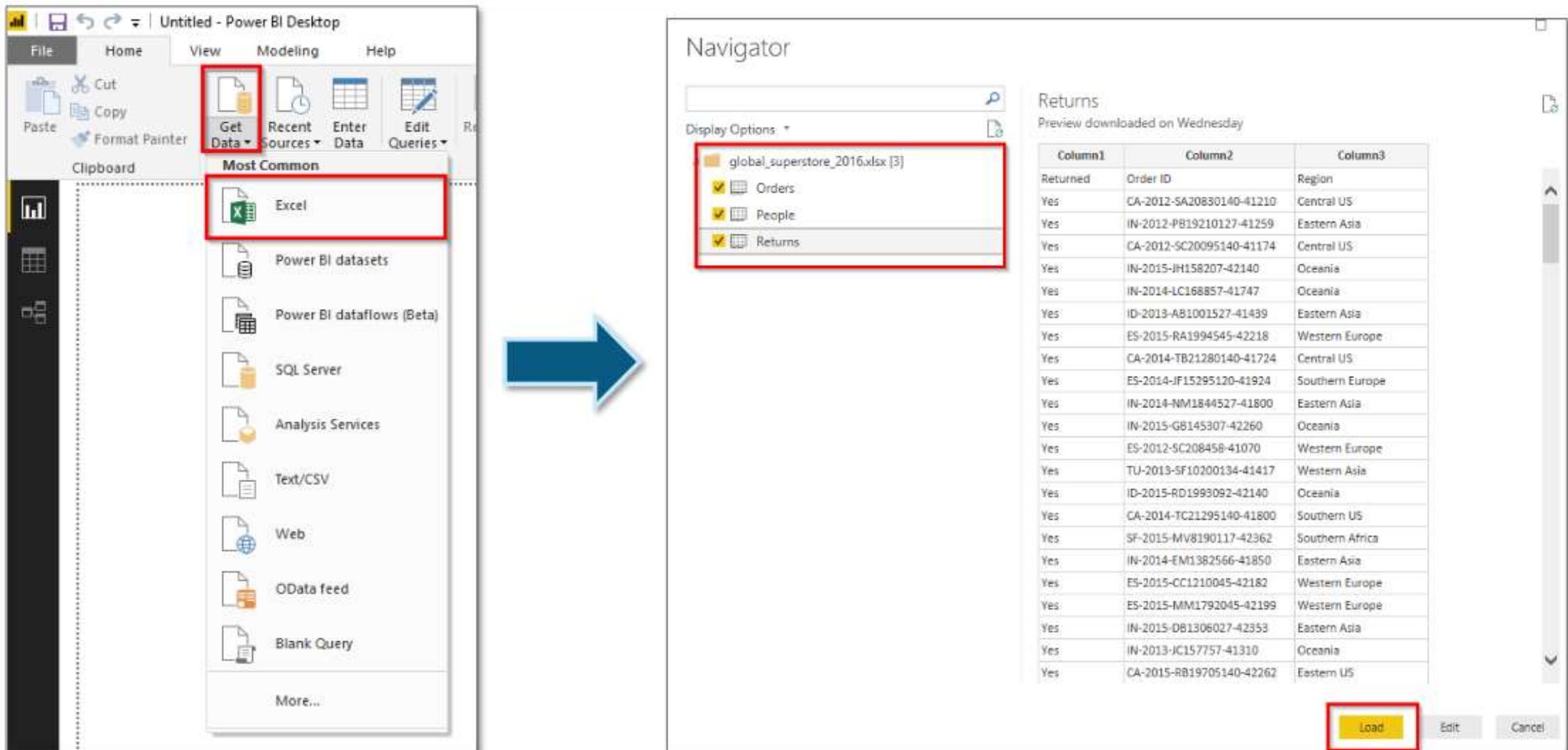
Others

- SharePoint list
- OData Feed
- Active Directory
- Microsoft Exchange
- Hadoop File (HDFS)
- Spark (Beta)

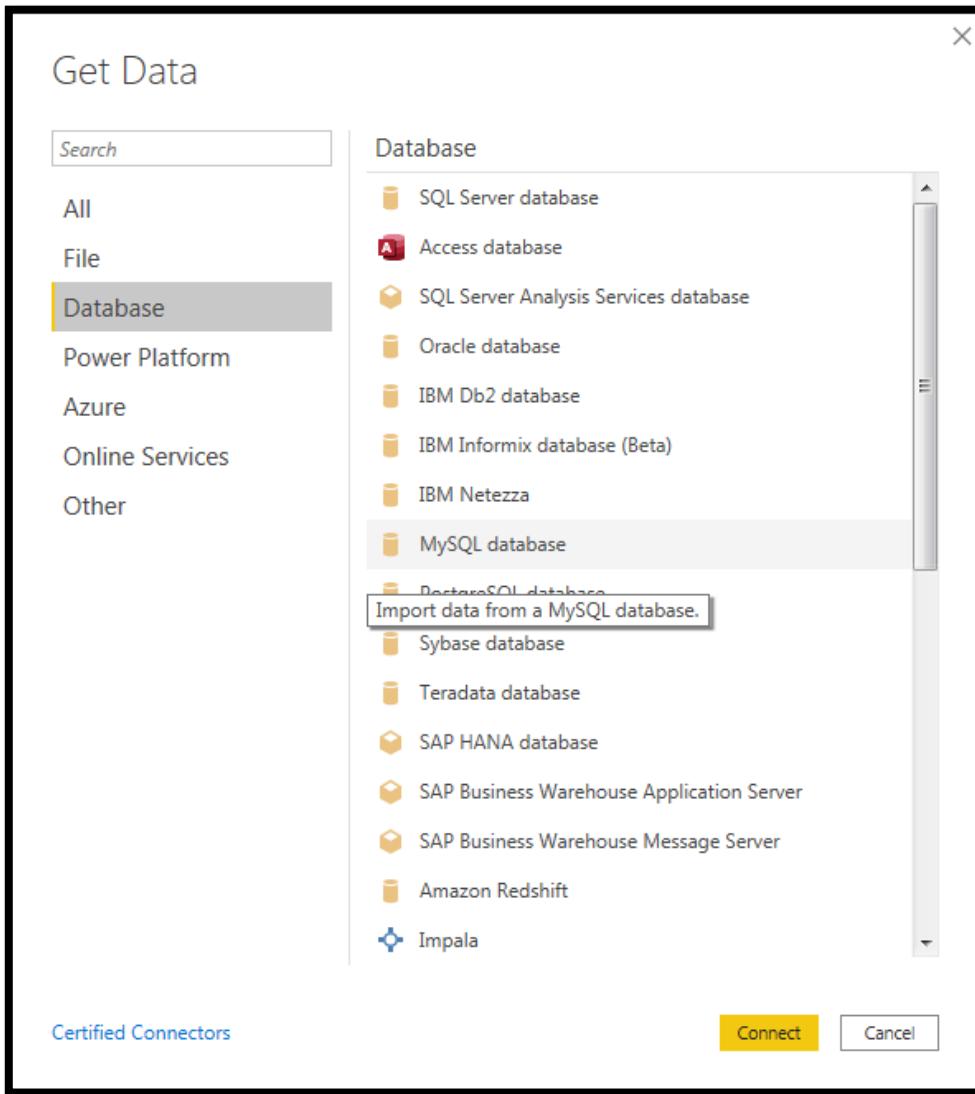
Loading Data Into Power BI Desktop



Illustration



Connecting with MySql

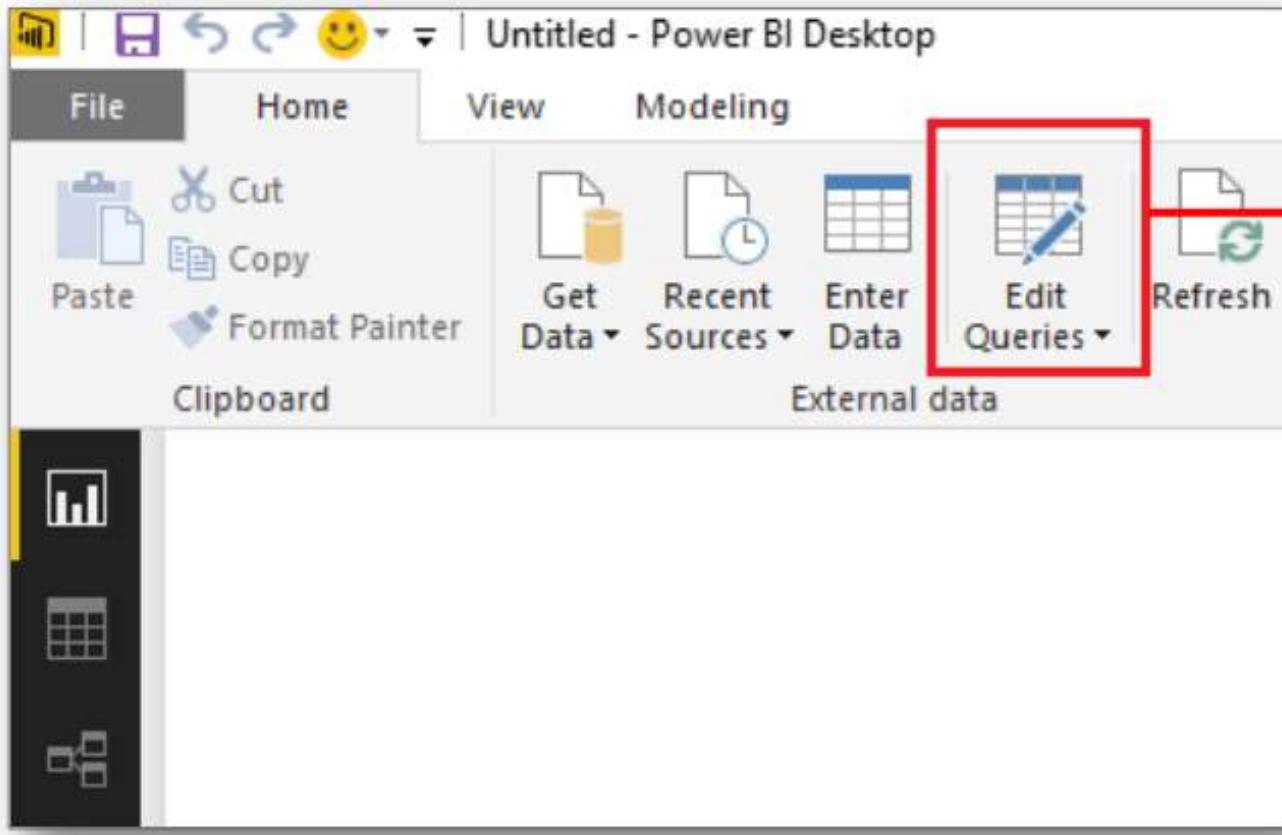


Query editor Demos

- Query Editor Basics options .
- Text Tools.
- Number Tool.
- Date Tool.
- Adding Index Column .
- Adding Conditional Column.
- Grouping & Aggregating Data.
- Pivoting & Un-pivoting.
- Merging Queries & Appending Queries.
- Data Source Setting
- Refreshing Queries.
- Defining Data Category
- Defining Hierarchies

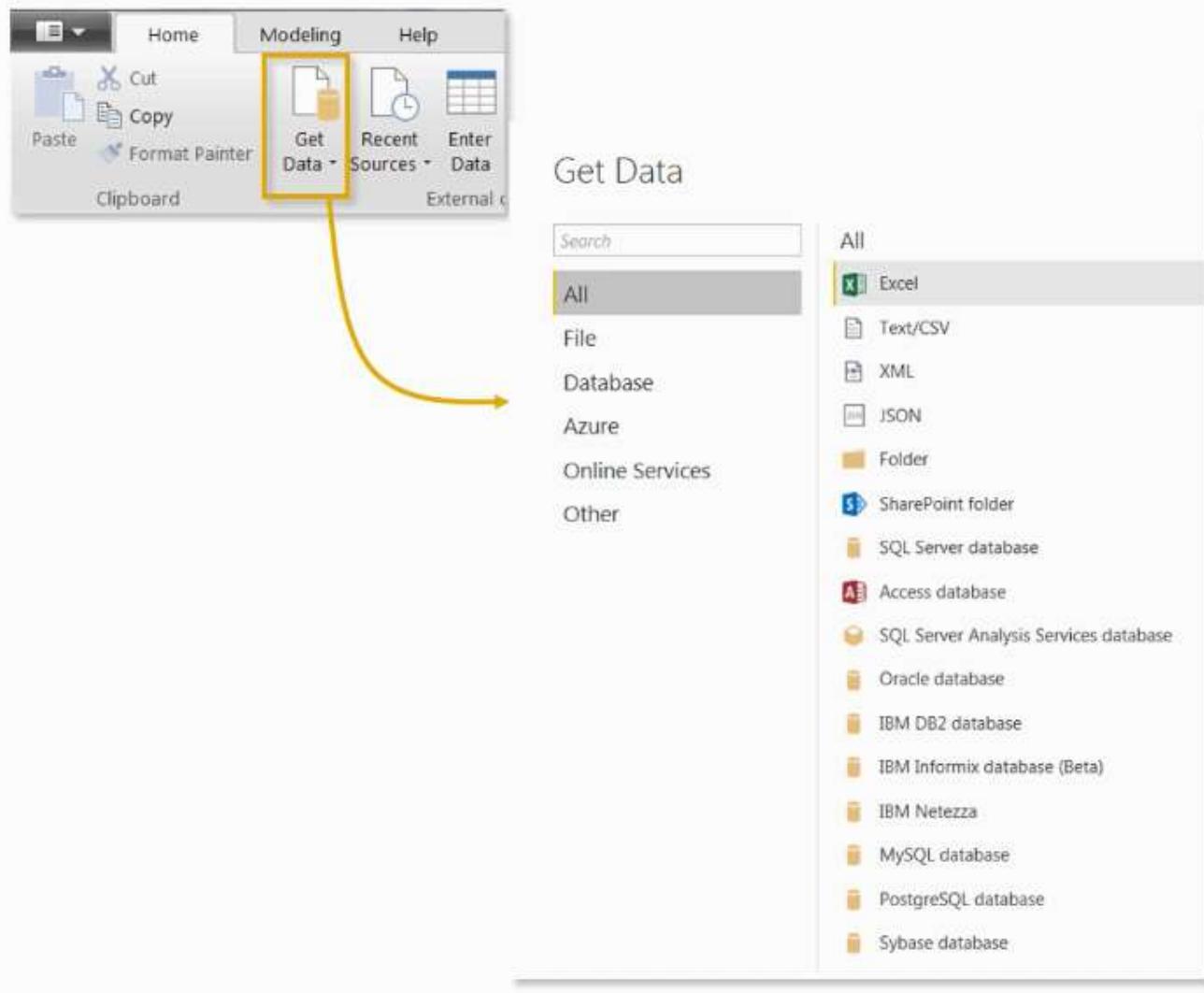
What Is Query Editor?

Query Editor is a powerful tool for shaping and transforming data. When you “Edit” from Navigator, Query Editor is launched and is populated with the tables or other entities which are selected from your data source



Query Editor can be launched directly from Power BI Desktop, Using “Edit Queries” on Home

TYPES OF DATA CONNECTORS



Power BI can connect to virtually **any** type of source data, including (*but not limited to*):

- **Flat files & Folders** (*csv, text, xls, etc*)
- **Databases** (*SQL, Access, Oracle, IBM, Azure, etc*)
- **Online Services** (*Sharepoint, GitHub, Dynamics 365, Google Analytics, Salesforce, Power BI Service, etc*)
- **Others** (*Web feeds, R scripts, Spark, Hadoop, etc*)

THE QUERY EDITOR

Query Editing Tools (Table transformations, calculated columns, etc)

Formula Bar (this is "M" code)

Query List

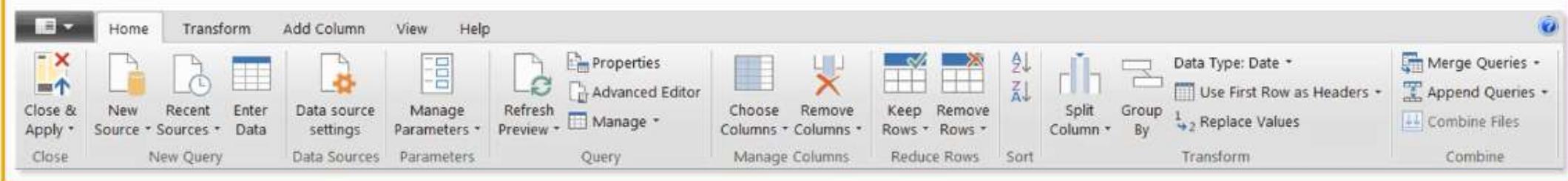
Table Name & Properties

Applied Steps (like a macro)

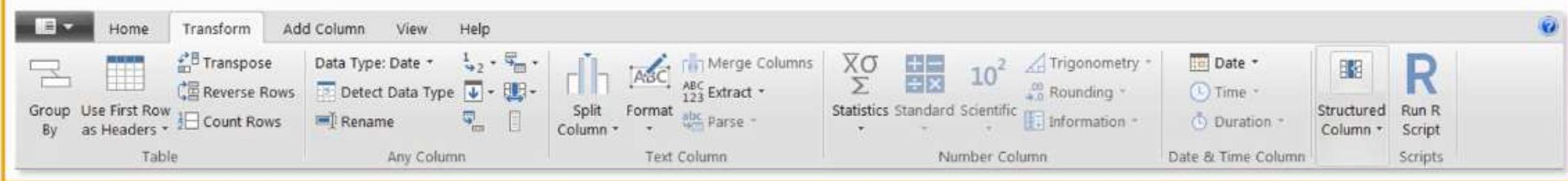
The screenshot shows the Microsoft Power Query Editor window. At the top left is the ribbon with Home, Modeling, and Help tabs. Below the ribbon is a toolbar with various icons for operations like Cut, Copy, Paste, Get Data, Refresh, and Edit Queries. A yellow arrow points from the 'Edit Queries' icon in the toolbar to the 'Edit Queries' button in the ribbon. The main area is divided into several sections: a 'Queries [13]' list on the left containing items like 'Transform File from AW_Sales_Data...', 'Sample Query [2]', and 'Other Queries [9]'; a central 'Preview' grid showing data from the 'AW_Sales_Data' query; a 'QUERY SETTINGS' pane on the right with 'PROPERTIES' (Name: AW_Sales_Data) and 'APPLIED STEPS' (listing steps like Source, Promoted Headers, Changed Type, etc.); and a status bar at the bottom indicating 'PREVIEW DOWNLOADED AT 1:27 PM'.

QUERY EDITING TOOLS

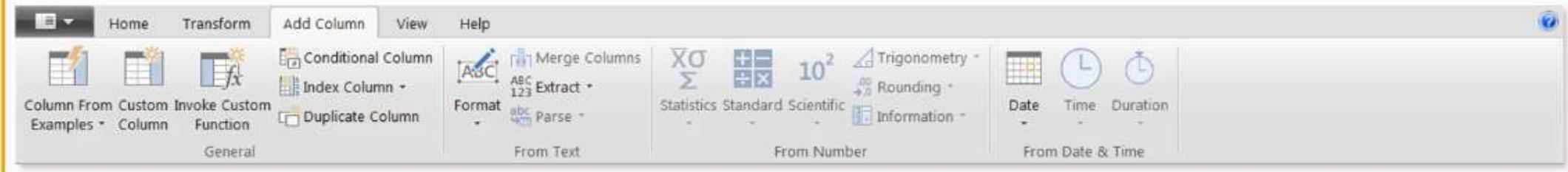
The **HOME** tab includes **general settings** and **common table transformation tools**



The **TRANSFORM** tab includes tools to **modify existing columns** (splitting/grouping, transposing, extracting text, etc)



The **ADD COLUMN** tools **create new columns** (based on conditional rules, text operations, calculations, dates, etc)



BASIC TABLE TRANSFORMATIONS

The screenshot shows the Power BI desktop ribbon with several tool groups highlighted by yellow boxes:

- Sort values (A-Z, Low-High, etc.)**: Contains Sort, Data Type, and Use First Row as Headers.
- Change data type (date, \$, %, text, etc.)**: Contains Data Type dropdown set to Date.
- Promote header row**: An arrow points from the Use First Row as Headers option to a screenshot of a table where the first row has been promoted to headers.
- Choose or remove columns**: Contains Remove Columns and Remove Other Columns.
- Keep or remove rows**: Contains Remove Top Rows, Remove Bottom Rows, Remove Alternate Rows, Remove Duplicates, Remove Blank Rows, and Remove Errors.
- Duplicate, move & rename columns**: An arrow points from the context menu of a column header to a screenshot of a table with a context menu open.
- Tip: Right-click the column header to access common tools**: A tip for using the context menu on a column header.

OrderID	CustomerID	EmployeeID	ShipCity
1	SO45101	1	Sao Paulo
2	SO45102	2	London
3	SO45103	3	London
4	SO45104	4	London
5	SO45105	5	London
6	SO45106	6	London
7	SO45107	7	London
8	SO45108	8	London
9	SO45109	9	London
10	SO45110	10	London
11	SO45111	11	London
12	SO45112	12	London
13	SO45113	13	London
14	SO45114	14	London
15	SO45115	15	London
16	SO45116	16	London
17	SO45117	17	London
18	SO45118	18	London
19	SO45119	19	London
20	SO45120	20	London
21	SO45121	21	London
22	SO45122	22	London
23	SO45123	23	London

Demo

- Import Products csv file to Power Bi.
- Change the name of the table to AW_Products_Lookup.
- Check Applied steps

TEXT-SPECIFIC TOOLS

The screenshot shows the Power BI ribbon with the 'Transform' tab selected. In the 'Text' section of the ribbon, there is a dropdown menu labeled 'Text Column'. A yellow arrow points from this menu to a callout box containing two options: 'By Delimiter' and 'By Number of Characters'. Another yellow arrow points from the 'Text Column' menu to a callout box listing several text manipulation tools: lowercase, UPPERCASE, Capitalize Each Word, Trim, Clean, Add Prefix, and Add Suffix.

Length
First Characters
Last Characters
Range
Text Before Delimiter
Text After Delimiter
Text Between Delimiters

Extract characters from a text column based on fixed lengths, first/last, ranges or delimiters

Tip: Select two or more columns to merge (or concatenate) fields

Split a text column based on either a specific delimiter or a number of characters

HEY THIS IS IMPORTANT!

You can access many of these tools in both the "Transform" and "Add Column" menus -- the difference is whether you want to **add a new column** or **modify an existing one**

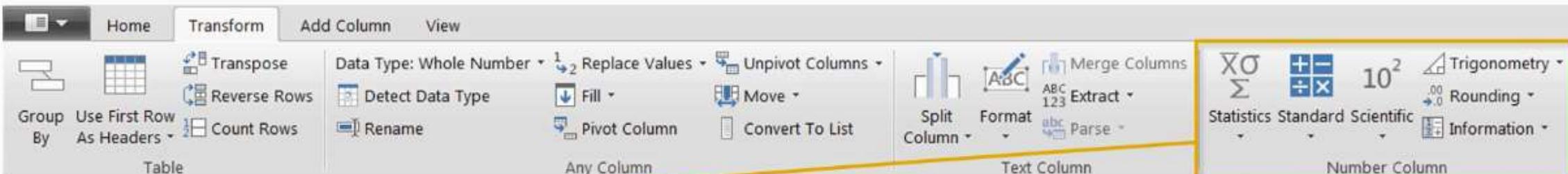
Format a text column to upper, lower or proper case, or add a prefix or suffix

Tip: Use "Trim" to eliminate leading & trailing spaces, or "Clean" to remove non-printable characters

Demo

- Import Customers csv file to Power Bi.
- Change the Prefix to capitalize format.
- Change the name of the table to AW_customer_Lookup.
- Merge the (Prefix ,FirstName ,LastName) columns.
- Change the name of the Applied steps to (Inserted Full name column)
- Get the username from mail address column using (@) as a delimiter from (Add Column → Select Extract → Text Before Delimiter.)
- Change the column header to (username)
- Return the domain name from the mail address column using (Add column → Select Extract → Text Between Delimiter.)
- Change the Header title of the new column to (Domain)
- Remove the (-) from the domain using (Transform → Replace Values→ replace (-) with space ()).
- Capitalize the domain column
- Close and apply

NUMBER-SPECIFIC TOOLS



Sum
Minimum
Maximum
Median
Average
Standard Deviation
Count Values
Count Distinct Values

Statistics functions allow you to evaluate basic stats for the selected column (sum, min/max, average, count, countdistinct, etc)

Note: These tools return a **SINGLE** value, and are commonly used to explore a table rather than prepare it for loading

Add
Multiply
Subtract
Divide
Integer-Divide
Modulo
Percentage
Percent Of

Standard

Absolute Value
Power
Square Root
Exponent
Logarithm
Factorial

Scientific

Sine
Cosine
Tangent
Arcsine
Arccosine
Arctangent

Trigonometry

Is Even
Is Odd
Sign

Information tools allow you to define binary flags (*TRUE/FALSE* or *1/0*) to mark each row in a column as even, odd, positive or negative

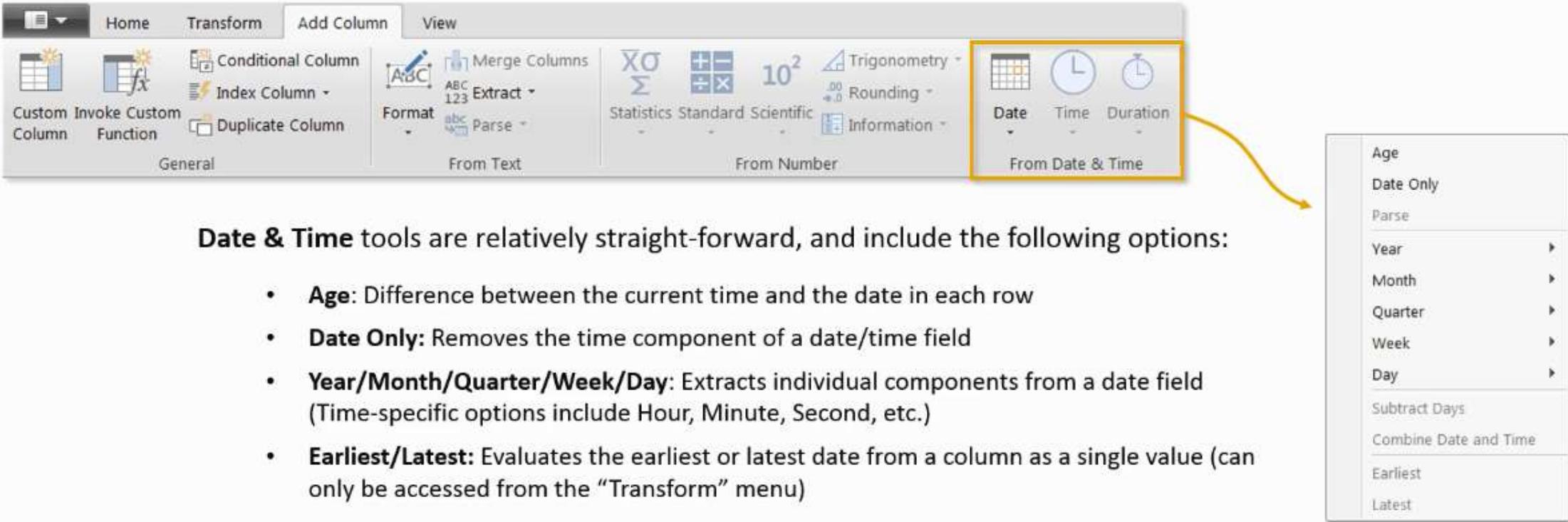
Standard, Scientific and **Trigonometry** tools allow you to apply standard operations (addition, multiplication, division, etc.) or more advanced calculations (power, logarithm, sine, tangent, etc) to each value in a column

Note: Unlike the Statistics options, these tools are applied to each individual row in the table

Demo

- Edit AW_Products_Lookup table
- Get the distinct count of the product name by (Click on Transform → Statistics → Count Distinct Values).
- Get the ProductPrice column Average Value.(Click Transform → Statistics → Average).
- Get the ProductPrice column Max Value.(Click Transform → Statistics → max).
- Multiply ProductPrice Column with 0.9 (Click Add Column → Standard → Multiply → 0.9 → OK).
- Change the name of the new column to (DiscountPrice)
- Round the new (DiscountPrice) to 2 Decimals (Click Transform → Rounding→ 2 decimal).

DATE-SPECIFIC TOOLS



The screenshot shows the Power BI ribbon with the 'Transform' tab selected. In the 'Date & Time' section of the ribbon, three icons are displayed: 'Date', 'Time', and 'Duration'. A yellow box highlights this section, and a yellow arrow points from it to a detailed description of the options.

Date & Time tools are relatively straight-forward, and include the following options:

- **Age:** Difference between the current time and the date in each row
- **Date Only:** Removes the time component of a date/time field
- **Year/Month/Quarter/Week/Day:** Extracts individual components from a date field
(Time-specific options include Hour, Minute, Second, etc.)
- **Earliest/Latest:** Evaluates the earliest or latest date from a column as a single value (can only be accessed from the "Transform" menu)

Note: You will almost always want to perform these operations from the "Add Column" menu to build out new fields, rather than transforming an individual date/time column

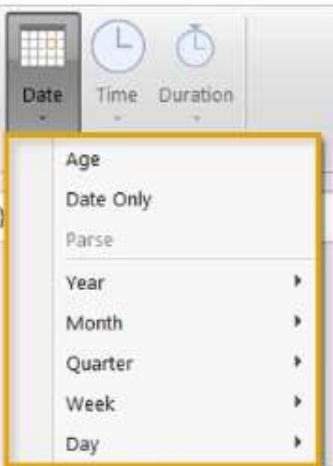


PRO TIP:

Load up a table containing a **single date column** and use Date tools to build out an **entire calendar table**

CREATING A BASIC CALENDAR TABLE

	Date
1	1/1/2015
2	1/2/2015
3	1/3/2015
4	1/4/2015
5	1/5/2015
6	1/6/2015
7	1/7/2015
8	1/8/2015
9	1/9/2015
10	1/10/2015
11	1/11/2015
12	1/12/2015
13	1/13/2015
14	1/14/2015
15	1/15/2015
16	1/16/2015
17	1/17/2015
18	1/18/2015
19	1/19/2015
20	1/20/2015
21	1/21/2015
22	1/22/2015
23	1/23/2015
24	1/24/2015
25	1/25/2015



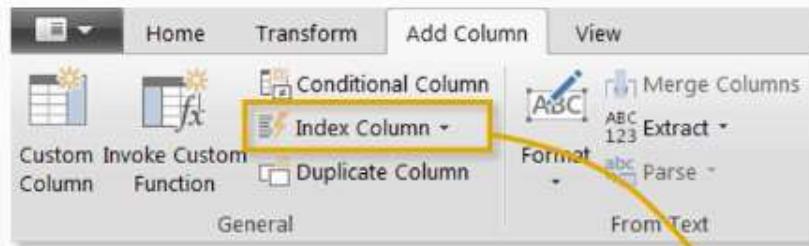
Use pre-defined **Date** options in the “Add Column” menu to quickly build out a calendar table from a list of dates

	Date	Day	Day of Week	Day Name	Start of Week	Month
1	1/1/2015	1	4	Thursday	12/28/2014	1
2	1/2/2015	2	5	Friday	12/28/2014	1
3	1/3/2015	3	6	Saturday	12/28/2014	1
4	1/4/2015	4	0	Sunday	1/4/2015	1
5	1/5/2015	5	1	Monday	1/4/2015	1
6	1/6/2015	6	2	Tuesday	1/4/2015	1
7	1/7/2015	7	3	Wednesday	1/4/2015	1
8	1/8/2015	8	4	Thursday	1/4/2015	1
9	1/9/2015	9	5	Friday	1/4/2015	1
10	1/10/2015	10	6	Saturday	1/4/2015	1
11	1/11/2015	11	0	Sunday	1/11/2015	1
12	1/12/2015	12	1	Monday	1/11/2015	1
13	1/13/2015	13	2	Tuesday	1/11/2015	1
14	1/14/2015	14	3	Wednesday	1/11/2015	1
15	1/15/2015	15	4	Thursday	1/11/2015	1
16	1/16/2015	16	5	Friday	1/11/2015	1
17	1/17/2015	17	6	Saturday	1/11/2015	1
18	1/18/2015	18	0	Sunday	1/18/2015	1
19	1/19/2015	19	1	Monday	1/18/2015	1
20	1/20/2015	20	2	Tuesday	1/18/2015	1
21	1/21/2015	21	3	Wednesday	1/18/2015	1
22	1/22/2015	22	4	Thursday	1/18/2015	1
23	1/23/2015	23	5	Friday	1/18/2015	1
24	1/24/2015	24	6	Saturday	1/18/2015	1
25	1/25/2015	25	0	Sunday	1/25/2015	1

Demo

- Enter new Table which is Calender.csv
- Change the name of the table to AW_Calender_Lookup
- Get the earliest date (Transform → Date → Earliest)
- Get the Latest date (Transform → Date → Latest)
- Get the day name (Add Column → Date → Day → Name of the Day)
- Get the start of the week (Add Column → Date → week → start of week)
- Change the start of the week to Monday by modifying (M code) and write
= Table.AddColumn(#"Inserted Day Name", "Start of Week", each Date.StartOfWeek([Date],1), type date)
- Get the Start of the month (Add Column → Date → Month → start of month)
- Get the month name (Add Column → Date → Month → name of month)
- Get the start of the year (Add Column → Date → Year → start of year)
- Get the year (Add Column → Date → Year → year)
- Apply and close

ADDING INDEX COLUMNS



Index Columns contain a list of sequential values that can be used to identify each unique row in a table
(typically starting from 0 or 1)

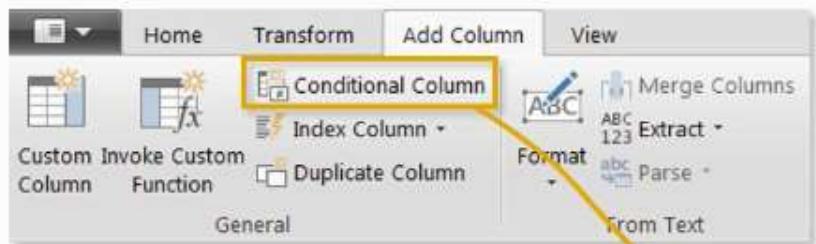
These columns are often used to create **unique IDs** that can be used to form relationships between tables
(more on that later!)

Index	OrderDate	StockDate	OrderNumber	ProductKey	CustomerKey
1	1/1/2015	9/21/2001	SO45080	332	14657
2	1/1/2015	12/5/2001	SO45079	312	29255
3	1/1/2015	10/29/2001	SO45082	350	11455
4	1/1/2015	11/16/2001	SO45081	338	26782
5	1/2/2015	12/15/2001	SO45083	312	14947
6	1/2/2015	10/12/2001	SO45084	310	29143
7	1/2/2015	12/18/2001	SO45086	314	18747
8	1/2/2015	10/9/2001	SO45085	312	18746
9	1/3/2015	10/3/2001	SO45093	312	18906
10	1/3/2015	9/29/2001	SO45090	310	29170
11	1/3/2015	12/11/2001	SO45088	345	11398
12	1/3/2015	10/24/2001	SO45092	313	18899
13	1/3/2015	12/16/2001	SO45089	351	25977
14	1/3/2015	10/26/2001	SO45091	314	18909
15	1/3/2015	9/11/2001	SO45087	350	11388
16	1/3/2015	9/11/2001	SO45094	310	22785
17	1/4/2015	10/30/2001	SO45096	312	12483
18	1/4/2015	10/30/2001	SO45097	313	29151

Demo-Creating Index Column

- Get Adventureworks_Sales_2017.csv
- Change the table name to (AW_Sales_2017)
- Create Index Column (Add Column → Index Column → from 1)
- Change the data type of the column to whole number (Transform → Data type → Whole Number)
- Take the new column (index) to the beginning of the table by (right click on the column → move → to the beginning)
- Remove (index) column
- Remove the Applied Steps

ADDING CONDITIONAL COLUMNS



In this case we're creating a new conditional column called "**QuantityType**", which depends on the values in the "**OrderQuantity**" column, as follows:

- If *OrderQuantity = 1*, *QuantityType = "Single Item"*
- If *OrderQuantity > 1*, *QuantityType = "Multiple Items"*
- Otherwise *QuantityType = "Other"*

Conditional Columns allow you to define new fields based on logical rules and conditions (*IF/THEN statements*)

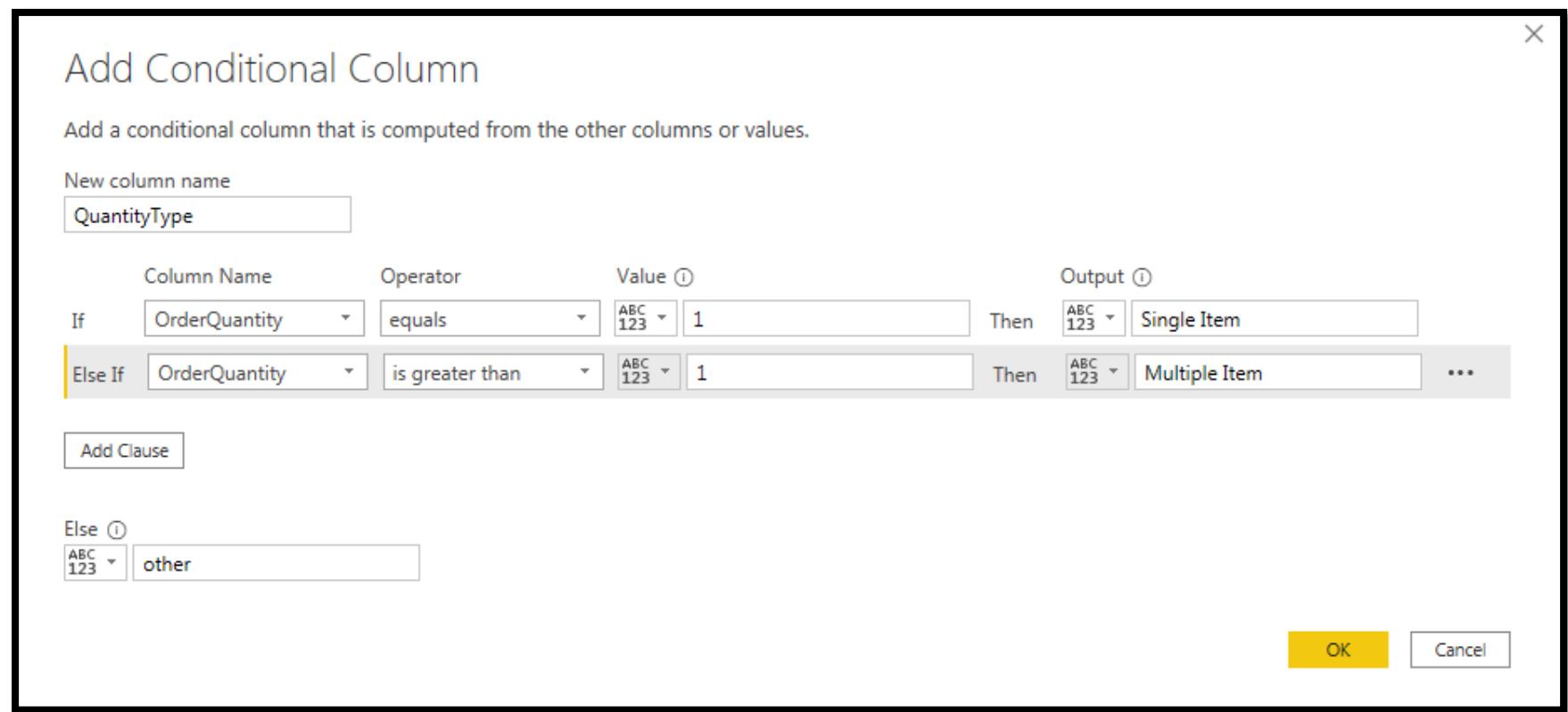
The 'Add Conditional Column' dialog box is open. It shows the configuration for creating a new column named 'QuantityType'. The dialog uses an 'If-Else If-Otherwise' structure to determine the value based on the 'OrderQuantity' column.

Condition	Column Name	Operator	Value	Output
If	OrderQuantity	equals	ABC 123	1
Then	ABC 123	Single Item		
Else If	OrderQuantity	is greater than	ABC 123	1
Then	ABC 123	Multiple Items		
Otherwise	ABC 123	Other		

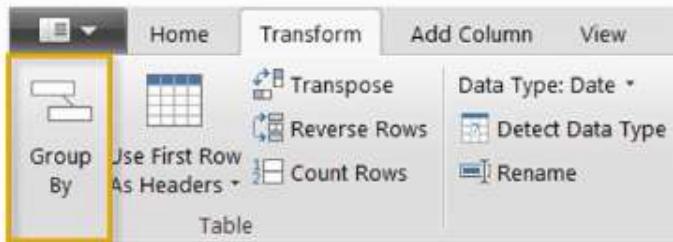
Buttons at the bottom right include 'OK' and 'Cancel'.

Demo – Conditional Column

- Apply condition (Add column → Conditional Column), write column name (QuantityType)
- Close & Apply

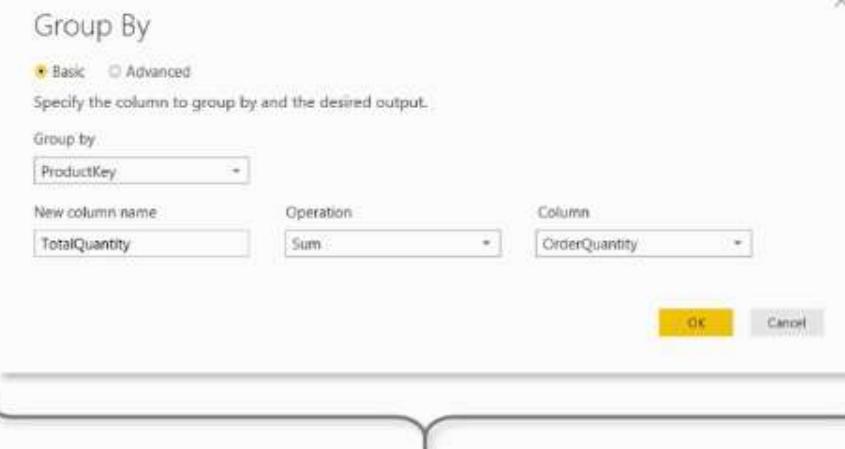


GROUPING & AGGREGATING DATA



Group By allows you to aggregate your data at a different level
(i.e. transform daily data into monthly, roll up transaction-level data by store, etc)

	OrderDate	ProductKey	CustomerKey	OrderQuantity
1	6/25/2017	214	14719	1
2	7/16/2016	214	11243	1
3	12/31/2016	214	21452	1
4	6/29/2017	214	22748	1
5	10/6/2016	214	25025	1
6	10/7/2016	214	16504	1
7	10/13/2016	214	13043	1
8	1/19/2017	214	23101	1
9	9/7/2016	214	24900	1
10	1/19/2017	214	24196	1
11	6/29/2017	214	12963	1
12	11/6/2016	214	14570	1
13	11/13/2016	214	16999	1
14	7/11/2016	214	12281	1
15	10/9/2016	214	15685	1
16	8/1/2016	214	16982	1
17	12/4/2016	214	12835	1

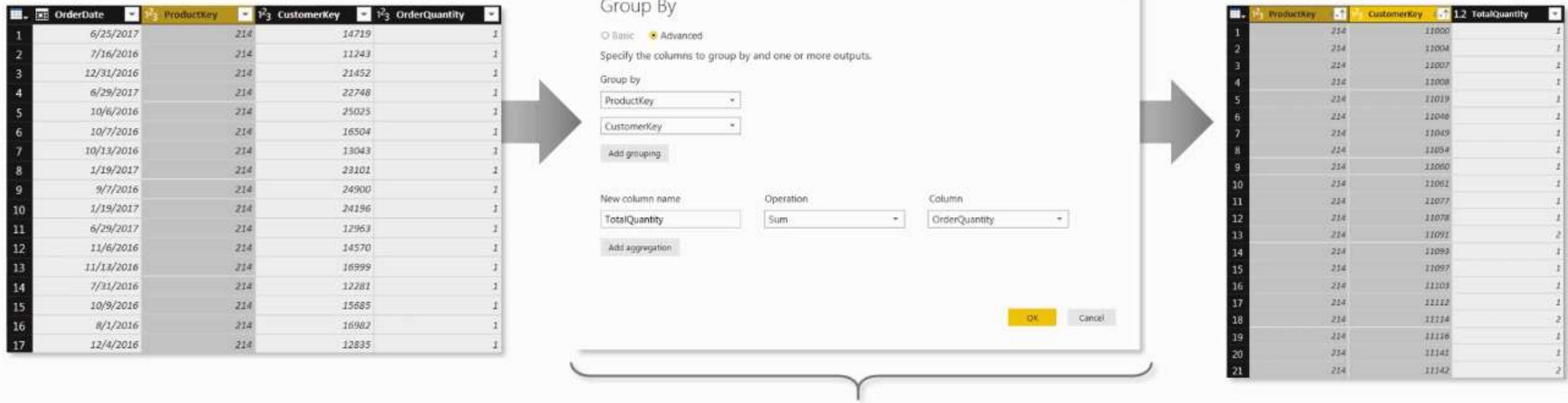


	ProductKey	TotalQuantity
1	214	2099
2	217	1940
3	222	1995
4	225	4151
5	228	392
6	231	408
7	234	424
8	237	381
9	310	169
10	311	139
11	312	179
12	313	168
13	314	157
14	320	10
15	321	55
16	322	5
17	323	34

In this case we're transforming a daily, transaction-level table into a summary of "TotalQuantity" rolled up by "ProductKey"

NOTE: Any fields not specified in the Group By settings are lost

GROUPING & AGGREGATING DATA (ADVANCED)



*This time we're transforming the daily, transaction-level table into a summary of "**TotalQuantity**" aggregated by both "**ProductKey**" and "**CustomerKey**" (using the advanced option in the dialog box)*

NOTE: This is similar to creating a PivotTable in Excel and pulling in "**Sum of OrderQuantity**" with **ProductKey** and **CustomerKey** as row labels

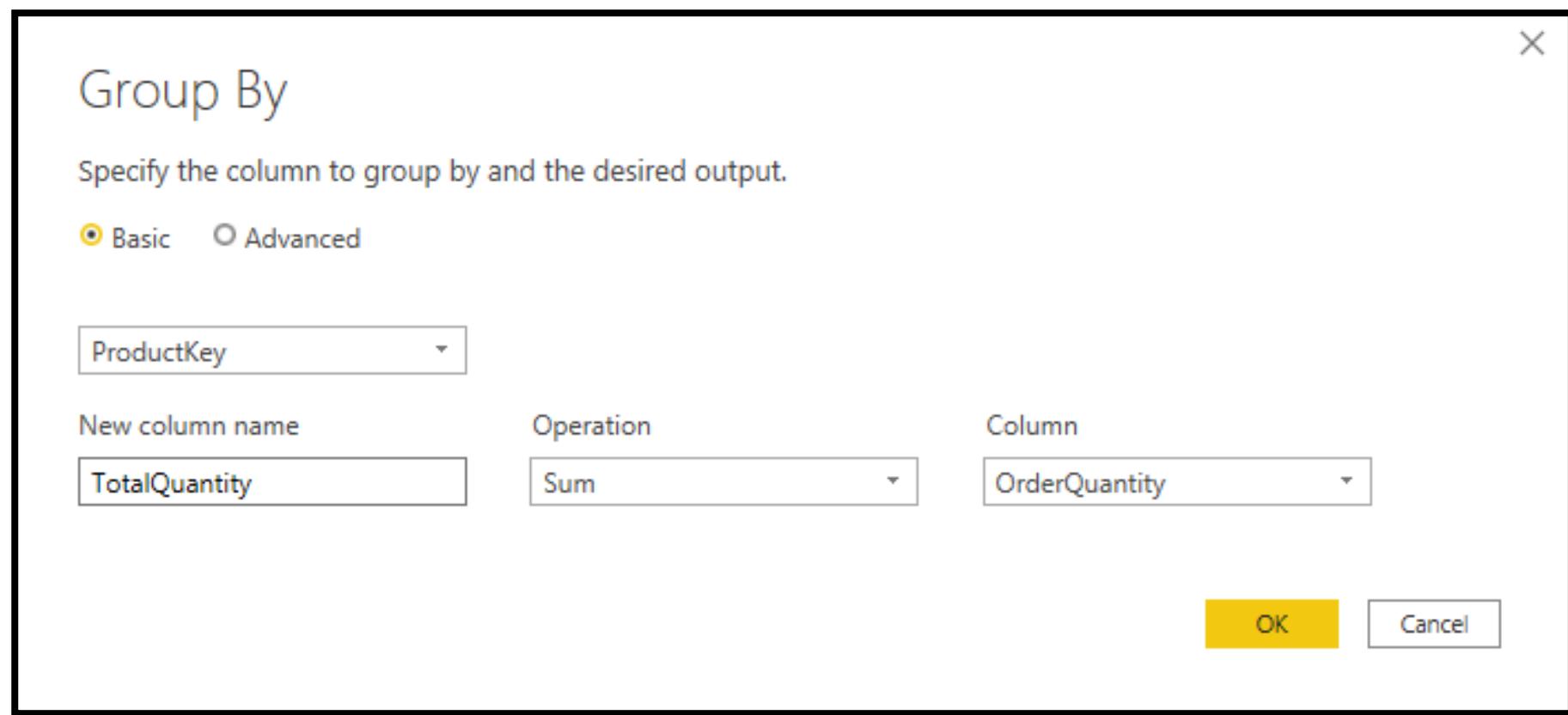
Demo – Group by (Basic)

- Group the product key and show the order quantity for each as a summary. (Transform → group by)

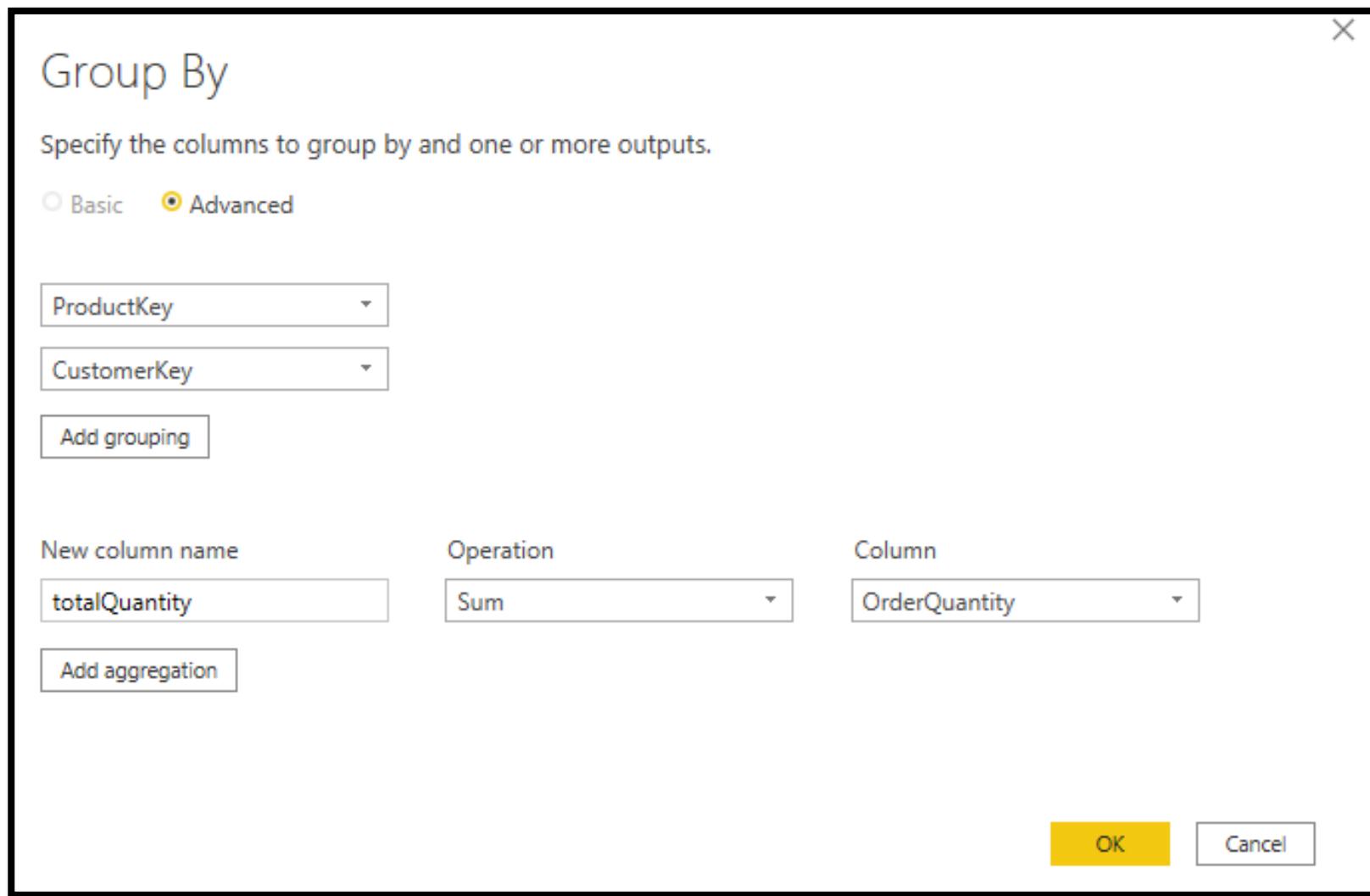
• After finishing

Remove the

Applied steps.

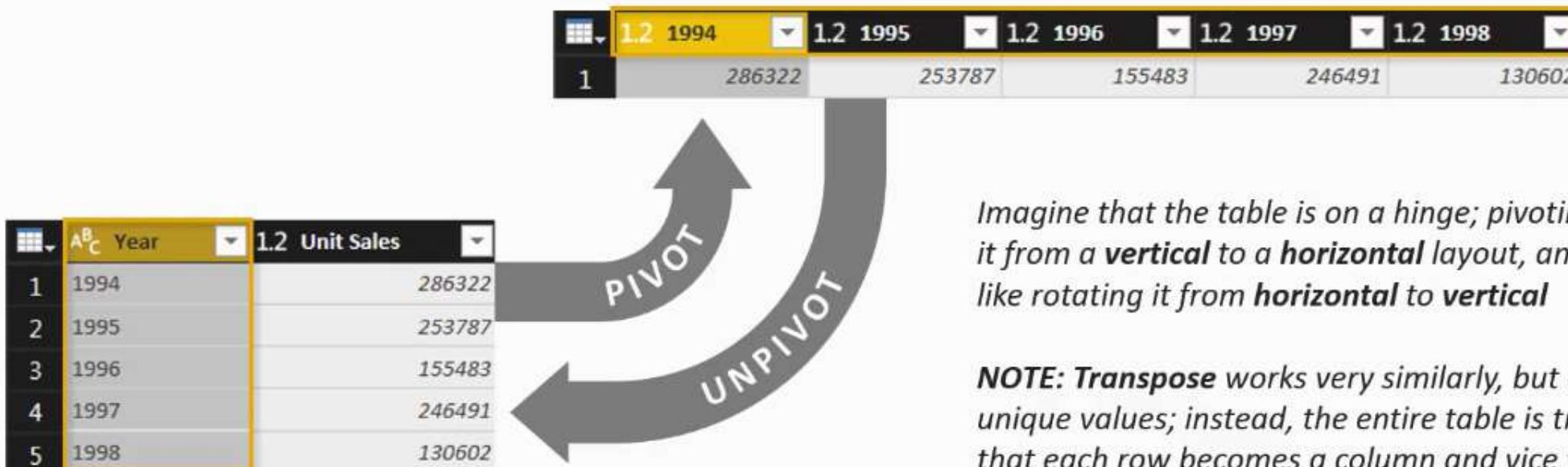


Demo – Group by (Advanced)



PIVOTING & UNPIVOTING

“Pivoting” is a fancy way to describe the process of turning **distinct row values** into **columns** (“*pivoting*”) or turning **columns** into **rows** (“*unpivoting*”)



Imagine that the table is on a hinge; pivoting is like rotating it from a **vertical** to a **horizontal** layout, and unpivoting is like rotating it from **horizontal** to **vertical**

NOTE: *Transpose* works very similarly, but doesn't recognize unique values; instead, the entire table is transformed so that each row becomes a column and vice versa

MERGING QUERIES

The screenshot shows the 'Merge' dialog box in Power BI. On the left, a vertical menu lists 'Merge Queries' (selected), 'Append Queries', and 'Combine Files'. Below the menu, there's a 'Combine' button. The main area has a title 'Merge' and a subtitle 'Select a table and matching columns to create a merged table.' Two tables are shown: 'AW_Sales_Data' and 'AW_Product_Lookup'. The 'ProductKey' column in 'AW_Sales_Data' and the 'ProductKey' column in 'AW_Product_Lookup' are highlighted with yellow boxes. A 'Join Kind' dropdown is set to 'Left Outer (all from first, matching from second)'. At the bottom, a note says 'The selection has matched 56046 out of the first 56046 rows.' with a checkmark. There are 'OK' and 'Cancel' buttons.

Merging queries allows you to **join tables** based on a common column (like VLOOKUP)

In this case we're merging the **AW_Sales_Data** table with the **AW_Product_Lookup** table, which share a common “*ProductKey*” column

NOTE: Merging **adds columns** to an existing table

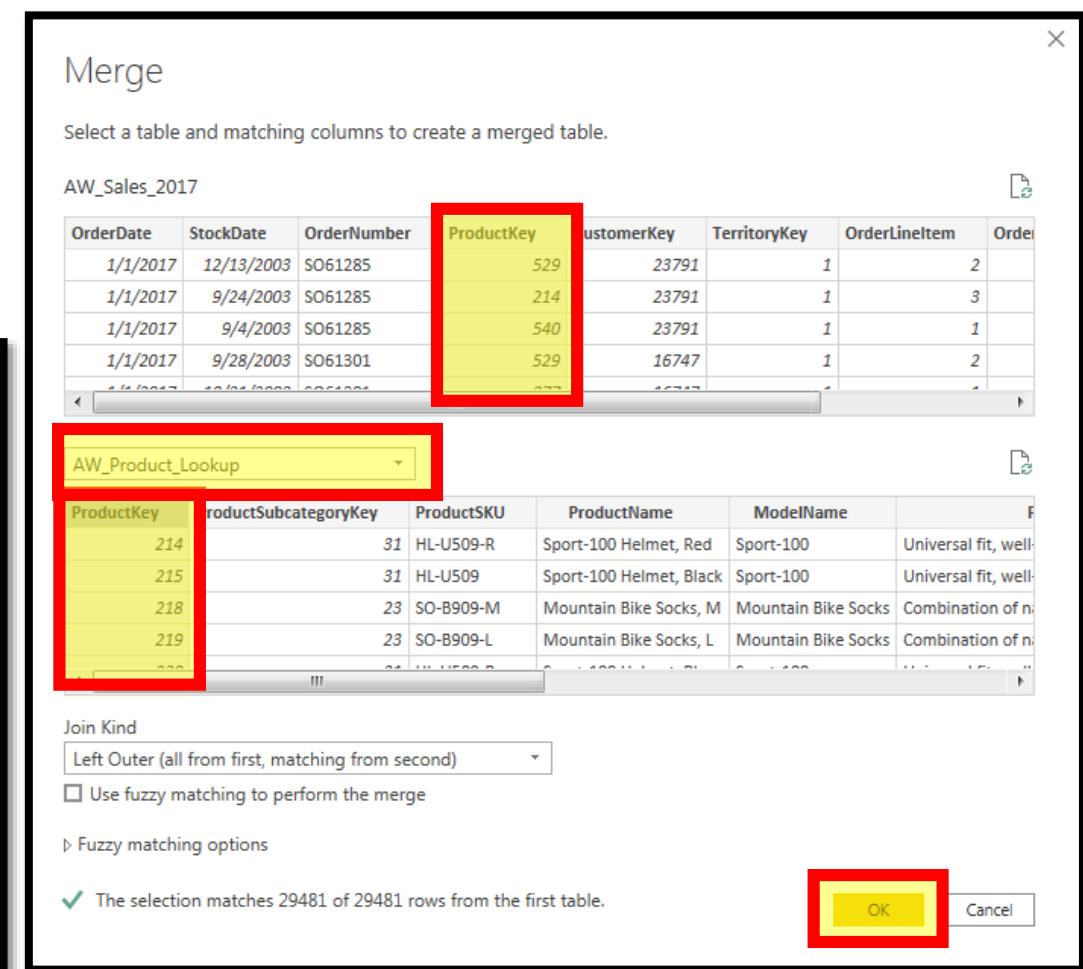
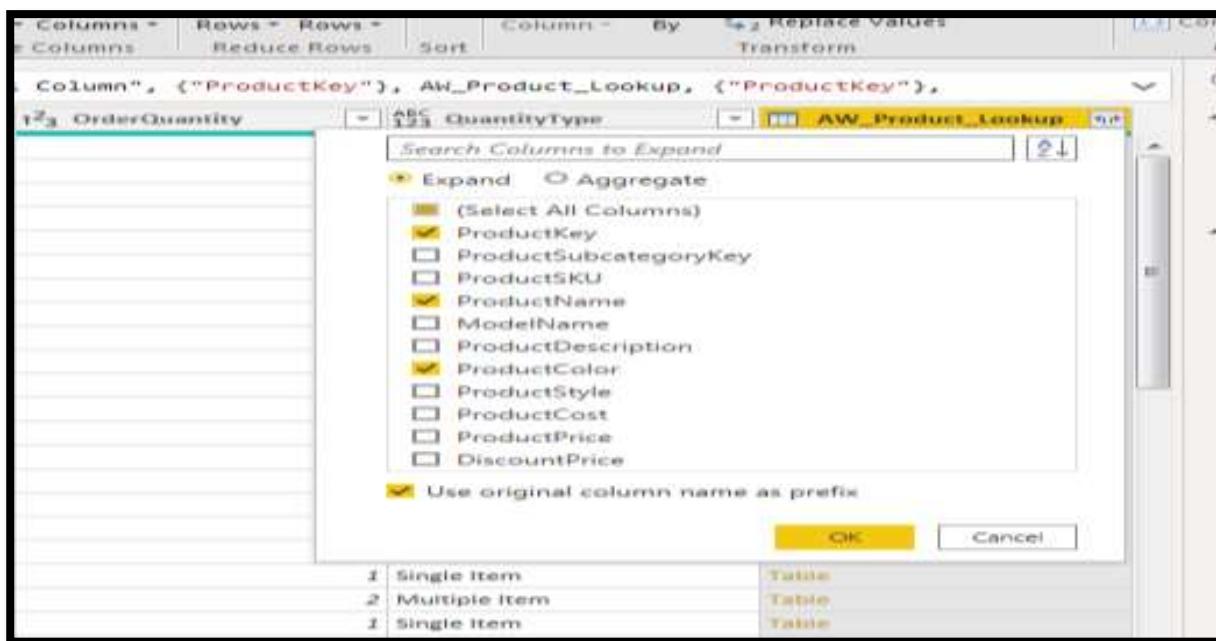
HEY THIS IS IMPORTANT!

Just because you **can** merge tables, doesn't mean you **should**.

In general, it's better to keep tables separate and define **relationships** between them (*more on that later!*)

Demo : Add product details to AW_sales_2017 table

- Edit AW_sales_2017 → go to (productkey) column
- Select Home tab → merge Queries
- After finishing The demo Delete the Changes.



APPENDING QUERIES

The screenshot shows the 'Append' feature in the Power BI ribbon. The 'Append Queries' option is selected, highlighted with a yellow arrow. The 'Two tables' radio button is selected. The 'Primary table' dropdown is set to 'AdventureWorks_Sales_2015'. The 'Table to append to the primary table' dropdown is set to 'AdventureWorks_Sales_2016'.

Appending queries allows you to **combine** (or **stack**) tables that share the exact same column structure and data types

In this case we're appending the **AdventureWorks_Sales_2015** table to the **AdventureWorks_Sales_2016** table, which is valid since they share identical table structures

NOTE: Appending **adds rows** to an existing table



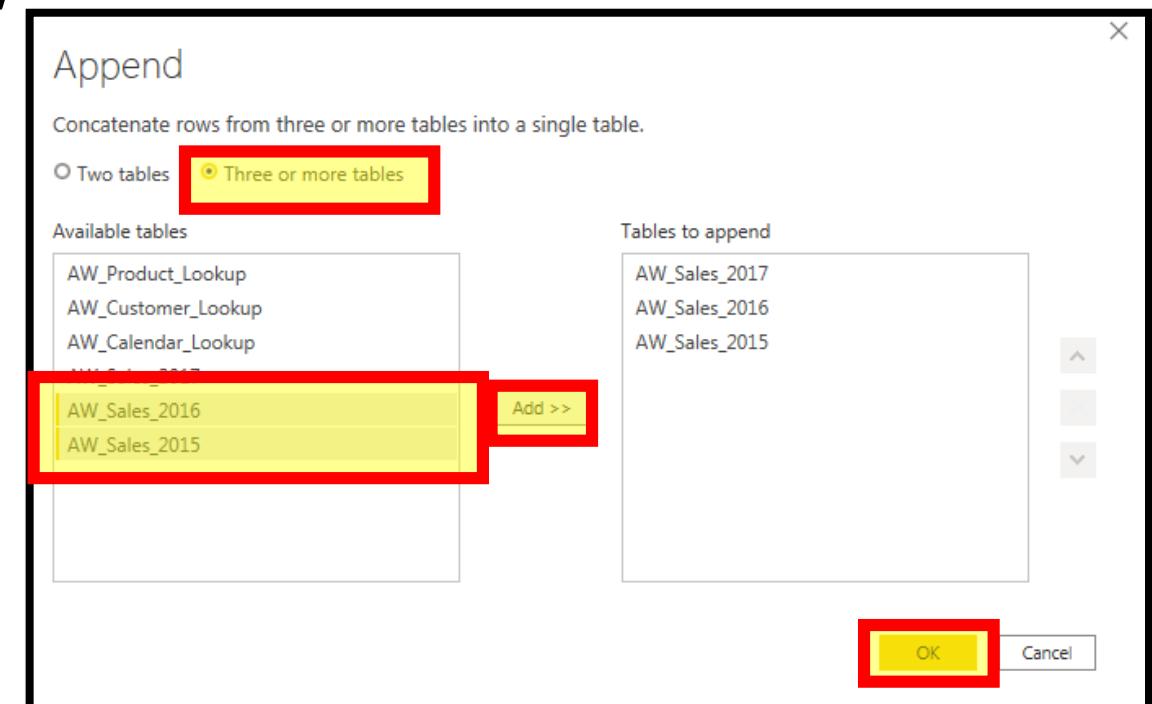
PRO TIP:

Use the "**Folder**" option (*Get Data > More > Folder*) to append all files within a folder (assuming they share the same structure); as you add new files, simply refresh the query and they will automatically append!

Demo: append rows of AW_sales_2017 , AW_sales_2016, AW_sales_2015

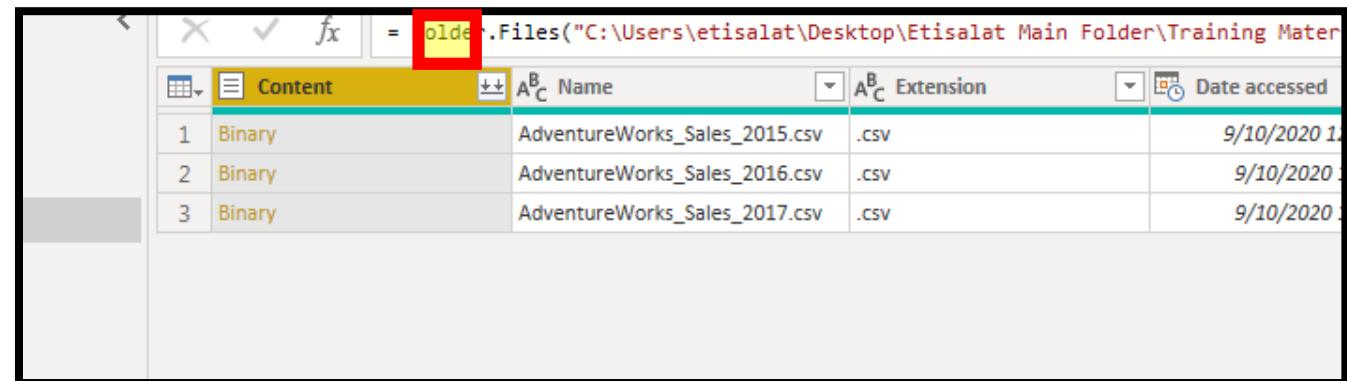
- Import AW_sales_2016 and AW_sales_2015
- Change the name of the tables.
- Delete quantity type column from AW_sales_2017 as we don't need it
- Go to Home tab → Append Queries as new
- Name it AW_Sales_2015-2017

Note: the new table created depending
On the three tables, and we can not delete
Any of the three tables as they are used
To create AW_Sales_2015-2017 table



Demo: append rows of AW_sales_2017 ,
AW_sales_2016, AW_sales_2015 from a folder

- Create a new folder name it (AW-Sales)
- Cut and past AW_sales-2017, AW_sales-2016, AW_sales-2015
- From power BI go to (new source) → more →select folder → connect
- Write the folder path for (AW-Sales)
- Click Transform data button.
- Click on expand to see all rows.
- Check all rows
- Choose close & apply



A screenshot of the Power BI Data View interface. The top bar shows the formula bar with the text = older.Files("C:\Users\etisalat\Desktop\Etisalat Main Folder\Training Mater". The main area is a table with the following data:

	Content	Name	Extension	Date accessed
1	Binary	AdventureWorks_Sales_2015.csv	.csv	9/10/2020 1
2	Binary	AdventureWorks_Sales_2016.csv	.csv	9/10/2020 1
3	Binary	AdventureWorks_Sales_2017.csv	.csv	9/10/2020 1

DATA SOURCE SETTINGS

The screenshot shows the Power BI Desktop interface with the Query Editor open. The ribbon menu at the top includes Home, Transform, Add Column, View, Help, Close & Apply, New Source, Recent Sources, Enter Data, Data source settings (which is highlighted with a yellow box), Data Sources (also highlighted with a yellow box), Manage Parameters, and Parameters.

The main area is titled "Data source settings" and contains the following text:
Manage settings for data sources that you have connected to using Power BI Desktop.
 Data sources in current file Global permissions

A search bar labeled "Search data source settings" is present. Below it is a list of local file connections, with one item highlighted in yellow:
c:\users\chris\documents\secon...ks\adventureworks_calendar.csv
c:\users\chris\documents\secon...s\adventureworks_customers.csv
c:\users\chris\documents\secon...reworks_product_categories.csv
c:\users\chris\documents\secon...orks_product_subcategories.csv
c:\users\chris\documents\secon...ki\adventureworks_products.csv
c:\users\chris\documents\secon...rks\adventureworks_returns.csv
c:\users\chris\documents\secon...works\adventureworks_sales.csv
c:\users\chris\documents\secon...adventureworks_territories.csv
c:\users\chris\documents\secon...i\data\adventureworks\aw_sales

At the bottom of the dialog are buttons for "Change Source...", "Edit Permissions...", "Clear Permissions...", and "Close". A yellow arrow points from the "Data source settings" button in the ribbon to the "Data source settings" title in the dialog. Another yellow arrow points from the "Data Sources" button in the ribbon to the "Data Sources" section in the dialog.

Comma-Separated Values

Basic Advanced

File path

C:\Users\Chris\Desktop\Power BI Course Files\Adventure Works\Adventure



Open file as

Csv Document

File origin

1252: Western European (Windows)

Line breaks

Apply all line breaks

Delimiter

Comma

The **Data Source Settings** in the Query Editor allow you to manage data connections and permissions

HEY THIS IS IMPORTANT!

Connections to local files reference the *exact* path

If the file name or location changes, **you will need to change the source and browse to the current version**

REFRESHING QUERIES



By default, **ALL** queries in the model will refresh when you use the “*Refresh*” command from the **Home** tab

From the Query Editor, uncheck “***Include in report refresh*** to exclude individual queries from the refresh

SalesTerritoryKey	Region	Country
1	Northwest	United States
2	Northeast	United States
3	Central	United States
4	Southwest	United States
5	Southeast	United States
6	Canada	Canada
7	France	France
8	Germany	Germany
9	Australia	Australia
10	United Kingdom	United Kingdom

PRO TIP:

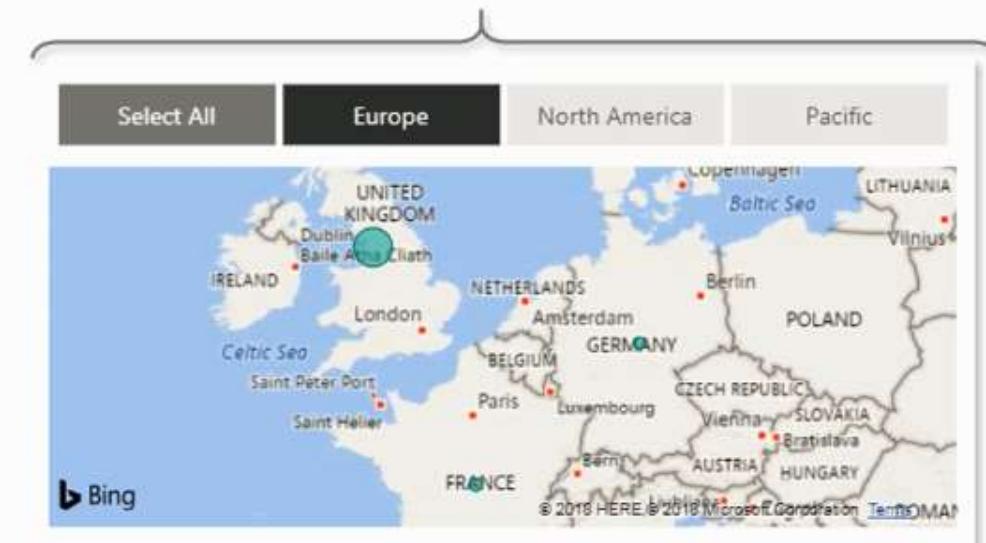
Exclude queries that don't change often,
like lookups or static data tables

DEFINING DATA CATEGORIES

A screenshot of the Microsoft Power BI Data view interface. The top navigation bar includes Home, Modeling, and Help tabs. Below the navigation bar are several icons: Manage Relationships, New Measure Column, New Table, New Parameter, What If, Sort, and Formatting. The main area shows a table with columns SalesTerritoryKey, Region, Country, and Continent. The 'Country' column is selected, highlighted in yellow. A context menu is open over this column, with the 'Data Category' option expanded. The 'Country/Region' category is selected, indicated by a checkmark. Other options in the list include Uncategorized, Address, City, Continent, County, Latitude, Longitude, Place, Postal Code, State or Province, Web URL, Image URL, and Barcode.

From the “**Modeling**” tab in the **Data** view, you can edit field properties to define specific categories

*This is commonly used to help Power BI accurately map location-based fields like **addresses**, **countries**, **cities**, **latitude/longitude coordinates**, **zip codes**, etc*



BEST PRACTICES: CONNECTING & SHAPING DATA



Get yourself organized, *before* loading the data into Power BI

- *Define clear and intuitive table names (no spaces!) from the start; updating them later can be a headache, especially if you've referenced them in multiple places*
- *Establish a file/folder structure that makes sense from the start, to avoid having to modify data source settings if file names or locations change*



Disabling report refresh for any static sources

- *There's no need to constantly refresh sources that don't update frequently (or at all), like lookups or static data tables; only enable refresh for tables that will be changing*



When working with large tables, only load the data you need

- *Don't include hourly data when you only need daily, or product-level transactions when you only care about store-level performance; extra data will only slow you down*

Quiz

Question 1:

Which three tabs in the Query Editor contain data shaping and transformation tools?

Home, Transform, Add Column

Transform, Load, Add Column

Load, Transform, Analyze

Transform, Design, Analyze

Question 2:

TRUE or FALSE: The Query Editor "Transform" tools overwrite the existing values in a column

- True
- False

Question 3:

TRUE or FALSE: Statistics tools are accessible from the Add Column tab in the Query Editor

- True
- False

Question 5:

Which of the following date tools is *only* available in the "Transform" tab of the Query Editor?

Age

Month

Quarter

Day

Latest

Question 6:

TRUE or FALSE: Merging queries makes tables *wider* by adding columns, and appending queries makes tables *taller* by adding rows

- True
- False

Question 7:

Which term *best* describes the process of transforming a table from a horizontal orientation to a vertical orientation by turning distinct column values into rows?

Transposing

Pivoting

Unpivoting

Hinging

Question 8:

TRUE or FALSE: *All* queries in a Power BI file will refresh by default

- True
- False

Question 9:

Which type of column would you add to create a series of values that uniquely identify each row?

Index

Conditional

Sequential

Count

Series

Question 10:

Which of the following could represent a valid hierarchy?

Country > City > State

Peach > Pear > Plum

Zip Code > State > Department

Product Category > Product Brand > Product

Question 11:

TRUE or FALSE: When you connect to a local file from Power BI, the path will automatically update in the data source settings if the file is renamed or moved

- True
- False

Exercise : Connecting & Shaping Data with Power BI Desktop

Using your Adventure Works Power BI file, complete the following:

1) Create new queries to connect to the (AdventureWorks_Product_Categories) and (AdventureWorks_Product_Subcategories) files from the course resources:

- Name your queries (AW_Product_Category_Lookup) and (AW_Product_Subcategory_Lookup)
- Confirm that headers have been promoted and that detected data types are correct
- Disable the report refresh option for both connections

Exercise : Connecting & Shaping Data with Power BI Desktop

2) Make the following modifications to the **AW_Product_Lookup** query:

- Add a calculated column that extracts all characters before the dash ("") in the **ProductSKU** column, named "**SKUType**"
- Update the **SKUType** calculation above to return all characters before second dash, instead of the first
- Replace zeros (0) in the **ProductStyle** column with "NA"
- Update the **DiscountPrice** calculation to 15%, by multiplying the **ProductPrice** values by 0.85 (instead of 0.9)

Exercise : Connecting & Shaping Data with Power BI Desktop

3) Using the Statistics tools in the Query Editor, confirm the following values :

- Average product cost (**\$413.66**)
- Number of distinct product colors (**10**)
- Number of distinct customer names (**18,110**)
- Maximum annual customer income (**\$170,000**)
- Count of order numbers (**56,046**)
- Count of distinct order numbers (**25,164**)

4) Make the following modifications to the AW_Customer_Lookup query:

- Add a new calculated column for the year of birth (named "**BirthYear**"), based on **BirthDate**
- Add a conditional column to categorize customer income (named "**IncomeLevel**"), based on the following criteria :
 - If **AnnualIncome** >= \$150,000, then **IncomeLevel** = "Very High"
 - If **AnnualIncome** >= \$100,000, then **IncomeLevel** = "High"
 - If **AnnualIncome** >= \$50,000, then **IncomeLevel** = "Average"
 - Otherwise **IncomeLevel** = "Low"

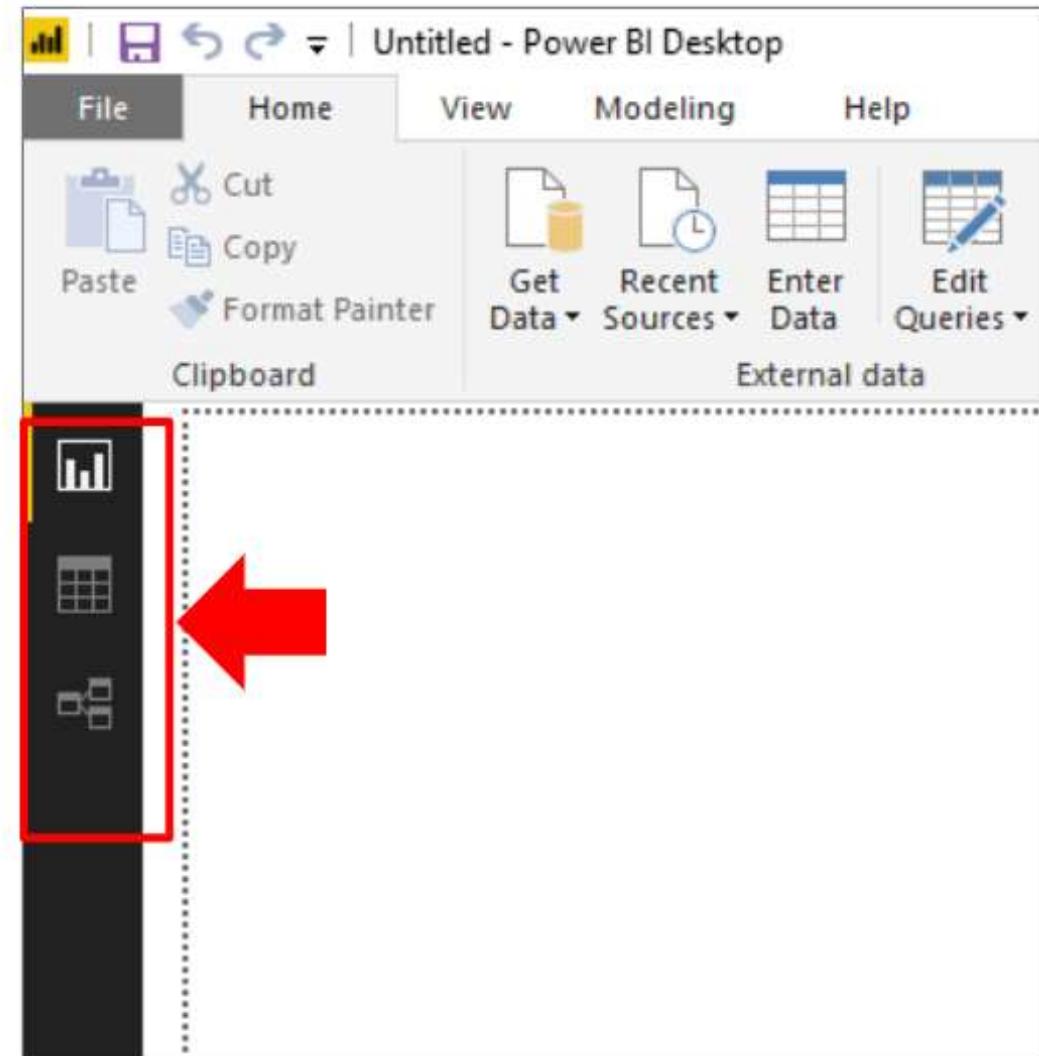
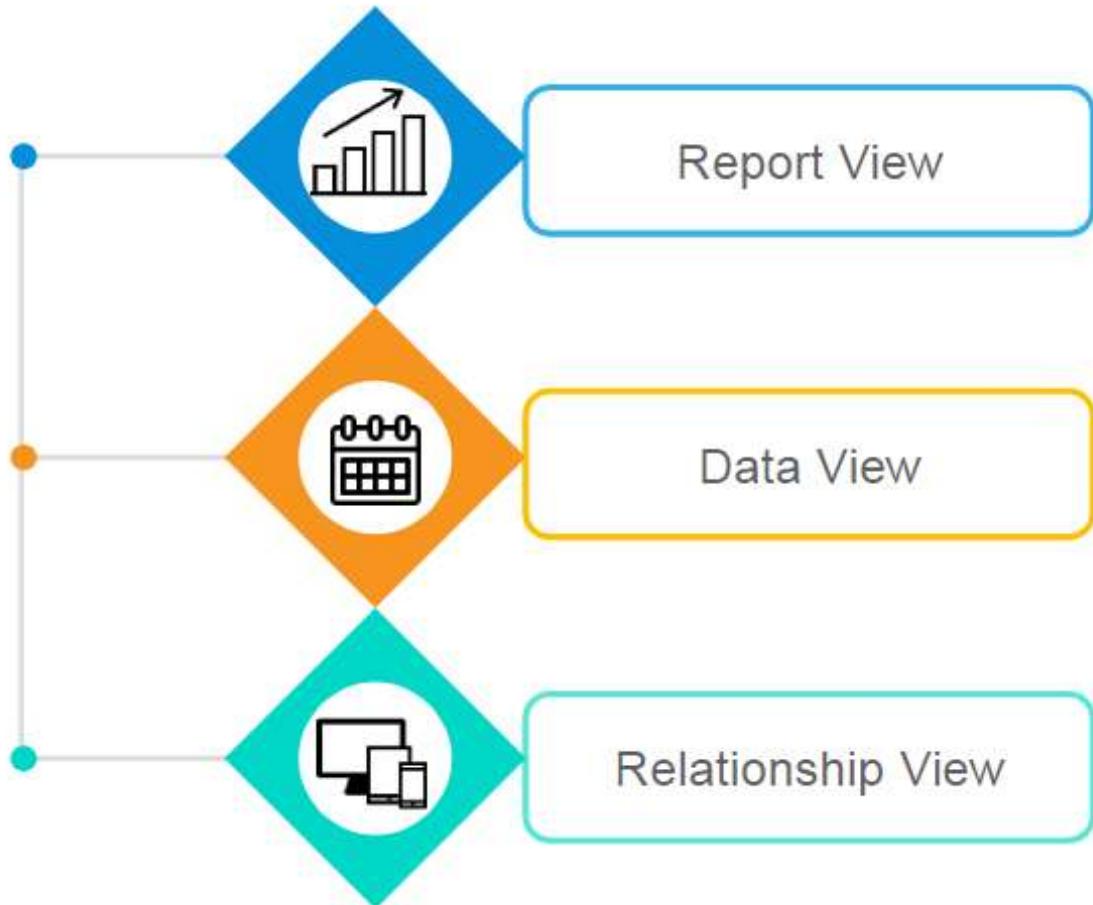
5) Apply all changes, and confirm that new tables and fields are accessible within both the **Data** and **Relationships** views (recommend saving a backup copy of the report (i.e. "*AdventureWorks_Report_Backup*"))



Section 3: Build a Relational Data Model

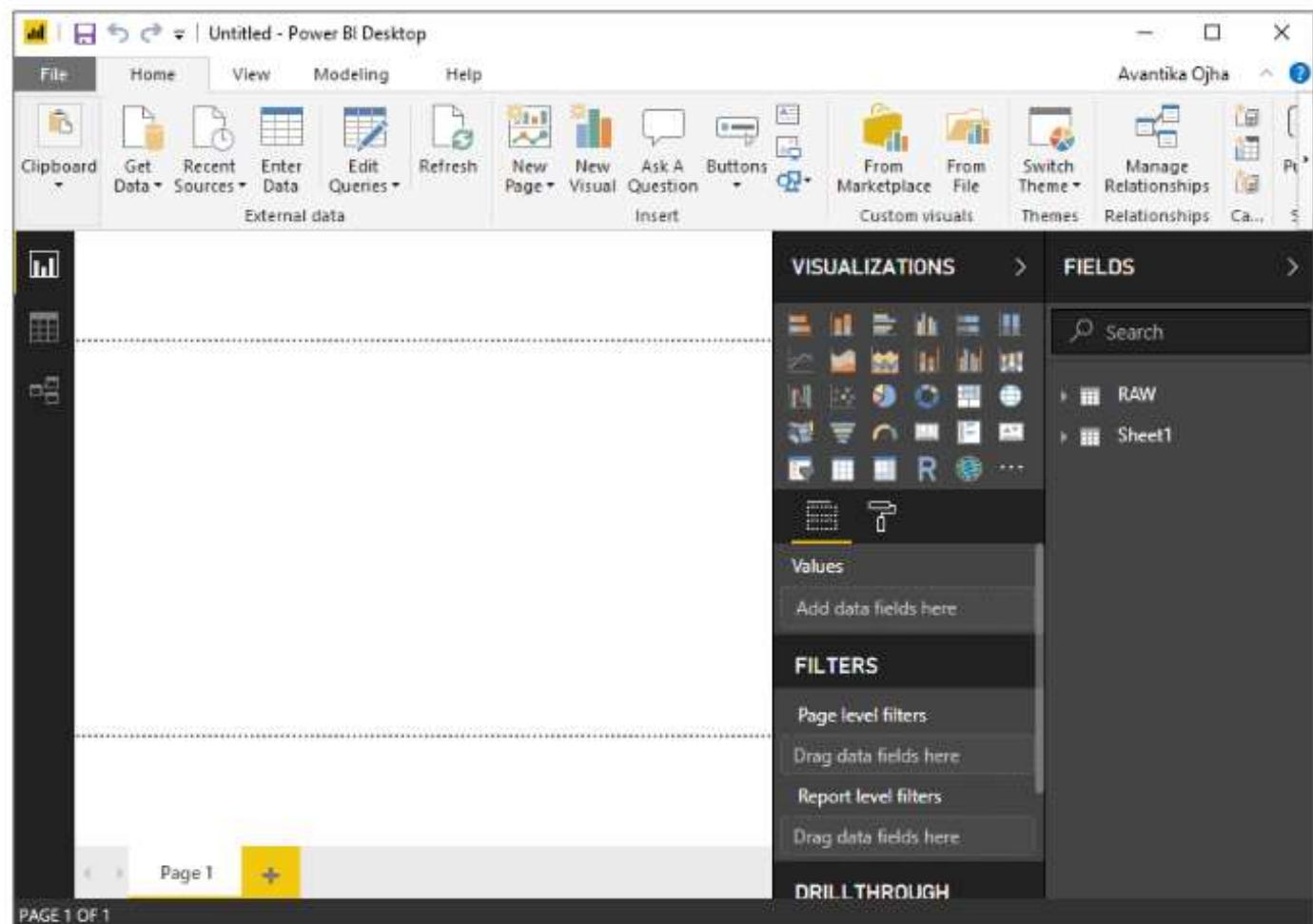
Views In Power BI Desktop

There are three views in Power BI Desktop:



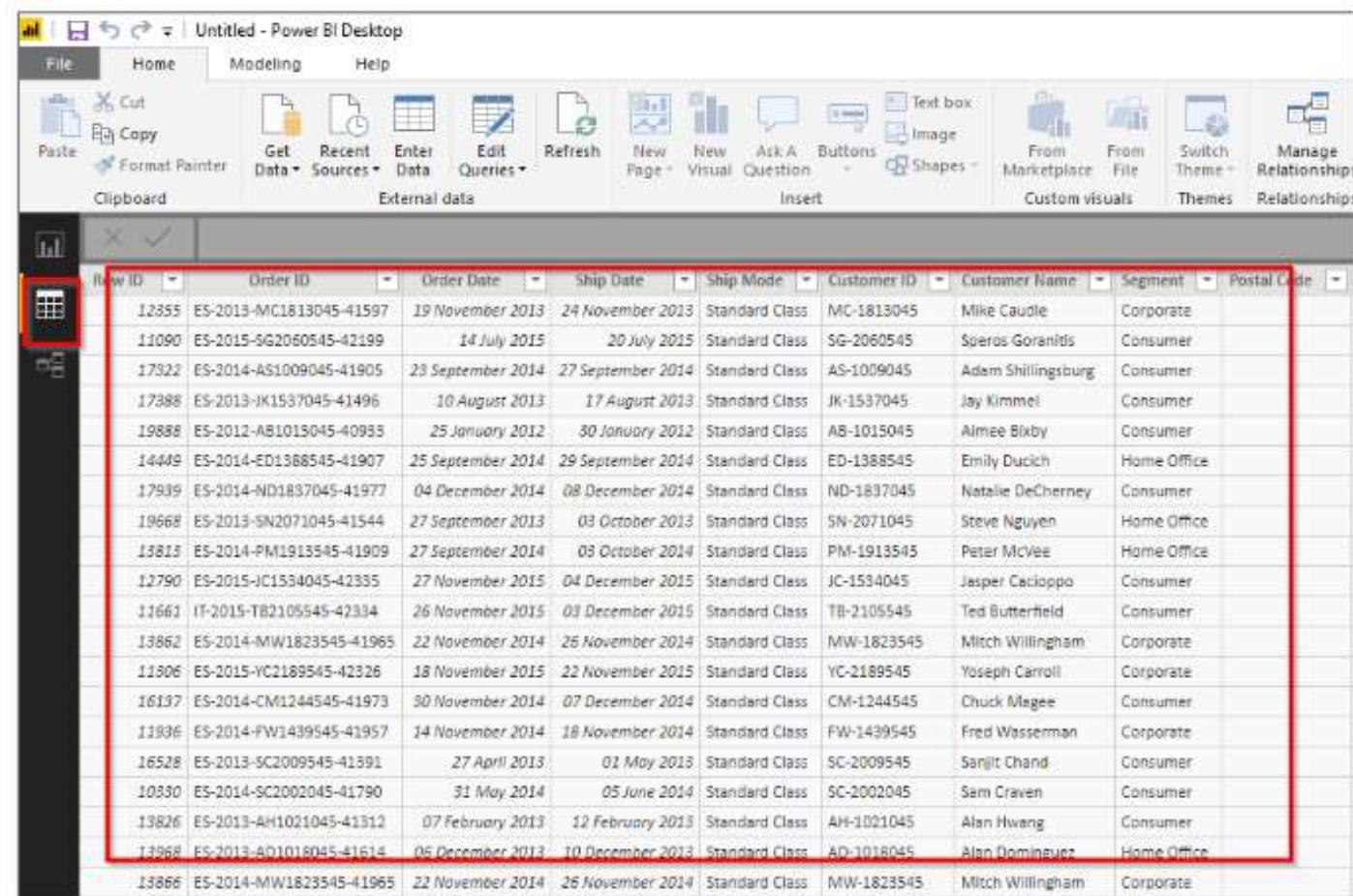
Report View In Power BI Desktop

- Report View allows you to create any number of report pages with visualizations
- You can move visualizations around, copy and paste, merge, etc.
- Pages appear in the navigator pane just to the left of the canvas
 - To add new pages to your report, just click New Page on the ribbon
 - To delete a page, click the X on the page's tab at the bottom of the Report View



Data View In Power BI Desktop

- **Data View** helps you inspect, explore, and understand data in your Power BI Desktop model. It's different from how you view tables, columns, and data in Query Editor
- Let's take a closer look at some of the elements found in Data View.
 - Data View Icon
 - Data Grid
 - Modelling Ribbon
 - Formula Bar
 - Search
 - Fields list

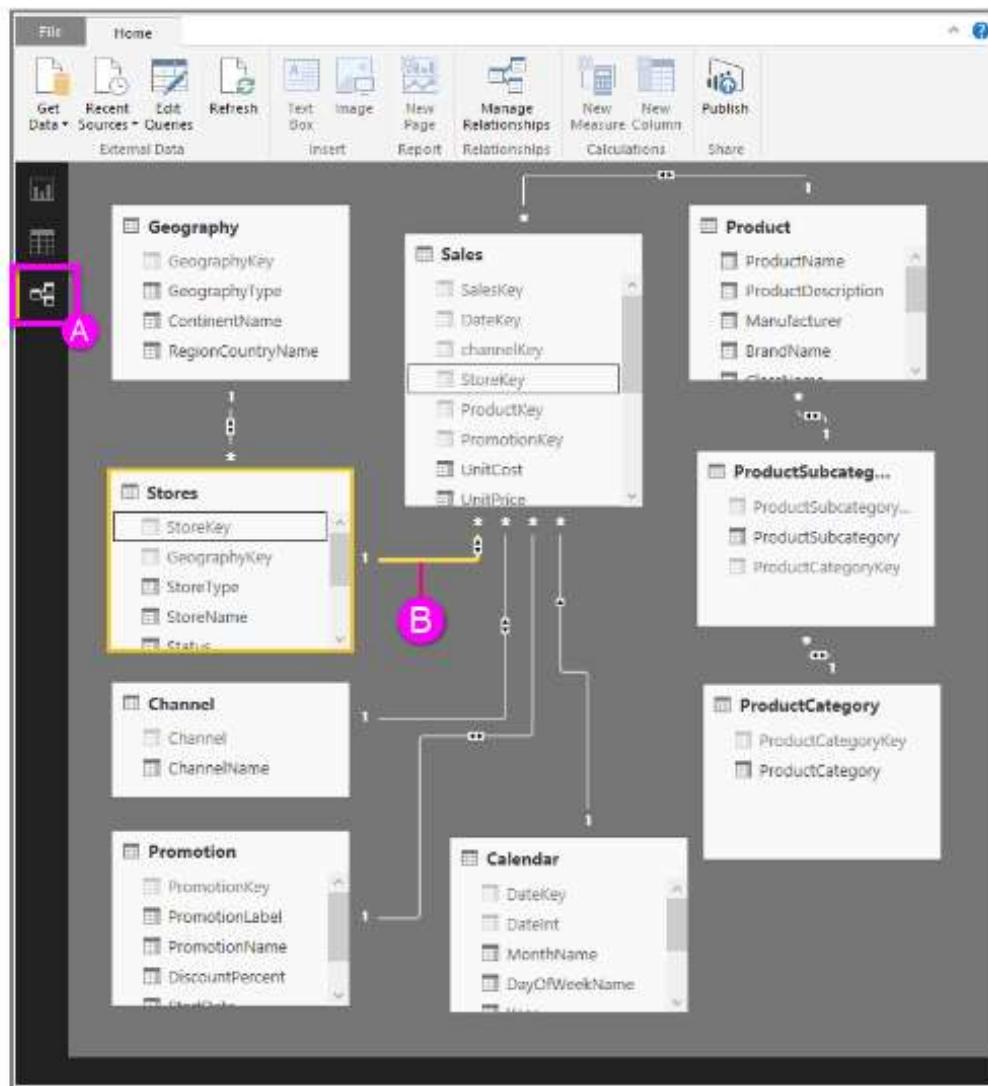


The screenshot shows the Power BI Desktop interface with the 'Data View' ribbon tab selected. A red box highlights the main data grid area where a table of sales data is displayed. The table has columns for Row ID, Order ID, Order Date, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, and Postal Code. The data includes various rows with specific values for each column.

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Postal Code
12855	ES-2013-MC1813045-41597	19 November 2013	24 November 2013	Standard Class	MC-1813045	Mike Caudle	Corporate	
11090	ES-2015-SG2060545-42199	1d July 2015	20 July 2015	Standard Class	SG-2060545	Speros Goranitis	Consumer	
17322	ES-2014-AS1009045-41905	23 September 2014	27 September 2014	Standard Class	AS-1009045	Adem Shillingsburg	Consumer	
17388	ES-2013-IK1537045-41496	10 August 2013	17 August 2013	Standard Class	IK-1537045	Jay Kimmel	Consumer	
19888	ES-2012-AB1013045-40933	25 January 2012	30 January 2012	Standard Class	AB-1015045	Aimee Bixby	Consumer	
14449	ES-2014-ED1388545-41907	25 September 2014	29 September 2014	Standard Class	ED-1388545	Emily Ducich	Home Office	
17939	ES-2014-ND1837045-41977	04 December 2014	08 December 2014	Standard Class	ND-1837045	Natalie DeCherney	Consumer	
19668	ES-2013-SN2071045-41544	27 September 2013	03 October 2013	Standard Class	SN-2071045	Steve Nguyen	Home Office	
13813	ES-2014-PM1913545-41909	27 September 2014	03 October 2014	Standard Class	PM-1913545	Peter McVee	Home Office	
12790	ES-2015-JC1534045-42335	27 November 2015	04 December 2015	Standard Class	JC-1534045	Jasper Cacioppo	Consumer	
11661	IT-2015-TB2105545-42334	26 November 2015	03 December 2015	Standard Class	TB-2105545	Ted Butterfield	Consumer	
13862	ES-2014-MW1823545-41965	22 November 2014	26 November 2014	Standard Class	MW-1823545	Mitch Willingham	Corporate	
11806	ES-2015-YC2189545-42326	18 November 2015	22 November 2015	Standard Class	YC-2189545	Yoseph Carroll	Corporate	
16137	ES-2014-CM1244545-41973	30 November 2014	07 December 2014	Standard Class	CM-1244545	Chuck Magee	Consumer	
11936	ES-2014-FW1439545-41957	14 November 2014	18 November 2014	Standard Class	FW-1439545	Fred Wasserman	Corporate	
16528	ES-2013-SC2009545-41591	27 April 2013	01 May 2013	Standard Class	SC-2009545	Sanjiti Chand	Consumer	
10330	ES-2014-SC2002045-41790	31 May 2014	05 June 2014	Standard Class	SC-2002045	Sam Craven	Consumer	
13826	ES-2013-AH1021045-41312	07 February 2013	12 February 2013	Standard Class	AH-1021045	Alan Hwang	Consumer	
13968	ES-2013-BO1016045-41614	05 December 2013	10 December 2013	Standard Class	BO-1018045	Alan Dominquez	Home Office	
13866	ES-2014-MW1823545-41965	22 November 2014	26 November 2014	Standard Class	MW-1823545	Mitch Willingham	Corporate	

Relationship View In Power BI Desktop

- Relationship View shows all of the tables, columns, and relationships in your model
- Applicable when your model has complex relationships between many tables
- Click on **Relationship View icon [A]** to show your model in Relationship View
- Double-click on a relationship [B] to open it in Edit Relationship dialog box



Introduction To Modelling

In Power BI you don't have to flatten your data into one table. Rather, you can utilize numerous tables from different sources, and characterize the *relationship* between them

You can also create your own custom **calculations** and assign new metrics to view particular sections of your data, and utilize these **new measures** in representations for simple modelling

WHAT'S A "DATA MODEL"?

The screenshot shows the Power BI Data View interface. On the left, there are three tables listed under the 'Data' tab:

- AW_Product_Lookup**: Contains columns ProductKey, ProductSubcategory, ProductSKU, and ProductName.
- AW_Sales_Data**: Contains columns OrderDate, StockDate, OrderNumber, ProductKey, CustomerKey, TerritoryKey, OrderLineItem, and OrderQuantity.
- AW_Returns_Data**: Contains columns ReturnDate, TerritoryKey, ProductKey, and ReturnQuantity.



This IS NOT a data model



- This is a collection of independent tables, which share no connections or relationships
- If you tried to visualize **Orders** and **Returns** by **Product**, this is what you'd get

ProductName	OrderQuantity	ReturnQuantity
All-Purpose Bike Stand	84,174	1,828
AWC Logo Cap	84,174	1,828
Bike Wash - Dissolver	84,174	1,828
Cable Lock	84,174	1,828
Chain	84,174	1,828
Classic Vest, L	84,174	1,828
Classic Vest, M	84,174	1,828
Classic Vest, S	84,174	1,828
Fender Set - Mountain	84,174	1,828
Total	84,174	1,828

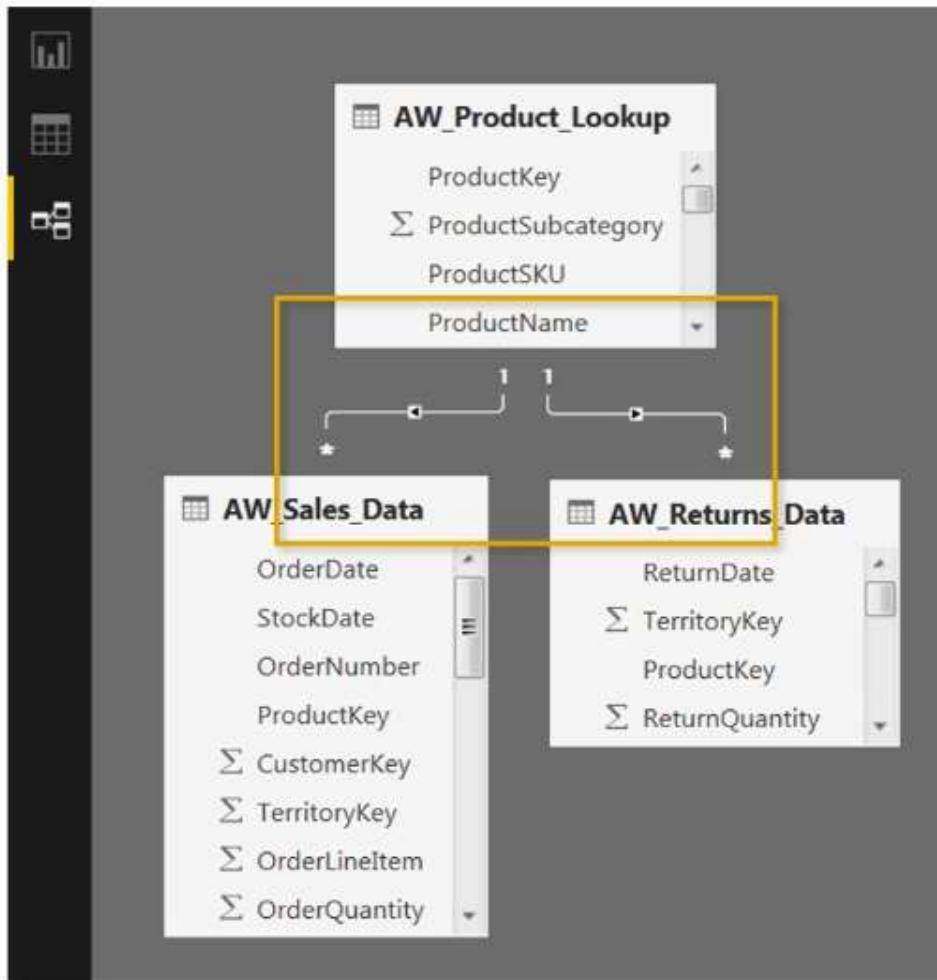
Demo : Create your first relationship

- Import return table into power bl
- User query editor to modify the name to become AW_return_Data
- Save and close
- Go to model tab and create the relation between (product and sales tables) also create a relation between (product and return).

Note: you can use (manage relationship) to create relation between tables.

- Go to view tab and choose matrix table
- After that drag product name to (row) field.
- And drag the Order and return quantity to (value) field.

WHAT'S A "DATA MODEL"?



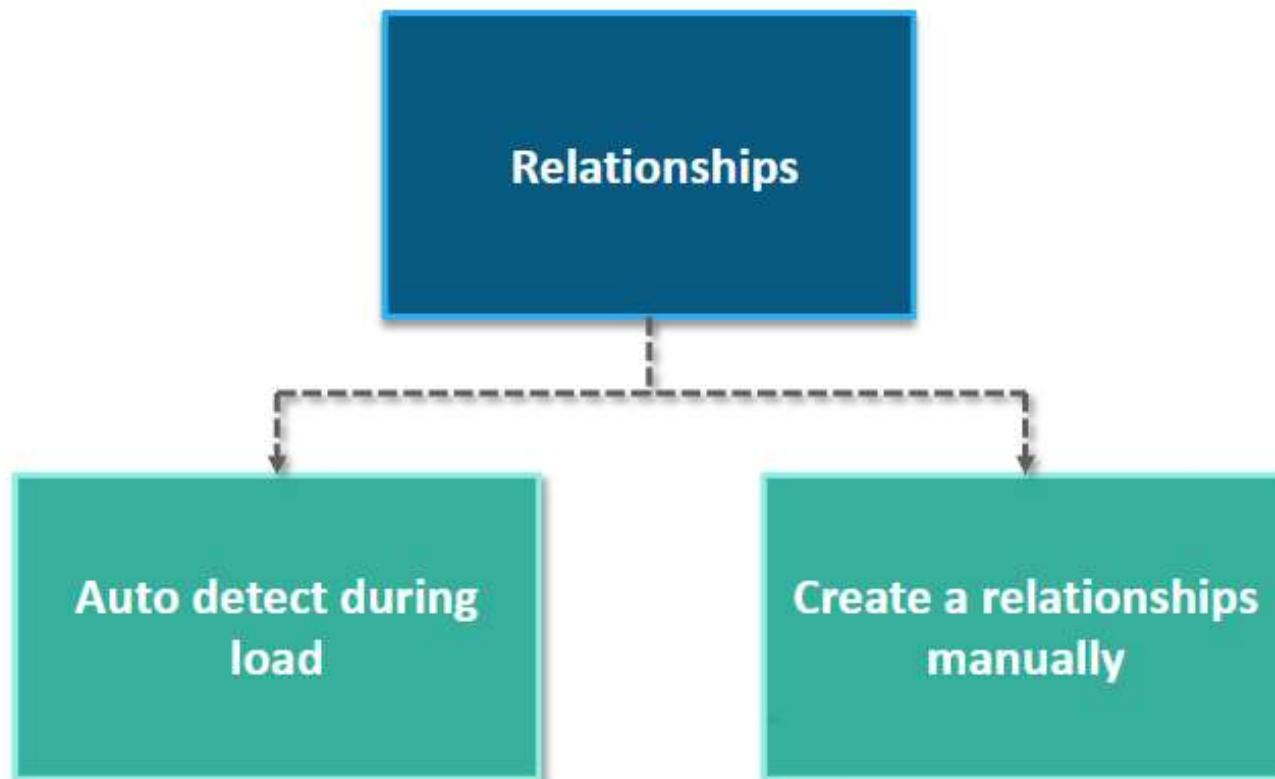
This **IS** a data model! 😊

- The tables are connected via relationships, based on the common *ProductKey* field
- Now the **Sales** and **Returns** tables know how to filter using fields from the **Product** table!

ProductName	OrderQuantity	ReturnQuantity
All-Purpose Bike Stand	234	8
AWC Logo Cap	4,151	46
Bike Wash - Dissolver	1,706	25
Classic Vest, L	182	4
Classic Vest, M	182	7
Classic Vest, S	157	8
Fender Set - Mountain	3,960	54
Half-Finger Gloves, L	840	18
Half-Finger Gloves, M	918	16
Total	84,174	1,828

Ways Of Creating Relationships

Power BI Desktop helps you creating relationships between tables in order to accurately calculate results and display the correct information in your reports. This can be done in two different ways



Sample Dataset Used: Credit Card Analysis

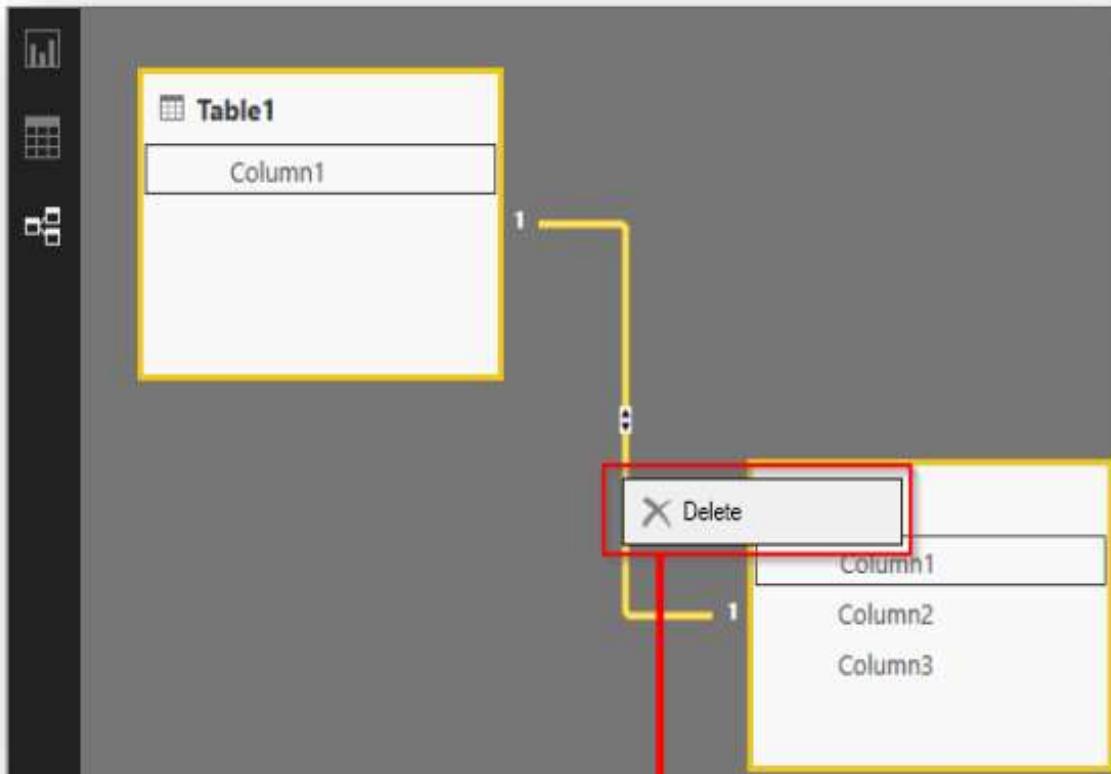
In this sample data set of Retail Analysis we have 5 tables. Let's see how we can establish relationship among these tables

id	customer_id	bank	type	valid_month	valid_year	expiry_month	expiry_year	card_no	card_limit
1341	1341	Citibank	VISA	6	2004	1	2018	4725-4827-3647-4564	57974
1412	1412	Citibank	VISA	6	2004	3	2018	4823-9098-2723-9820	726256
5760	5760	Citibank	VISA	6	2004	11	2018	4329-8359-9450-3028	553190
7945	7945	Citibank	VISA	6	2004	5	2018	4823-3799-3882-3739	383930
9188	9188	Citibank	VISA	6	2004	10	2018	5119-3314-3634-8937	403264
9201	9201	Citibank	VISA	6	2004	7	2018	5873-4162-5979-2584	783860
9271	9271	Citibank	VISA	6	2004	11	2018	2678-3045-4861-2985	577494
10726	10726	Citibank	VISA	6	2004	4	2018	2678-3387-4920-7372	703889
10788	10788	Citibank	VISA	6	2004	9	2018	4725-6788-7988-8054	627614
11005	11005	Citibank	VISA	6	2004	7	2018	5873-1717-5540-8937	244358
11107	11107	Citibank	VISA	6	2004	4	2018	4329-8238-6865-9409	229218
11610	11610	Citibank	VISA	6	2004	11	2018	5873-4171-9712-4229	587072
13311	13311	Citibank	VISA	6	2004	9	2018	4823-8256-7392-2601	713122
13557	13557	Citibank	VISA	6	2004	11	2018	2678-4636-8737-9766	192501
14003	14003	Citibank	VISA	6	2004	2	2018	3768-4776-6776-3934	665041
14359	14359	Citibank	VISA	6	2004	2	2018	2678-2942-7802-7533	617663
15856	15856	Citibank	VISA	6	2004	4	2018	5873-7651-2588-9941	878544
17501	17501	Citibank	VISA	6	2004	10	2018	4823-8174-3997-5114	14761
18918	18918	Citibank	VISA	6	2004	2	2018	5214-7926-3637-5542	418044
20939	20939	Citibank	VISA	6	2004	6	2018	2678-4802-2555-8558	689225
21165	21165	Citibank	VISA	6	2004	7	2018	4823-8190-9534-9967	820921
21638	21638	Citibank	VISA	6	2004	7	2018	5214-8327-7342-9831	254433
22959	22959	Citibank	VISA	6	2004	2	2018	5873-5470-7635-8122	520566
24610	24610	Citibank	VISA	6	2004	5	2018	5119-5491-7105-6474	811334

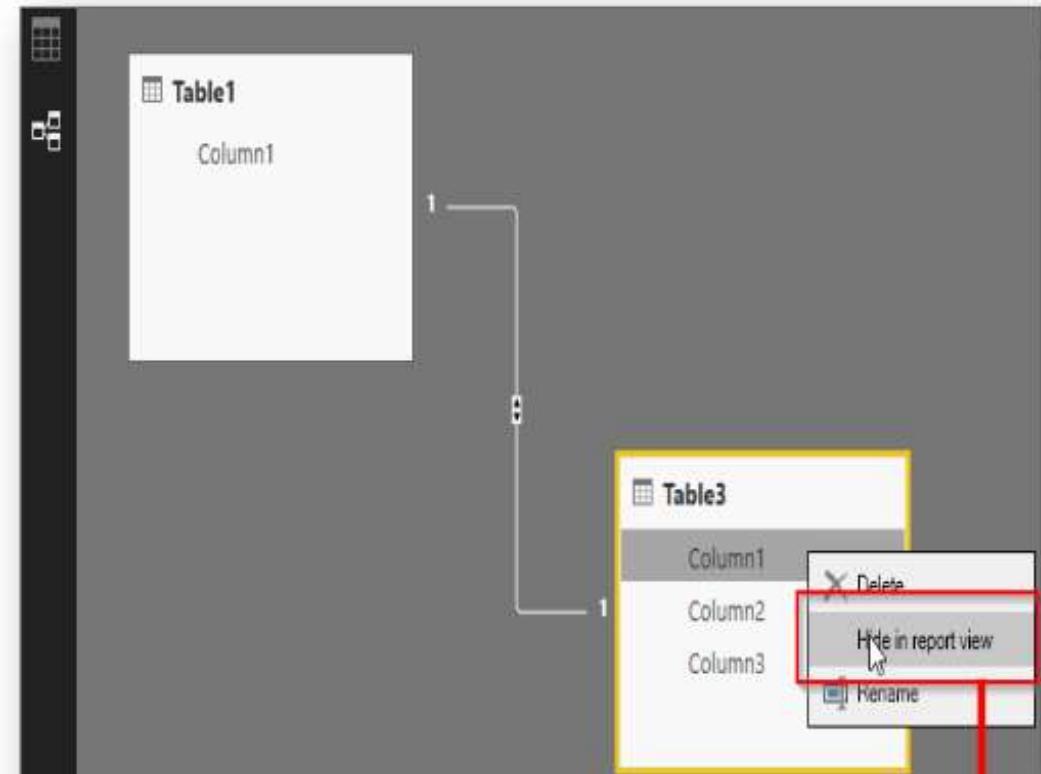
FIELDS

- card
- card-billing
- customer
- merchant
- payment-min
- transaction-min

Managing Relationships



To “remove” a relationship, right-click on it and Select Delete. To “create” a relationship, “drag and drop” the fields that you want to link between tables



To hide a table or individual column, right-click on it in the Relationship view and select “Hide” in Report View

Auto Detect During Load

1 Manage Relationships

2 Autodetect

3 Relationship Created

Click here to manage relationships

The screenshot shows the Microsoft Power BI Data Model ribbon. The 'Relationships' tab is selected, indicated by a red box and an arrow pointing to the 'Manage Relationships' button. The ribbon also includes tabs for File, Home, Modeling, and Help. Below the ribbon, several data tables are listed in a pane:

- payment-min**:
 - Σ transaction_id
 - Σ customer_id
 - Σ merchant_id
 - timestamp
- customer**:
 - Σ id
 - name
 - Σ mobile_no
 - gender
 - ...
- merchant**:
 - Σ merchant_id
 - tax_registration
 - merchant_name
 - Σ mobile_no
 - ...
- card**:
 - Σ id
 - Σ customer_id
 - bank
 - type
- transaction-min**:
 - Σ transaction_id
 - Σ customer_id
 - Σ merchant_id
 - timestamp
- card-billing**:
 - Σ card_id
 - Σ customer_id
 - merchant_id
 - transaction_id
 - timestamp

Auto Detect During Load

- 1 Manage Relationships
- 2 Autodetect
- 3 Relationship Created

Manage relationships

Active

From: Table (Column)

To: Table (Column)

There are no relationships defined yet.

Autodetect

Found 6 new relationship(s).

Close

New...

Autodetect...

Edit...

Delete

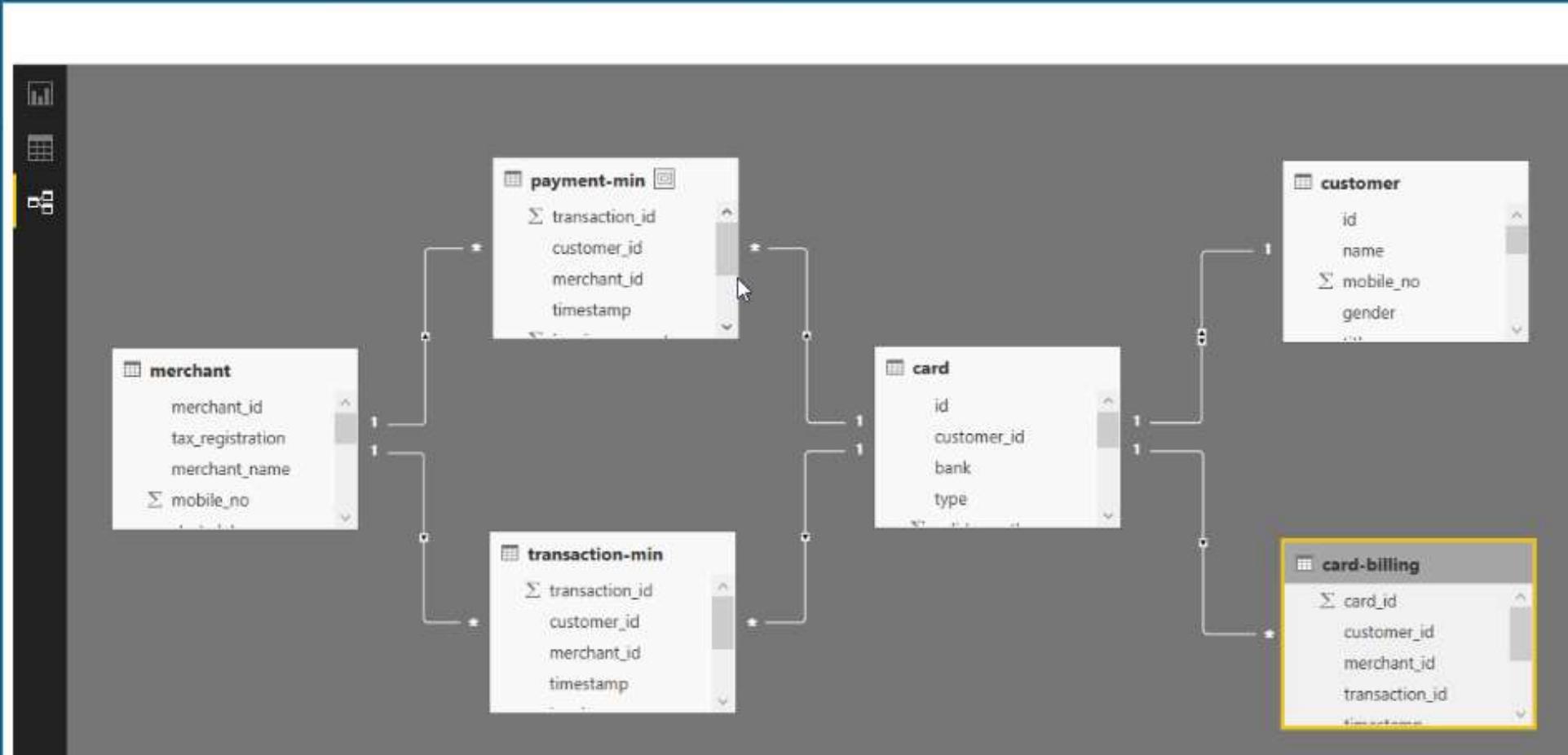
Click here for auto-detection

Close

Finally, click here and the relationship will be created

Auto Detect During Load

- 1 Manage Relationships
- 2 Autodetect
- 3 Relationship Created



The relationships are now established among the tables

Creating Relationship Manually

- 1 Manage Relationship
- 2 New
- 3 Select Tables
- 4 Create Relationships
- 5 Relationship Created

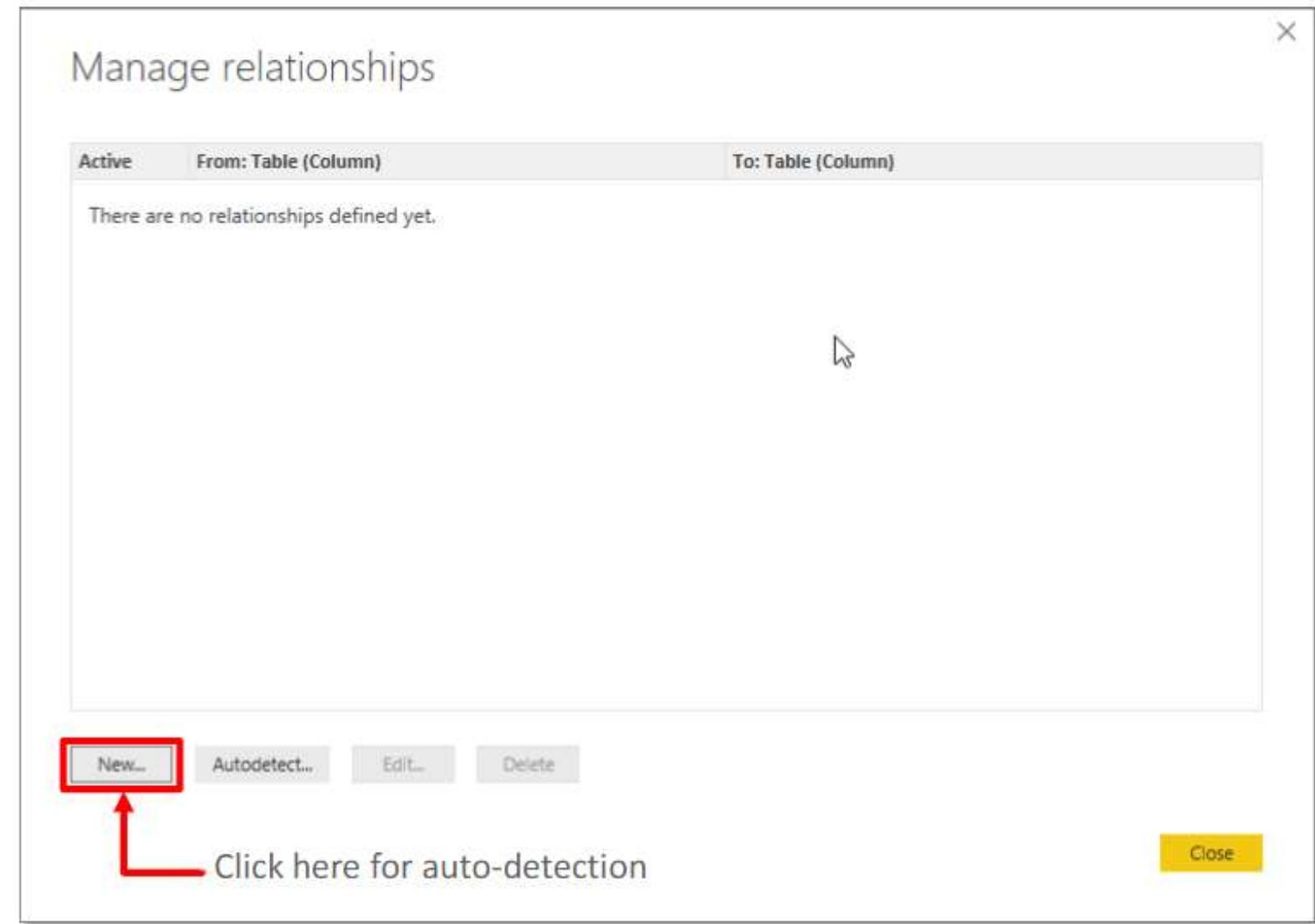
Click here to manage relationships

The screenshot shows the Microsoft Power BI desktop interface. At the top, the ribbon has several tabs: Home, Insert, Relationships, Calculations, and Share. The 'Relationships' tab is highlighted with a red box and an arrow pointing to it from the text above. Below the ribbon is the data pane, which displays six tables: payment-min, merchant, transaction-min, card, customer, and card-billing. Each table has a list of columns. The 'payment-min' table is currently selected, indicated by a yellow border around its preview window.

Table	Columns
payment-min	transaction_id, customer_id, merchant_id, timestamp
merchant	merchant_id, tax_registration, merchant_name, mobile_no
transaction-min	transaction_id, customer_id, merchant_id, timestamp
card	id, customer_id, bank, type
customer	id, name, mobile_no, gender
card-billing	card_id, customer_id, merchant_id, transaction_id

Creating Relationship Manually

- 1 Manage Relationship
- 2 New
- 3 Select Tables
- 4 Create Relationships
- 5 Relationship Created



Creating Relationship Manually

1 Manage Relationship

2 New

3 Select Tables

4 Create Relationships

5 Relationship Created

Create relationship

Select tables and columns that are related.

card
card-billing
customer
merchant
payment-min
transaction-min

1

Click here and select the table from the drop down menu

Create relationship

Select tables and columns that are related.

card								
id	customer_id	bank	type	valid_month	valid_year	expiry_month	expiry_year	card_no
1341	1341	Citibank	VISA	6	2004	1	2018	4725-4827-364
1412	1412	Citibank	VISA	6	2004	3	2018	4823-9098-272

2

Click here and select another table you want to establish relationship with

card-billing
customer
merchant
payment-min
transaction-min

Creating Relationship Manually

- 1 Manage Relationship
- 2 New
- 3 Select Tables
- 4 Create Relationships
- 5 Relationship Created

Create relationship

Select tables and columns that are related.

card								
id	customer_id	bank	type	valid_month	valid_year	expiry_month	expiry_year	card_no
1341	1341	Citibank	VISA	6	2004	1	2018	4725-4827-364
1412	1412	Citibank	VISA	6	2004	3	2018	4823-9098-272
5760	5760	Citibank	VISA	6	2004	11	2018	4329-8359-945

card-billing						
card_id	customer_id	merchant_id	transaction_id	timestamp	invoice_amount	status
14132902	14132902	35951	2.01601E+13	05-01-2016 14:38:00	32561	success
8225591	8225591	7685	2.01601E+13	05-01-2016 23:51:00	46717	success
1825759	1825759	27438	2.01601E+13	05-01-2016 06:55:00	37394	success

Cardinality Cross filter direction

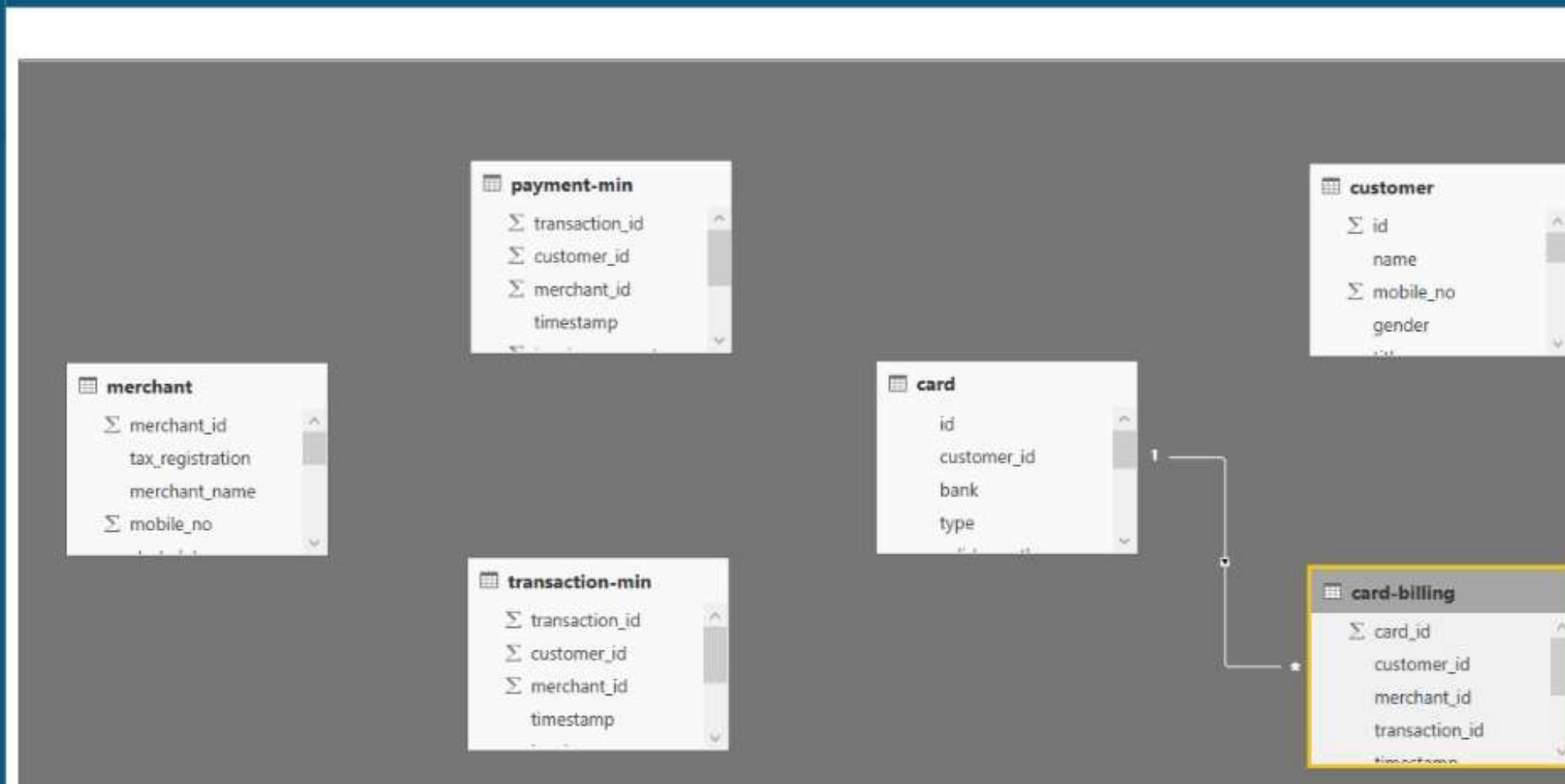
Make this relationship active Apply security filter in both directions

Assume referential integrity

After you have selected the tables and the columns, the dialog box would look like this

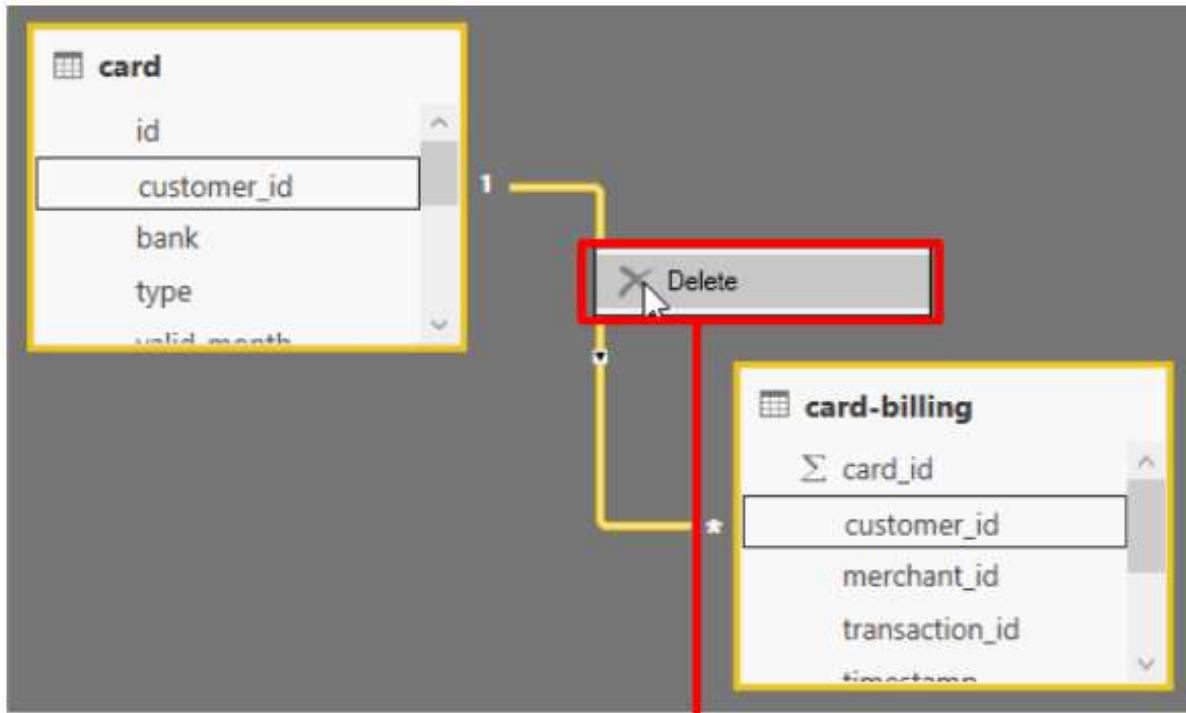
Creating Relationship Manually

- 1 Manage Relationship
- 2 New
- 3 Select Tables
- 4 Create Relationships
- 5 Relationship Created

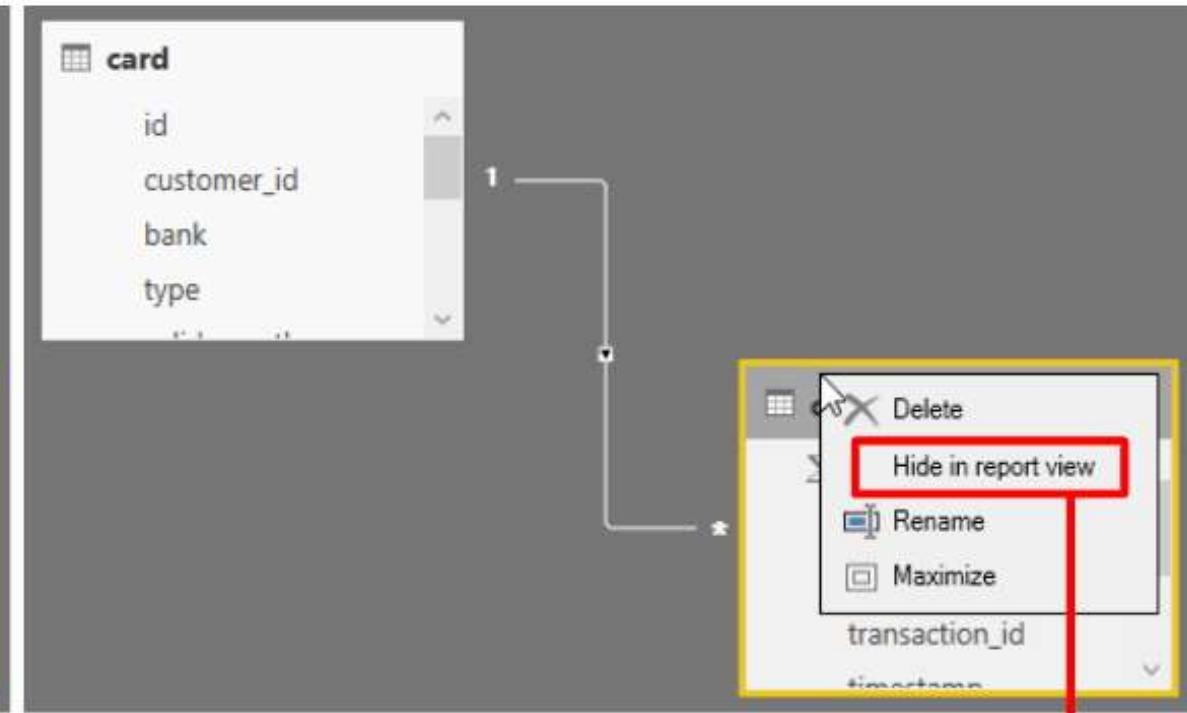


The relationship between **card** table & **card-billing** table is now established

Managing Relationships

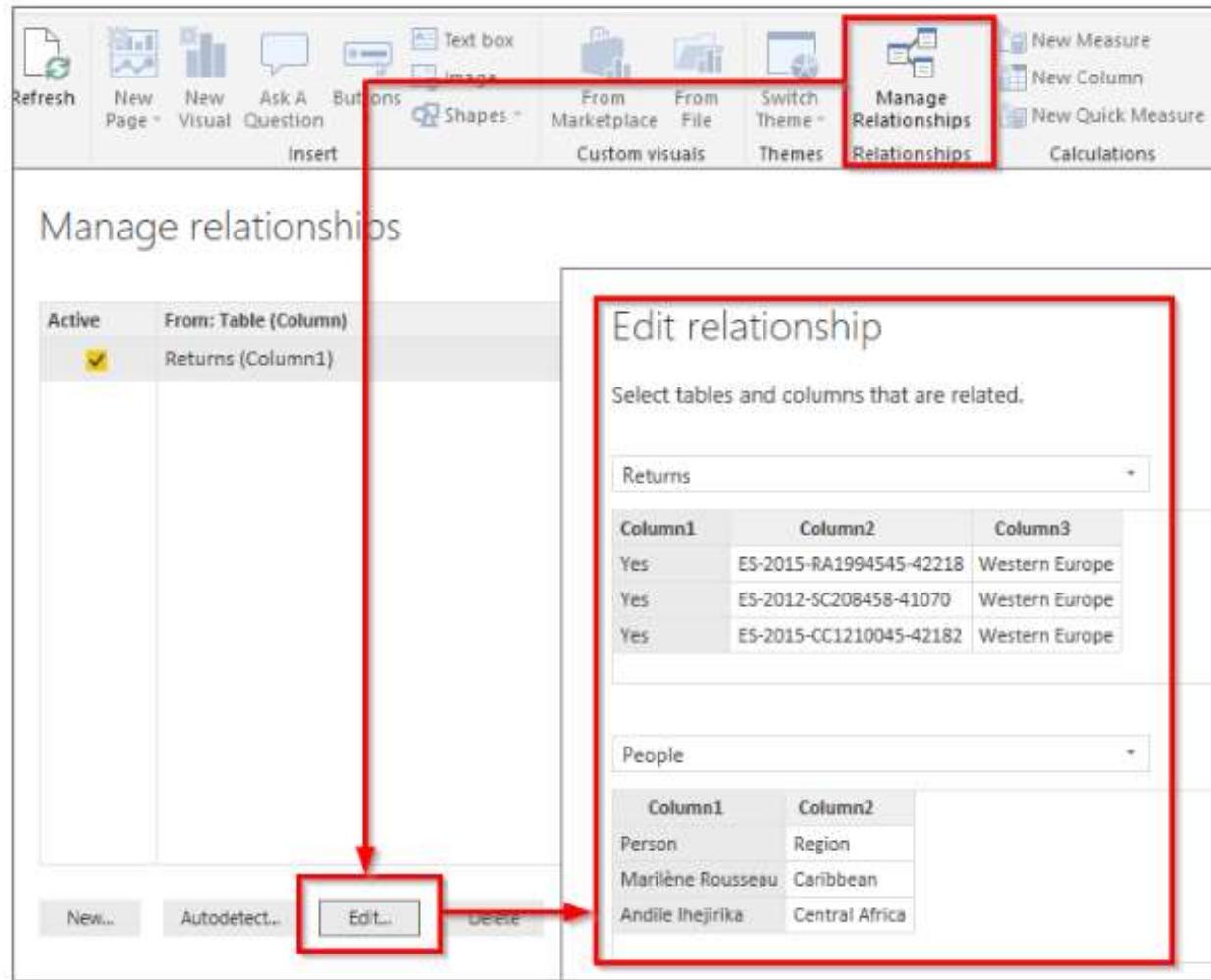


To “remove” a relationship, right-click on it and Select Delete. To “create” a relationship, “drag and drop” the fields that you want to link between tables.



To hide a table or individual column, right-click on it in the Relationship view and select “**Hide**” in Report View

Editing A Relationship



To edit a relationship follow the steps below:

On the Home tab, click Manage Relationships

In the Manage Relationships dialog, select the relationship

Click Edit

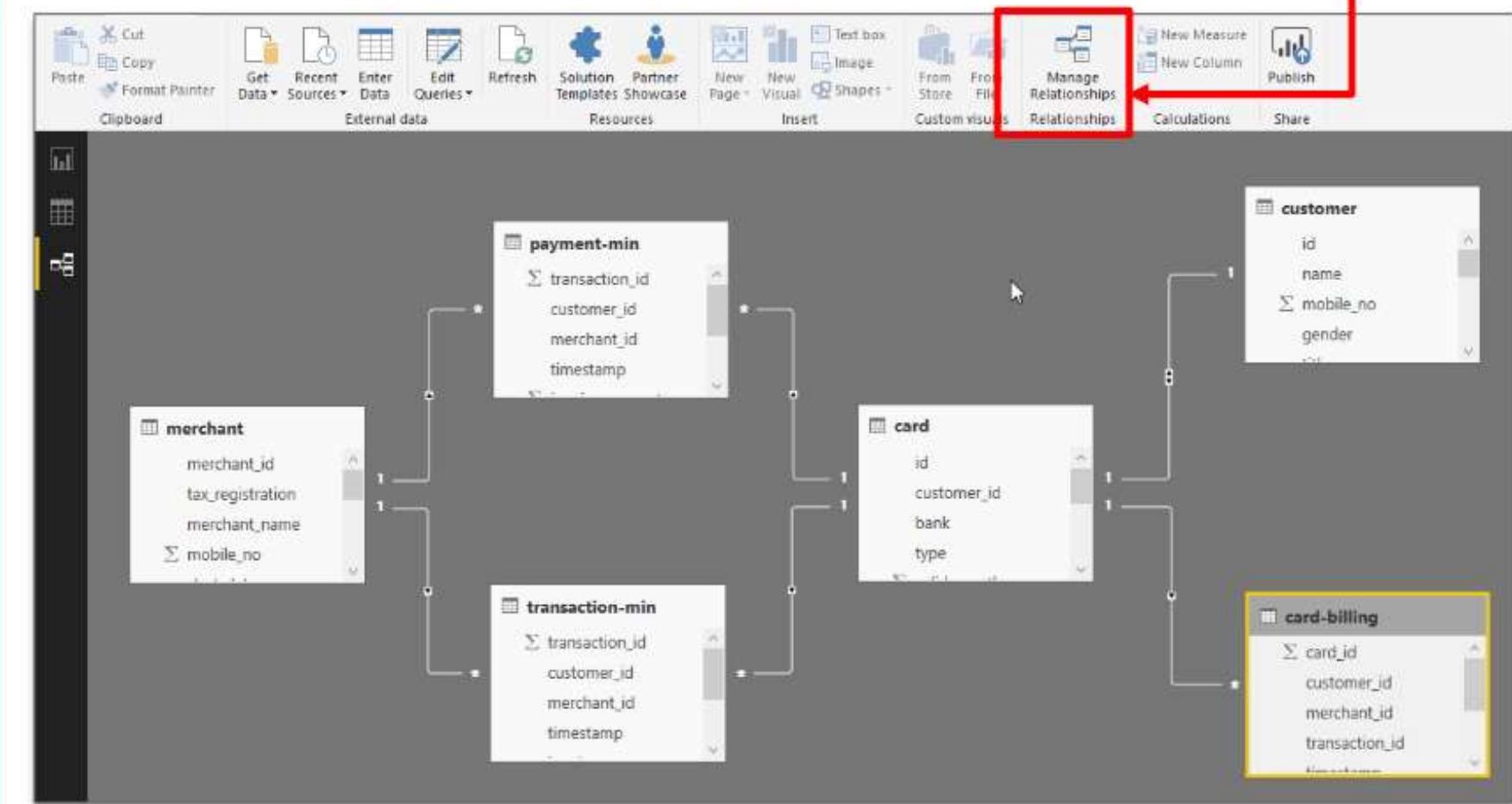
Editing a Relationship

Click here to get a dialog box of active relationships

1 Manage Relationship

2 Select the Relationship

3 Edit Relationship



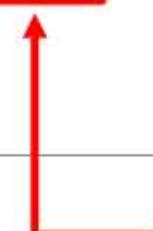
Editing a Relationship

- 1 Manage Relationship
- 2 Select the Relationship
- 3 Edit Relationship

Manage relationships

Active	From: Table (Column)	To: Table (Column)
<input checked="" type="checkbox"/>	card-billing (customer_id)	card (customer_id)
<input checked="" type="checkbox"/>	customer (id)	card (id)
<input checked="" type="checkbox"/>	payment-min (customer_id)	card (customer_id)
<input checked="" type="checkbox"/>	payment-min (merchant_id)	merchant (merchant_id)
<input checked="" type="checkbox"/>	transaction-min (customer_id)	card (customer_id)
<input checked="" type="checkbox"/>	transaction-min (merchant_id)	merchant (merchant_id)

New... Autodetect... **Edit...** Delete Close



Click here after selecting the relationships

Select the relationship you want to edit from the list

Editing a Relationship

1

Manage Relationship

2

Select the Relationship

3

Edit Relationship

Edit relationship

Select tables and columns that are related.

card-billing

card_id	customer_id	merchant_id	transaction_id	timestamp	invoice_amount	status
14132902	14132902	35951	2.01601E+13	05-01-2016 14:38:00	32561	success
8225591	8225591	7685	2.01601E+13	05-01-2016 23:51:00	46717	success
1825759	1825759	27438	2.01601E+13	05-01-2016 06:55:00	37394	success

card

id	customer_id	bank	type	valid_month	valid_year	expiry_month	expiry_year	card_no
1341	1341	Citibank	VISA	6	2004	1	2018	4725-4827-364
1412	1412	Citibank	VISA	6	2004	3	2018	4823-9098-272
5760	5760	Citibank	VISA	6	2004	11	2018	4329-8359-945

Cardinality

Many to one (*:1)

Cross filter direction

Single

Make this relationship active

Apply security filter in both directions

Assume referential integrity

OK

Cancel

In this dialog box you can edit a relationship and also you can select the columns for creating relationship