

Microsoft

POWER BI

Course Overview

Course Synopsis

- Lesson 1** Introduction to Power BI, Connecting to Sources, Basic Visuals
- Lesson 2** Data Modelling and Data Transformation with Power Query Editor
- Lesson 3** Data Analysis with DAX Features and Creating Themed Page
- Lesson 4** Actions, Advanced Features and Dashboard Creation Tips
- Assessment** Take home projects

Important Notes for issuance of Certificate of Completion:

- (1) For Zoom video lessons, students are **required to turn on their cameras throughout the lesson**. Please ensure that your internet connection works well as to avoid missing out information. For F2F lessons, students are required to be present throughout the lessons. Students who did not observe this requirement will not be issued the Certificate of Completion.
- (2) Certificate of Completion will only be **issued to participants who have attended all lessons, turned on their video camera throughout the lessons, submitted and obtain a Pass grade for the end-of-workshop assignment** and uploaded it to Portfolium within the deadline given by the Teaching Assistants. Exemption may be granted on a case-by-case basis with email to Teaching Assistants xychan002@suss.edu.sg and copied to careerdev@suss.edu.sg.
- (3) Students will not be awarded with the Certificate will be notified 3 weeks after end of workshop and may clarify with the Teaching Assistants within 3 days of notification. A reply to the Teaching Assistants is required to acknowledge the notification, after which no exception will be made to issue the Certificate.

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POWER BI

A large, abstract graphic element occupies the right half of the page. It consists of two overlapping curved shapes: a thick, light orange curve on top and a darker navy blue curve underneath, creating a dynamic, swooping effect.

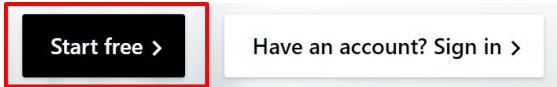
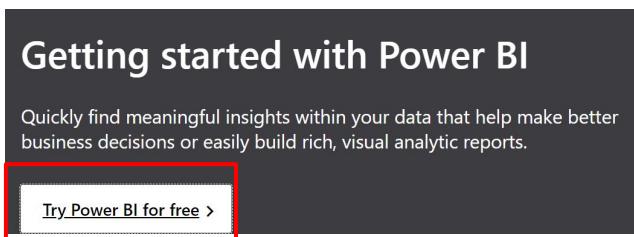
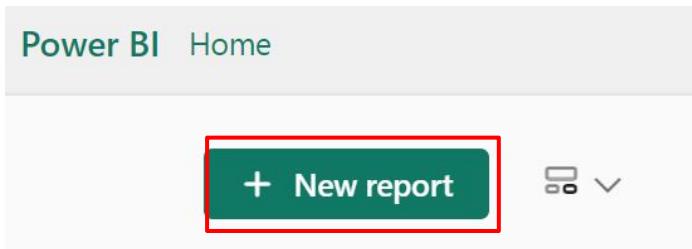
Installation Guide

Installation for Windows

Step 1:	Go to download link: https://powerbi.microsoft.com/
Step 2:	<p>Click on Products → PowerBI Desktop</p> 
Step 3:	<p>Click on Download Free</p> 
Step 4:	<p>You will be redirected to the Windows Store, click on Install</p> 

PowerBI Online for Mac Users

** Note that it is always recommended to use the PowerBI Desktop version as the online version does not have Power Query Editor and does not allow you to load datasets directly.

Step 1:	Go to download link: https://powerbi.microsoft.com/
Step 2:	Click on Start Free 
Step 3:	Click on Try Power BI for free 
Step 4:	Click on New Report 

Microsoft

POWER BI

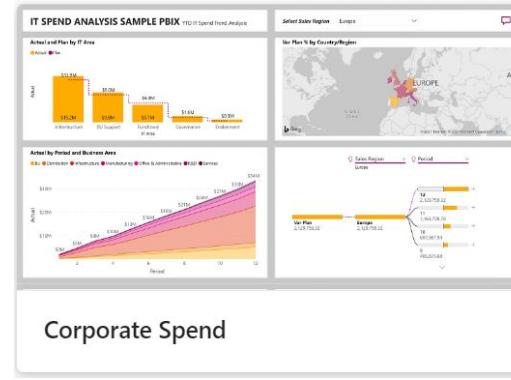
Usage and Samples



What PowerBI can do: Sample reports



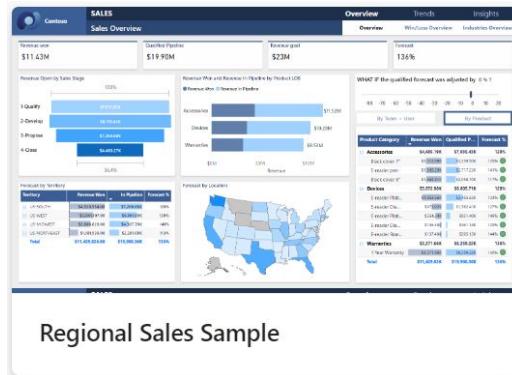
Revenue Opportunities



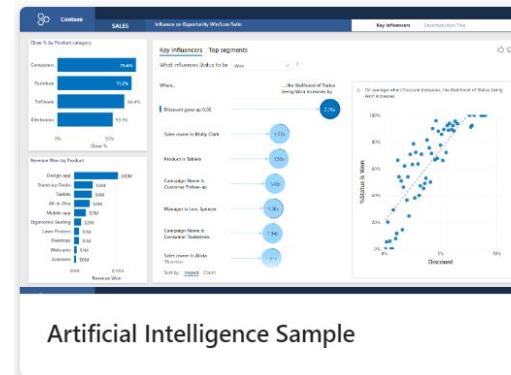
Corporate Spend



Employee Hiring and History



Regional Sales Sample



Artificial Intelligence Sample

and more

Regional Sales Sample - Overview

Contoso

REGIONAL SALES

Sales Overview

Overview Trends Insights

Revenue won
\$11.43M

Qualified Pipeline
\$19.90M

Revenue goal
\$23M

Forecast
136%

Revenue Open by Sales Stage

Sales Stage	Revenue
1-Qualify	\$7,912.02K
2-Develop	\$8,170.42K
3-Propose	\$7,264.68K
4-Close	\$4,465.27K

Revenue Won and Revenue In Pipeline by Product LOB

Product Category	Revenue Won	Revenue In Pipeline
Accessories	\$4,485.19K	\$7,035.43K
Devices	\$3,672.98K	\$6,605.71K
Warranties	\$3,271.66K	\$6,259.22K

WHAT IF the qualified forecast was adjusted by 0 % ?

By Team + User By Product

Product Category	Revenue Won	Qualified P...	Forecast %
Accessories	\$4,485.19K	\$7,035.43K	128%
Devices	\$3,672.98K	\$6,605.71K	128%
E-reader Plat...	\$1,853.66K	\$3,455.63K	133%
E-reader Dia...	\$971.02K	\$1,562.41K	127%
E-reader Plat...	\$554.24K	\$931.40K	149%
E-reader Dia...	\$156.58K	\$361.14K	129%
E-reader Stan...	\$137.48K	\$295.13K	144%
Warranties	\$3,271.66K	\$6,259.22K	136%
1 Year Warran...	\$3,271.66K	\$6,259.22K	136%

Forecast by Territory

Territory	Revenue Won	In Pipeline	Forecast %
US-SOUTH	\$4,520,554.00	\$7,269.60K	131%
US-WEST	\$3,041,107.00	\$6,061.89K	130%
US-MIDWEST	\$2,686,629.00	\$4,367.79K	141%
US-NORTHEAST	\$1,181,536.00	\$2,201.09K	113%
Total	\$11,429,826.00	\$19,900.36K	136%

Forecast by Location

Introduction

Regional Sales Sample - Trends

Contoso

REGIONAL SALES

Pipeline Trends

Overview

Trends

Insights

Opportunity Count

4,831

Total Pipeline

\$25.18M

Avg Days Remaining

-398.49

Qualified Pipeline

\$17.98M

Revenue Open by Product Category and Territory

Category	US-MIDWEST	US-NORTHEAST
Accessories	\$2.1M	\$1.0M
Devices	\$1.7M	\$0.7M
Warranties	\$1.3M	\$0.7M

Category	US-SOUTH	US-WEST
Accessories	\$4.6M	\$2.7M
Devices	\$3.5M	\$2.2M
Warranties	\$2.9M	\$1.9M

Pipeline by Top Industries

Industry ● Comput... ● Life Ins... ● Major B... ● Major ... ● Real Est...

Nov 2021 Dec 2021 Jan 2022 Feb 2022 Mar 2022 Apr 2022

YEAR MONTH

At \$2,789,169.00, Real Estate Investment Trusts had the highest Revenue Open and was 63,901.12% higher than Water Supply, which had the lowest Revenue Open at \$4,358.00.

Across all 43 Industry, Revenue Open ranged from \$4,358.00 to \$2,789,169.00.

Territory	Days Until Close	Weeks Open	Industry	Account Name	Owner	Sales Stage	Rating	Product	Discount	Value
US-SOUTH	-352	16	Property-Casualty Insurers	Langworth Group	Angel Brown	3-Propose	Warm	1 Year Warranty	13.5%	\$14,999
US-SOUTH	-377	14	Major Banks	A. Datum Corporat...	Julian Isla	2-Develop	Warm	1 Year Warranty	16.0%	\$14,678
US-WEST	-310	22	Business Services	Graham Inc	Riley Johnson	4-Close	Hot	1 Year Warranty	15.0%	\$14,219
US-WEST	-452	19	Computer Software: Programmin...	Osinski-Schulist	Riley Johnson	2-Develop	Warm	1 Year Warranty	11.0%	\$13,129
US-SOUTH	-360	14	Computer Software: Prepackaged ...	Kertzmann, Herzog...	Spencer Low	2-Develop	Warm	1 Year Warranty	16.5%	\$12,823
US-SOUTH	-447	15	Real Estate Investment Trusts	Abbott Group (An...	Eric Gruber	1-Qualify	Cold	1 Year Warranty	10.5%	\$12,703
US-SOUTH	-427	14	Real Estate	Grady Group	Renee Lo	1-Qualify	Cold	1 Year Warranty	14.5%	\$12,392
Total									11.2%	\$25,181,843

Introduction

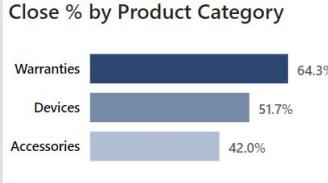
Regional Sales Sample - Insights

 Contoso

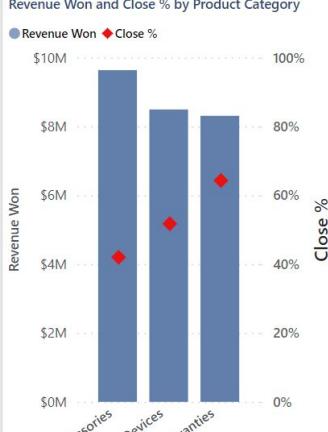
REGIONAL SALES

Win/Loss Ratio Insights - Key influencers

Close % by Product Category



Revenue Won and Close % by Product Category



Key influencers Top segments

What influences Status to be Won ?

When... ...the likelihood of Status being Won increases by

Segment	Impact
Campaign is QuarterlySales Contest	1.96x
Owner is Anne Weiler	1.96x
Discount is more than 15.5%	1.93x
Owner is Jordan Williams	1.77x
Product is E-reader Platinum 8" 32 GB	1.76x
Campaign is Customer Reference Lead	1.64x

Sort by: Impact

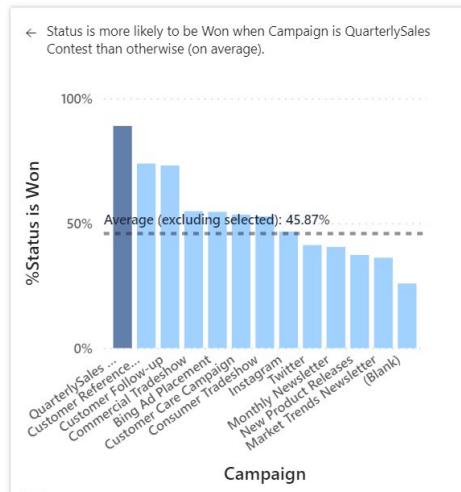
Only show values that are influencers

Win/Loss Ratio

Days to Close

Sales Discounting

← Status is more likely to be Won when Campaign is QuarterlySales Contest than otherwise (on average).



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POWER BI

Lesson 1



What is Power BI?

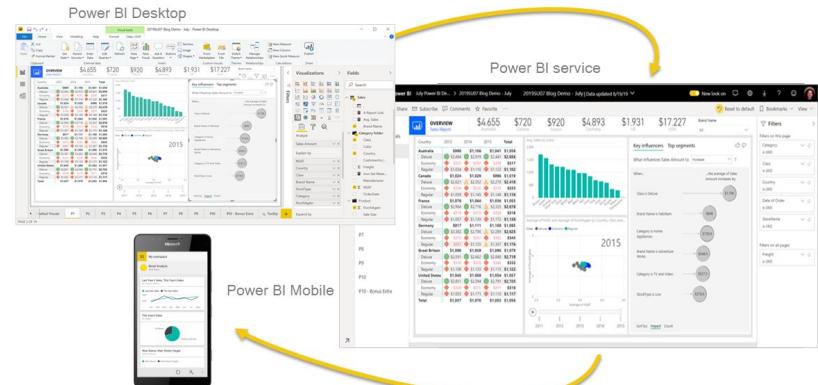
Power BI is

- A business intelligence platform
- Combines an intuitive user experience with analytics
- Discover insights with data and AI



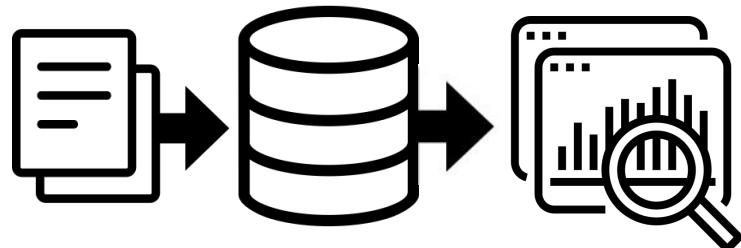
We will be using it to

- Work with data
- Create visuals
- Collaborate and share data for anybody (individuals/teams)



Why Power BI?

- **Data Preparation**
 - Data coming from different sources
 - Not properly formatted
(wrong format, redundant columns or data)
- **In-depth Data Analysis**
 - Calculations
(averages, date difference or other advanced calculations)
- **Visualisation**
 - Having your data show actionable insights



Power BI vs Excel

Although they overlap, the purpose for each tool are different!

Excel



Quick Calculations



Reports in Tabular Format



Single Tool Only

Power BI



Big Data

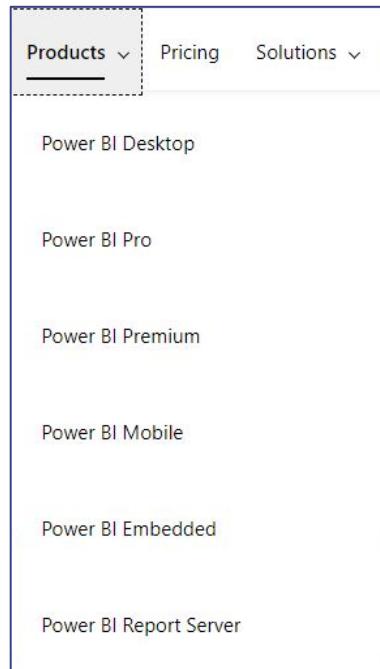


Interactive Visualizations



Collaboration

Power BI Components



- **Power BI Desktop (Free)**
 - Create dashboards and publish to own workspace for personal use
- **Power BI Pro & Premium (Paid)**
 - Sharing content with others (on the workspace or via link)
 - Advanced AI, self-service data prep for big data, and simplify data management and access at enterprise scale
- **Power BI Server**
 - Cloud-based version of Power BI with report editing and publishing features.
- **Power BI Mobile**
 - A mobile app of Power BI, which allows you to author, view, and share reports on the go.

Interface Tour

Visualisation and Dataset - 3 main views

- Report - custom visualisations and dashboards
- Data - view connected datasets
- Model - establish relationships between datasets

PowerBI Language / Calculations

- Power Query - data transformation and cleaning on the dataset (M - optional)
- DAX - create new information from data present in model

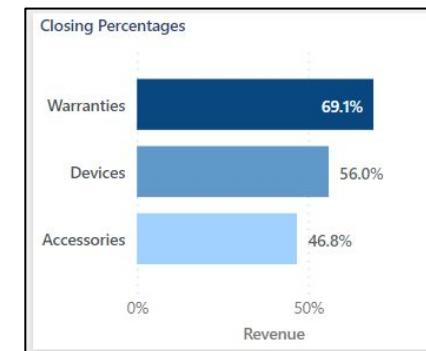
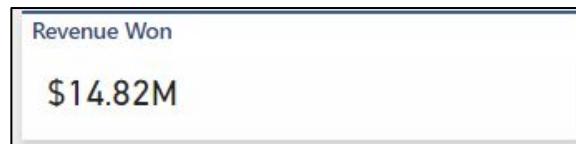
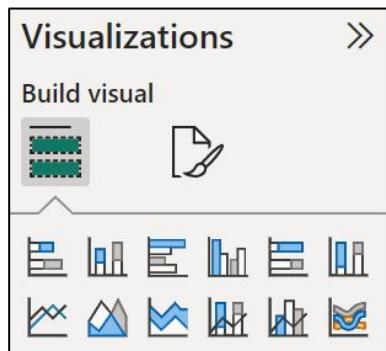
Building Blocks

- **Visualizations (Visuals)**
- **Datasets**
- **Reports**
- **Dashboards**
- **Tiles**

1. Visualizations

Visual representation of data like charts

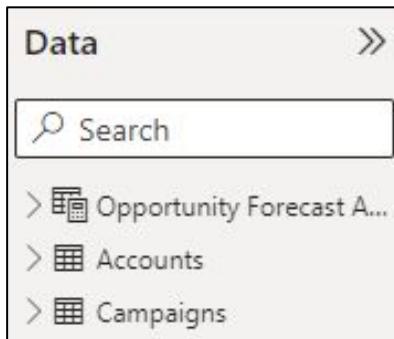
- Can be simple or complex
- goal of a visual is to present data in a way that provides context and insights



2. Datasets

Collection of data like excel workbooks, csv

- Can be based on a single table or a combination of many different sources
- Can be filtered for targeted insights generation

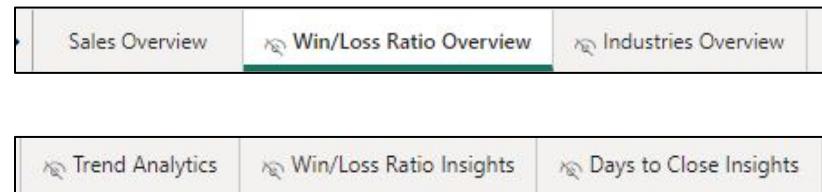
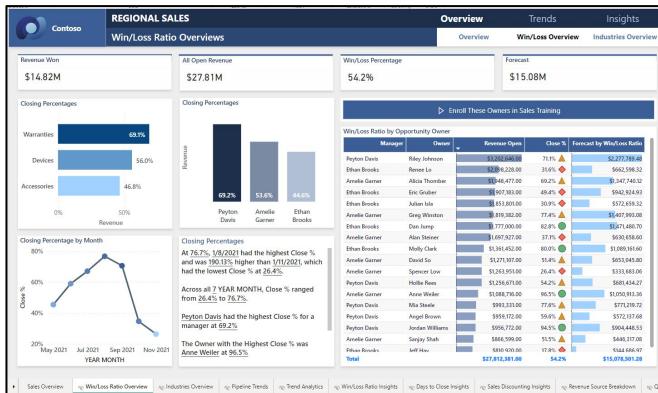


	First Name	State or Province	Country
A	Morar, Graham and Dickens	NC	United States
	Abbott Group (Andorra)	MD	United States
	Walsh-Pacocha	GA	United States
	Graham Inc	MI	United States
	Miller, Jones and Sawayn	WA	United States
	Lang, Carter and Stanton	TX	United States
	King Inc	HI	United States
	Grady Group	CT	United States
	Roberts-Bruen	TX	United States
	Stoltenberg LLC	IA	United States
	Fadel and Sons	TN	United States
		IN	United States

3. Reports

Collection of visualizations that appear together on one or more pages

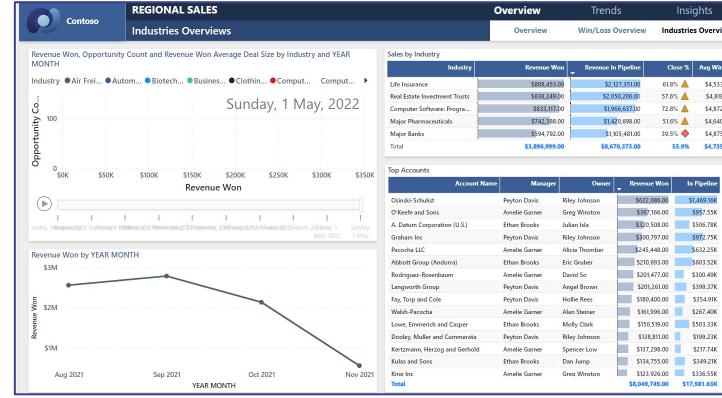
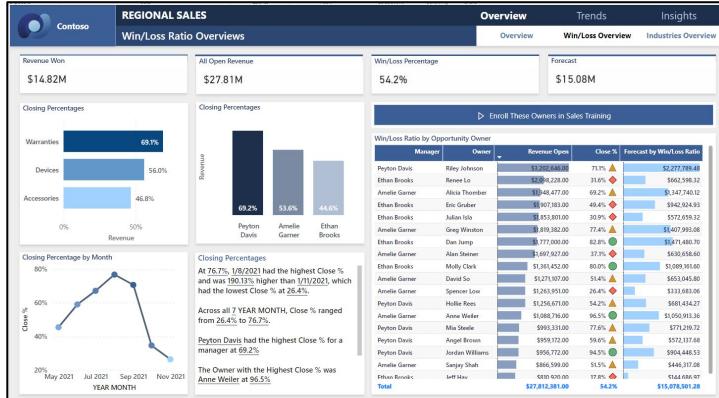
- Items are related to one another in telling a story
- Includes many visualizations, on multiple pages



4. Dashboards

Collection of visuals that provide quick insight into the data or story you're trying to present

- Must fit on a single page (canvas)

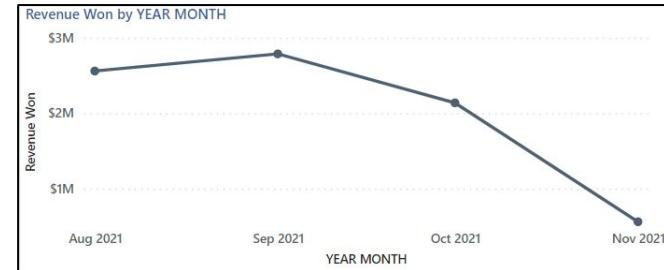


5. Tiles

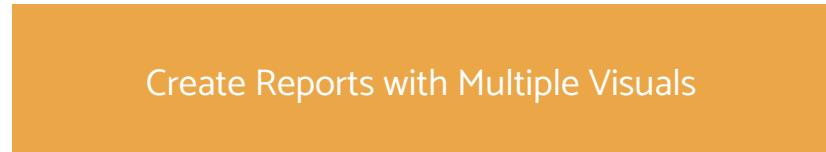
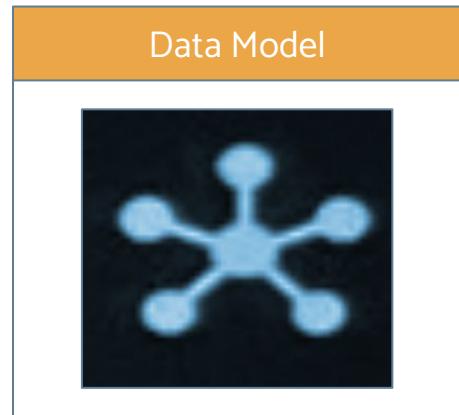
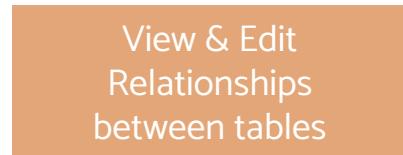
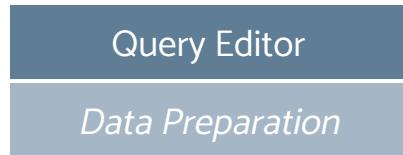
A single visualization on a dashboard

- Rectangular box that holds an individual visual
- Can be moved and arranged to fit the aesthetics of the dashboard

Sales by Industry				
Industry	Revenue Won	Revenue In Pipeline	Close %	Avg Win
Life Insurance	\$888,453.00	\$2,127,351.00	61.8% ▲	\$4,533
Real Estate Investment Trusts	\$838,249.00	\$2,050,206.00	57.6% ▲	\$4,818
Computer Software: Progra...	\$833,117.00	\$1,966,637.00	72.8% ▲	\$4,872
Major Pharmaceuticals	\$742,388.00	\$1,420,698.00	51.6% ▲	\$4,640
Major Banks	\$594,792.00	\$1,105,481.00	39.5% ◆	\$4,875
Total	\$3,896,999.00	\$8,670,373.00	55.9%	\$4,735



Power BI Creation Workflow



Download Data Sources

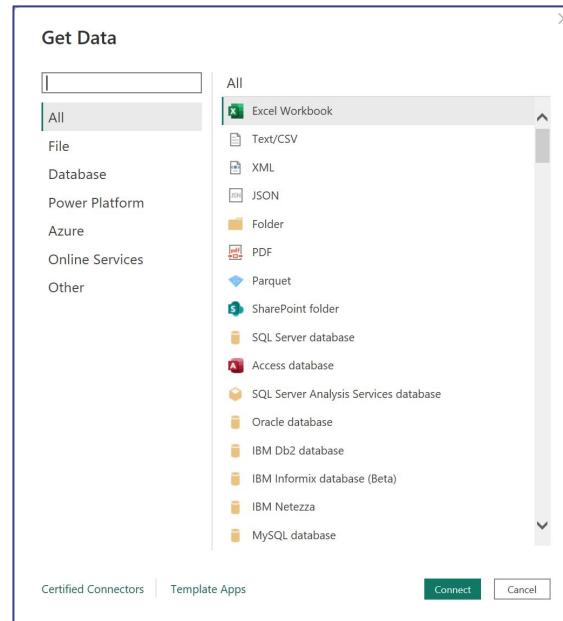
- Link:** <https://github.com/channxy/PowerBI-Course>
- Dataset:** Class Dataset » [Sample - Superstore.xls](#)



Connecting Data Sources

Connecting Power BI to Source Files

- Multiple source options (such as Excel, SQL, PowerBI Apps, Web)
- Can be linked directly to a datasource



Connecting Power BI to Source Files

- For a start, we will be using Excel to import data

Add data to your report

Once loaded, your data will appear in the **Fields** pane.



Import data from Excel



Import data from SQL Server



Paste data into a blank table



Try a sample dataset

Get data from another source →

Connecting Power BI to Source Files

Navigator

The screenshot shows the Power BI Navigator interface. On the left, a tree view displays a connection to 'Global Superstore.xlsx [4]' containing four datasets: 'Orders', 'Orders\$FilterDatabase', 'People', and 'Returns'. The 'Returns' dataset is selected and highlighted with a red box. On the right, a preview of the 'Returns' table is shown with three columns: 'Column1', 'Column2', and 'Column3'. The table data includes rows such as 'Returned', 'Order ID', 'Market', 'Yes', 'MX-2013-168137', 'LATAM', and 'Yes', 'US-2011-165316', 'LATAM'. At the bottom, there are three buttons: 'Load' (highlighted with a red box), 'Transform Data', and 'Cancel'.

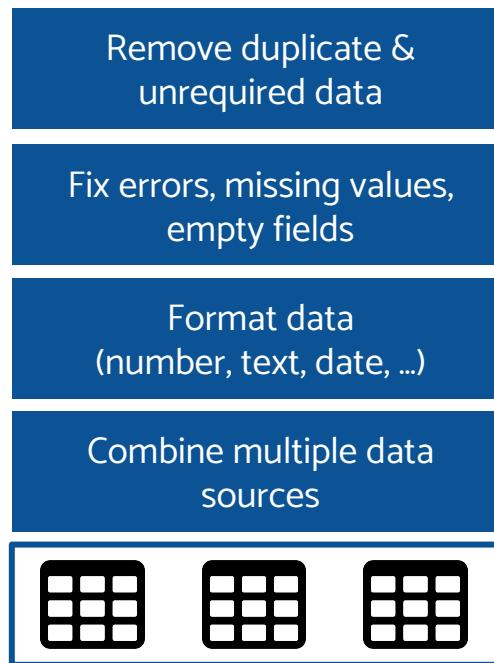
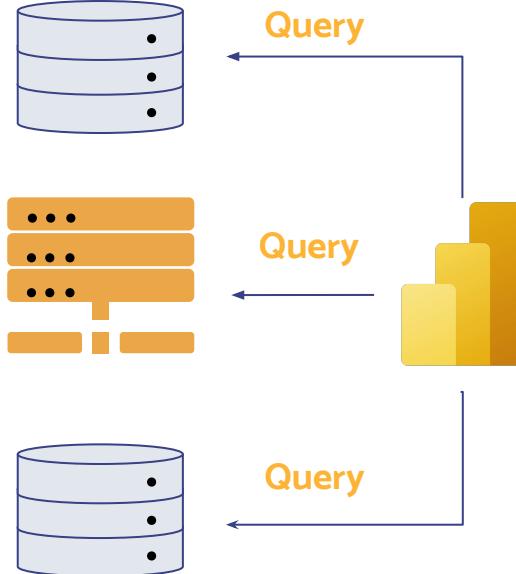
Column1	Column2	Column3
Returned	Order ID	Market
Yes	MX-2013-168137	LATAM
Yes	US-2011-165316	LATAM
Yes	ES-2013-1525878	EU
Yes	CA-2013-118311	United States
Yes	ES-2011-1276768	EU
Yes	MX-2013-131247	LATAM
Yes	ID-2011-20975	APAC
Yes	IN-2014-58460	APAC
Yes	ES-2011-3028321	EU
Yes	MX-2014-148285	LATAM
Yes	IN-2014-54708	APAC
Yes	ID-2011-20989	APAC
Yes	ES-2013-3323529	EU
Yes	MX-2014-135328	LATAM
Yes	IN-2012-63934	APAC
Yes	IN-2014-43039	APAC
Yes	CA-2012-150875	United States
Yes	ES-2011-3074997	EU
Yes	CA-2011-133690	United States
Yes	IN-2014-84948	APAC
Yes	CA-2013-157280	United States
Yes	ID-2012-44173	APAC
Yes	CA-2012-111948	United States

- Select the following datasheet to be imported:
 - Orders
 - People
 - Returns
- Select “Load”
- Since the dataset is large, it will take some time to load
- We will explore more about the “Transform Data” option later



Data Transformation

Data Cleaning



Query Data

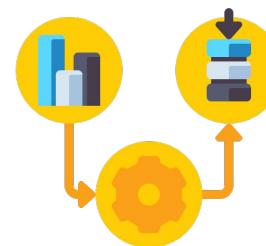
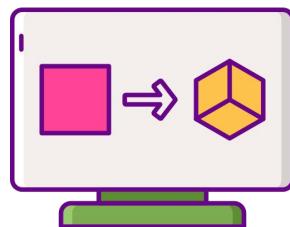
Clean Data

Analyse / Visualise Data

What is Data Transformation?

It is the process of changing data structures, format or values to prepare your set of data for analysis.

Examples of Data Transformation		
Excluding rows with missing data	Renaming column headings	Changing data type
Creating a conditional column	Removing unnecessary columns	Splitting columns



You might have noticed

- The headers for the “People” and “Return” sheet was not automatically detected by Power BI

Orders

Row ID	Order ID	Order Date
32298	CA-2012-124891	31/7/2012
26341	IN-2013-77878	5/2/2013
25330	IN-2013-71249	17/10/2013
13524	ES-2013-1579342	28/1/2013
47221	SG-2013-4320	5/11/2013
22732	IN-2013-42360	28/6/2013

People

Column1	Column2
Person	Region
Anna Andreadi	Central
Chuck Magee	South
Kelly Williams	East
Matt Collister	West

Returns

Column1	Column2
Returned	Order ID
Yes	MX-2013-168137
Yes	US-2011-165316
Yes	ES-2013-1525878
Yes	CA-2013-118311

You might have noticed

- The “Return” sheet has multiple rows that are duplicated

	Column1	Column2
1	Returned	Order ID
2	Yes	CA-2015-100762
3	Yes	CA-2015-100762
4	Yes	CA-2015-100762
5	Yes	CA-2015-100762
6	Yes	CA-2015-100867
7	Yes	CA-2015-102652
8	Yes	CA-2015-102652
9	Yes	CA-2015-102652
10	Yes	CA-2015-102652
11	Yes	CA-2015-103373
12	Yes	CA-2015-103744

Data Transformation

The screenshot shows the Microsoft Power BI interface, specifically the 'Data Transformation' section. The top navigation bar includes 'File', 'Home' (selected), 'Help', and 'Table tools'. The 'Home' tab has several icons for clipboard operations (Paste, Cut, Copy) and data sources (Get data, Excel workbook hub, Data Server, Enter data, Dataverse). Below these are sections for 'Clipboard', 'Data', 'Queries', and 'Relationships'. The 'Calculations' section contains icons for New measure, Quick measure column, New table, and Manage relationships. The 'Security' section includes Manage roles, View as, Sensitivity, and Share. The 'Sensitivity' section also includes Sensitivity and Publish.

The main area is the Power Query Editor, which displays a table of data with columns: Row ID, Order ID, Order Date, Ship Date, and Ship Mode. The editor's ribbon includes tabs for File, Home, Transform, Add Column, View, Tools, and Help. The 'Transform' tab is selected. The 'Properties' pane on the right shows the table is named 'Orders' and has applied steps for Source, Navigation, Promoted Headers, and Changed Type. The status bar at the bottom indicates 24 COLUMNS, 999+ ROWS, and a preview download time of 1:50 PM.

Row ID	Order ID	Order Date	Ship Date	Ship Mode
1	32298 CA-2012-124891	31/7/2012	31/7/2012	Same Day
2	26341 IN-2013-77678	5/2/2013	7/2/2013	Second Class
3	25330 IN-2013-71249	17/10/2013	18/10/2013	First Class
4	13524 ES-2013-1579342	28/1/2013	30/1/2013	First Class
5	47221 SG-2013-4320	5/11/2013	6/11/2013	Same Day
6	22732 IN-2013-42360	28/6/2013	1/7/2013	Second Class
7	30570 IN-2013-81826	7/11/2011	9/11/2011	First Class
8	31192 IN-2012-86369	14/4/2012	16/4/2012	Standard Class
9	40155 CA-2014-135909	14/10/2014	21/10/2014	Standard Class
10	40936 CA-2012-116638	28/1/2012	31/1/2012	Second Class
11	34577 CA-2013-102988	5/4/2011	9/4/2011	Second Class
12	28879 ID-2012-28402	19/4/2012	22/4/2012	First Class
13	45794 SA-2011-1838	27/12/2011	29/12/2011	Second Class
14	4132 MX-2012-130015	13/11/2012	13/11/2012	Same Day
15	27704 IN-2013-73951	6/6/2013	8/6/2013	Second Class
16	13779 ES-2014-509995	31/7/2014	3/8/2014	Second Class
17	36178 CA-2014-143567	3/11/2014	6/11/2014	Second Class
18	12069 ES-2014-1651774	8/9/2014	14/9/2014	Standard Class
19	22096 IN-2014-11763	31/1/2014	1/2/2014	First Class
20	49463 TZ-2014-8100	5/12/2014	7/12/2014	Second Class
21	46630 PL-2012-7820	8/8/2012	10/8/2012	First Class
22	31784 CA-2013-154627	29/10/2011	31/10/2011	First Class
23	21586 IN-2013-44803	2/5/2013	3/5/2013	First Class
24	13528 ES-2013-2860574	27/2/2013	1/3/2013	Second Class
25	1570 US-2014-131393	31/7/2014	1/8/2014	First Class
26	3484 MX-2014-165309	5/9/2014	8/9/2014	First Class
27	30191 IN-2013-10286	17/12/2011	20/12/2011	First Class
28				

Power Query Editor

Data preparation tool

- It is a graphical interface that allows you to connect to various data sources, transform and clean the data, and prepare it for analysis and visualization.
- Allows you to load clean and structured data into Power BI

PQE Key Features

- **Data Source Connectivity**
 - databases, files (such as Excel, CSV, and JSON), online services (such as SharePoint and Azure), and more
- **Data Transformation**
 - filtering, sorting, merging, splitting, grouping, pivoting, and aggregating data
- **Data Cleansing (ensure data accuracy)**
 - removing duplicates, changing data types, handling null values, renaming columns, and applying formatting
- **Formula Language (M)**
 - write custom data transformation logic
- **Applied Steps**
 - step-by-step history allows you to review and modify the transformations applied to the data
- **Query Dependencies**
 - allowing for data mashups and combining data from multiple sources

Power Query Editor Tour

The screenshot shows the Microsoft Power Query Editor interface with several numbered callouts:

- 1**: The ribbon menu bar at the top.
- 2**: The "Queries [1]" pane on the left, which contains a list of available queries and the currently selected "Customers" query.
- 3**: A red circle highlighting the "CustomerID" column header in the main data grid.
- 4**: The "Query settings" pane on the right, which includes fields for "Name" (set to "Customers") and "Entity type" (set to "Custom").
- 5**: The status bar at the bottom of the window.

Power Query - Edit queries

Home Transform Add column View Help

Get data Enter data Options Manage parameters Refresh Advanced editor Properties Choose columns Remove columns Keep rows Remove rows Sort Reduce rows Split column Group by Use first row as headers Replace values Merge queries Append queries Combine files Map to entity CDM AI insights

Queries [1]

Customers

	CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region
1	ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Obere Str. 57	Berlin	null
2	ANATR	Ana Trujillo Emparedados y helados	Ana Trujillo	Owner	Avda. de la Constitución 2222	México D.F.	null
3	ANTON	Antonio Moreno Taquería	Antonio Moreno	Manager	Mataderos 2312	México D.F.	null
4	AROUT	Around the Horn	Thomas Hardy	Sales Representative	120 Hanover Sq.	London	null
5	BERGS	Berglunds snabbköp	Christina Berglund	Order Administrator	Berguvsvägen 8	Luleå	null
6	BLAUS	Blauer See Delikatessen	Hanna Moos	Sales Representative	Forsterstr. 57	Mannheim	null
7	BLONP	Blondesdsssl père et fils	Frédérique Citeaux	Marketing Manager	24, place Kléber	Strasbourg	null
8	BOLID	Bólido Comidas preparadas	Martín Sommer	Owner	C/ Araquil, 67	Madrid	null
9	BONAP	Bon app'	Laurence Lebihan	Owner	12, rue des Bouchers	Marseille	null
10	BOTTM	Bottom-Dollar Markets	Elizabeth Lincoln	Accounting Manager	23 Tsawassen Blvd.	Tsawassen	BC
11	BSBEV	B's Beverages	Victoria Ashworth	Sales Representative	Fauntleroy Circus	London	null
12	CACTU	Cactus Comidas para llevar	Patricia Simpson	Sales Agent	Cerrito 333	Buenos Aires	null
13	CENTC	Centro comercial Móctezuma	Francisco Chang	Marketing Manager	Sierras de Granada 9993	México D.F.	null
14	CHOPS	Chop-suey Chinese	Yang Wang	Owner	Hauptstr. 29	Bern	null
15	COMMI	Comércio Mineiro	Pedro Afonso	Sales Associate	Av. dos Lusiadas, 23	Sao Paulo	SP
16	CONSH	Consolidated Holdings	Elizabeth Brown	Sales Representative	Berkley Gardens 12 Brewery	London	null
17	DRACD	Drachenblut Delikatessen	Sven Ottlieb	Order Administrator	Walsenweg 21	Aachen	null
18	DUMON	Du monde entier	Janine Labrune	Owner	67, rue des Cinquante Otages	Nantes	null
19							

1 warning Completed (1.57 s) Columns: 13 Rows: 91

Step Cancel Save & close

Power Query Editor Tour

The screenshot shows the Microsoft Power Query Editor window with several numbered callouts:

- 1**: Points to the ribbon at the top of the window.
- 2**: Points to the main content area where a box highlights the "Ribbon" section.
- 3**: Points to the "CustomerID" column header in the query grid.
- 4**: Points to the "Properties" pane on the right side.
- 5**: Points to the status bar at the bottom of the window.

1. Ribbon

Provides multiple tabs to add transforms, select options for your query and access different ribbon buttons to complete various tasks.

	Address	City	Region
Obere Str. 57	Berlin	null	
Avda. de la Constitución 2222	México D.F.	null	
Mataderos 2312	México D.F.	null	
120 Hanover Sq.	London	null	
Berguvvägen 8	Luleå	null	
Forsterstr. 57	Mannheim	null	
24, place Kléber	Strasbourg	null	
C/ Araquil, 67	Madrid	null	
12, rue des Bouchers	Marseille	null	
23 Tsavassen Blvd.	Tsawassen	BC	
Fauntieroy Circus	London	null	
Cerrito 333	Buenos Aires	null	
Sierras de Granada 9993	México D.F.	null	
Hauptstr. 29	Bern	null	
Av. dos Lusiadas, 23	Sao Paulo	SP	
Berkley Gardens 12 Brewery	London	null	
Walsenweg 21	Aachen	null	
67, rue des Cinquante Otages	Nantes	null	

1 warning Completed (1.57 s) Columns: 13 Rows: 91

Cancel Save & close

Power Query Editor Tour

The screenshot shows the Microsoft Power Query Editor window with several numbered callouts:

1. Top ribbon: Home, Transform, Add column, View, Help.
2. Queries pane: Shows a list of available queries, with "Customers" selected. A red box highlights this area, and a red circle with the number 2 is placed on it.
3. Main workspace: Displays the "Customers" query results as a table. A red box highlights this area, and a red circle with the number 5 is placed at the bottom center.
4. Query settings pane: Shows properties like Name (Customers), Entity type (Custom), and applied steps (Source, Navigation). A red box highlights this area, and a red circle with the number 4 is placed on it.

2. Queries Pane

A view of all your available queries

1 warning Completed (1.57 s) Columns: 13 Rows: 91

Cancel Save & close

CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region
1 ALFKI	Centro comercial Moctezuma	Francisco Chang	Marketing Manager	Sierras de Granada 9993	México D.F.	null
2 ANATR	Chop-suey Chinese	Yang Wang	Owner	Hauptstr. 29	Bern	null
3 ANTON	Comércio Mineiro	Pedro Afonso	Sales Associate	Av. dos Lusiadas, 23	Sao Paulo	SP
4 AROUT	Consolidated Holdings	Elizabeth Brown	Sales Representative	Berkeley Gardens 12 Brewery	London	null
5 BERGS	Drachenblut Delikatessen	Sven Ottlieb	Order Administrator	Waisenweg 21	Aachen	null
6 BLAUS	Du monde entier	Janine Labrune	Owner	67, rue des Cinquante Otages	Nantes	null
7 BLONP						
8 BOLID						
9 BONAP						
10 BOTTM						
11 BSBEV						
12 CACTU						
13 CENTC						
14 CHOPS						
15 COMMI						
16 CONSH						
17 DRACD						
18 DUMON						
19						

Power Query Editor Tour

The screenshot shows the Microsoft Power Query Editor interface. The top navigation bar includes Home, Transform, Add column, View, and Help. The main area displays a preview of a 'Customers' query with 15 rows of data. The right side features the 'Query settings' pane, which is highlighted with a red box and contains fields for Name (set to 'Customers') and Entity type (set to 'Custom'). The 'Applied steps' section shows two steps: 'Source' and 'Navigation'. A red circle labeled '1' is positioned above the ribbon, '2' is on the left side of the preview pane, '3' is on the preview grid, and '4' is on the 'Name' field in the Query settings.

CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region
ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Obere Str. 57	Berlin	null
ANATR	Ana Trujillo Emparedados y helados	Ana Trujillo	Owner	Avda. de la Constitución 2222	México D.F.	null
ANTON	Antonio Moreno Taquería	Antonio Moreno	Manager	Mataderos 2312	México D.F.	null
AROUT	Around the Horn	Thomas Hardy	Sales Representative	120 Hanover Sq.	London	null
BERGS	Berglunds snabbköp	Christina Berglund	Order Administrator	Berguvsvägen 8	Luleå	null
BLAUS	Blauer See Delikatessen	Hanna Moos	Sales Representative	Forsterstr. 57	Mannheim	null
BLONP	Blondesdösl père et fils	Frédérique Citeaux	Marketing Manager	24, place Kléber	Strasbourg	null
BOLID	Bólido Comidas preparadas	Martín Sommer	Owner	C/ Araquil, 67	Madrid	null
BONAP	Bon app'	Laurence Lebihan	Owner	12, rue des Bouchers	Marseille	null
BOTTM	Bottom-Dollar Markets	Elizabeth Lincoln	Accounting Manager	23 Tsawassen Blvd.	Tsawassen	BC
BSBEV	B's Beverages	Victoria Ashworth	Sales Representative	Fauntleroy Circus	London	null
CACTU	Cactus Comidas para llevar	Patricia Simpson	Sales Agent	Cerrito 333	Buenos Aires	null
CENTC	Centro comercial Móctezuma	Francisco Chang	Marketing Manager	Sierras de Granada 9993	México D.F.	null
CHOPS	Chop-suey Chinese	Yang Wang	Owner	Hauptstr. 29	Bern	null
COMMI	Comércio Mineiro	Pedro Afonso	Sales Associate	Av. dos Lusiadas, 23	Sao Paulo	SP

3. Current View

Main working view, that by default, displays a preview of the data for your query. You can also enable the diagram view along with the data preview view.

Power Query Editor Tour

The screenshot shows the Microsoft Power Query Editor interface. The top navigation bar includes Home, Transform, Add column, View, and Help. The Home tab is selected, indicated by a red circle labeled '1'. Below the ribbon is a toolbar with various icons for data retrieval, transformation, and management. On the left, a sidebar titled 'Queries [1]' lists a single query named 'Customers' (indicated by a red circle labeled '2'). The main area displays a preview of the 'Customers' table with columns: CustomerID, CompanyName, ContactName, ContactTitle, Address, City, Region, and null. A red box highlights this preview area. To the right is the 'Query settings' pane, which shows the query name 'Customers' and entity type 'Custom'. A red circle labeled '4' points to the 'Properties' section. At the bottom, status information shows 'Completed (1.57 s)', 'Columns: 13', 'Rows: 91', and buttons for 'Cancel' and 'Save & close'.

4. Query Settings

A view of the currently selected query with relevant information, such as query name, query steps, and various indicators.

Power Query Editor Tour

The screenshot shows the Microsoft Power Query Editor window with several numbered callouts:

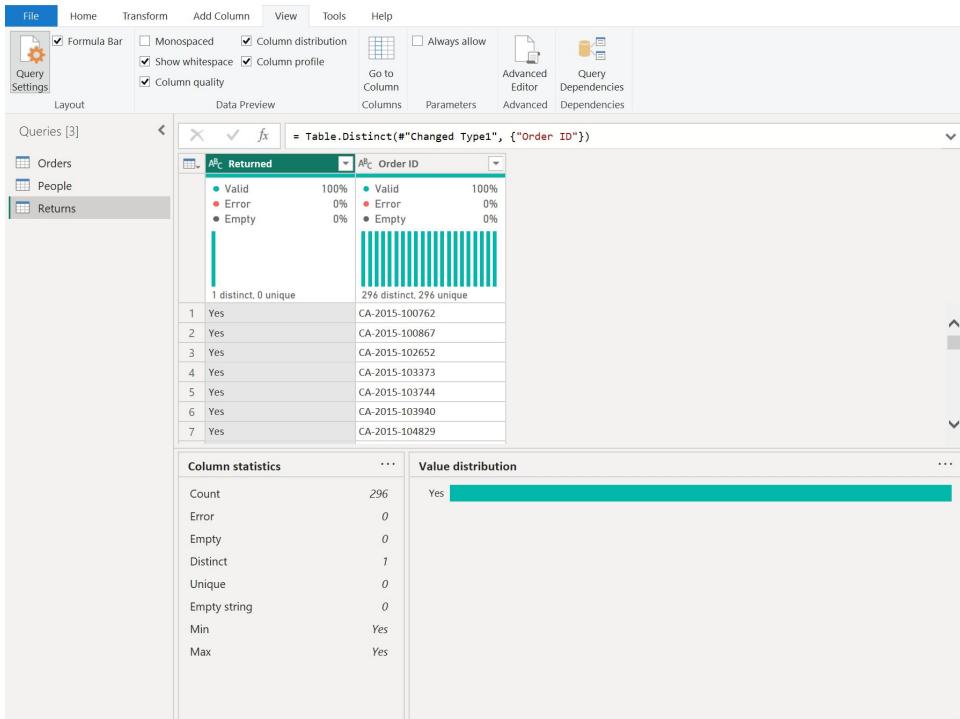
1. Top ribbon menu bar: Home, Transform, Add column, View, Help.
2. Left sidebar: Queries [1], showing a list of queries and a preview of the 'Customers' query.
3. Main data grid: A table of customer data with columns: CustomerID, CompanyName, ContactName, ContactTitle, Address, City, Region, and Country.
4. Right sidebar: Query settings panel, showing the query name 'Customers' and entity type 'Custom'.
5. Status Bar: Located at the bottom left, displaying '1 warning', 'Completed (1.57 s)', 'Columns: 13', 'Rows: 91', and a progress bar.

5. Status Bar

A bar that displays relevant information about your query, such as execution time, total columns and rows, and processing status. It also contains buttons to change your current view.

CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region	Country
1 ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Obere Str. 57	Berlin	null	DE
2 ANATR	Ana Trujillo Emparedados y helados	Ana Trujillo	Owner	Avda. de la Constitución 2222	México D.F.	null	MX
3 ANTON	Antonio Moreno Taquería	Antonio Moreno	Manager	Mataderos 2312	México D.F.	null	MX
4 ABOUC	À la Carte Services	Eric Fernandes	Marketing Manager	120 Hanover Sq.	London	null	GB
5 CLOUD	Coffee-Tea-Go	Frédéric Migaud	Marketing Manager	guvvägen 8	Luleå	null	SE
6 EATON	Eaton	Renee Tucker	Marketing Manager	sternstr. 57	Mannheim	null	DE
7 FRANZ	Fränz	Michael Slezak	Marketing Manager	place Kléber	Strasbourg	null	FR
8 ISAKA	Isakas	Yoshio Haraguchi	Marketing Manager	braquil, 67	Madrid	null	ES
9 KARHU	Kärrtorp Gruppen	Anna Mattsson	Marketing Manager	que des Bouchers	Marseille	null	FR
10 LAMAI	Lamai	David Rönnqvist	Marketing Manager	Tavassan Blvd.	Tsawassen	BC	CA
11 MOLIN	Molsvinen	Andrea Viera	Marketing Manager	Antieroy Circus	London	null	GB
12 OCEM	Océane	Manuela Smit	Marketing Manager	ito 333	Buenos Aires	null	AR
13 PAPAY	Papaya	Yousaf Ali	Marketing Manager	ras de Granada 9993	México D.F.	null	MX
14 RUSTY	Rusty Bucket	Terence Hart	Marketing Manager	atstr. 29	Bern	null	CH
15 SANTO	Santosteban	Francisco Chang	Marketing Manager	dos Lusíadas, 23	Sao Paulo	SP	BR
16 SWOLEN	Swolen	Paulo Mendes	Marketing Manager	Kelley Gardens 12 Brewery	London	null	GB
17 TASTY	Tasty Etc.	Paula Gellatly	Marketing Manager	serweg 21	Aachen	null	DE
18 VONRICH	Von Richetti	Yvonne Richetti	Marketing Manager	hue des Cinquante Otages	Nantes	null	FR

Data Profile



- Further identify the dataset distribution
- Check the data quality
- “Returned” column in “Returns” Sheet is redundant since all the values are “Yes”
- Delete the “Returned” column
 - Right click on the column
 - Delete
- Save
 - Home
 - Close & Apply

Changing Data Formats in Data Tab

The screenshot shows the 'Data' tab in Power BI. At the top, there are fields for 'Name' (set to 'Order Date'), 'Format' (set to '14/3/2001 (d/m/yyyy)'), and 'Summ'. Below these, the 'Data type' is set to 'Date'. A tooltip explains: 'Choose how the values in this column are displayed (this doesn't impact how they're stored). If you see an asterisk (*), that format will reflect the date and time settings of your operating system.' The main area displays a table with columns: Row ID, Order ID, Order Date, Ship Date, and Ship Mode. The 'Order Date' column is highlighted in green.

Row ID	Order ID	Order Date	Ship Date	Ship Mode
43	CA-2017-101343	17/7/2017	Saturday, 22 July 2017	Standard Cla
514	CA-2018-163405	21/12/2018	Tuesday, 25 December 2018	Standard Cla
515	CA-2018-163405	21/12/2018	Tuesday, 25 December 2018	Standard Cla
1606	US-2017-115819	19/4/2017	Monday, 24 April 2017	Second Class
1607	US-2017-115819	19/4/2017	Monday, 24 April 2017	Second Class
1609	US-2017-115819	19/4/2017	Monday, 24 April 2017	Second Class

Changing Data Formats in Data Tab

Sales	Quantity	Discount	Profit
\$77.88	2	\$0.00	\$3.89
\$6.63	3	\$0.00	\$1.79
\$5.88	2	\$0.00	\$1.71
\$5.46	3	\$0.00	\$1.53
\$73.20	5	\$0.00	\$21.23
\$22.72	4	\$0.00	\$10.22
\$45.36	7	\$0.00	\$21.77
\$11.34	3	\$0.00	\$5.22
\$80.30	5	\$0.00	\$20.88

Sales, Discount and Profit should be listed in the “Currency” format so that the charts will automatically display the \$ as well.

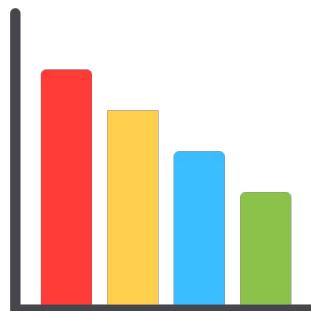
You can set them as:

- **Format:** Currency
- **Decimal:** 2



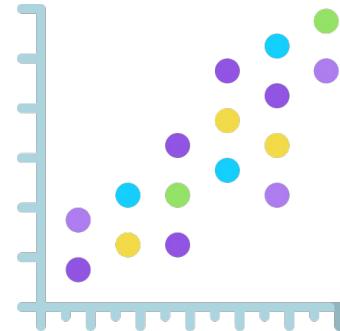
Creating Charts

Common Chart Types



Bar Chart

Easily displays ranks of values



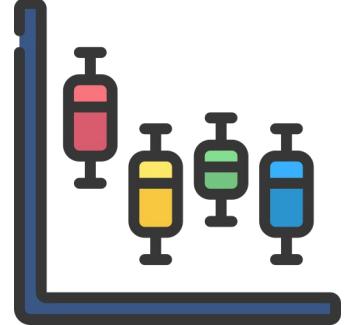
Scatter Plot

Demonstrates the relationship between continuous variables



Line Graph

Demonstrates the relationship between an amount and rate



Box Plot

Summarises the distribution of the data

FOUR TYPES OF DATA

NOMINAL: Data sorted into categories

ORDINAL: Arbitrary numerical scale

DISCRETE: Represents units

CONTINUOUS: Can be measured on a continuum

TYPES OF CHARTS

→ Bar chart 

→ Pie chart, bar chart 

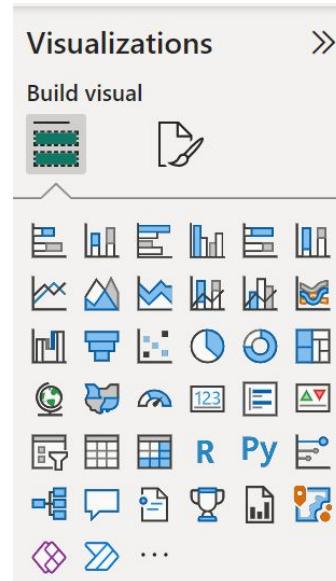
→ Arrays, Pie chart, Bar chart 

→ Line chart 

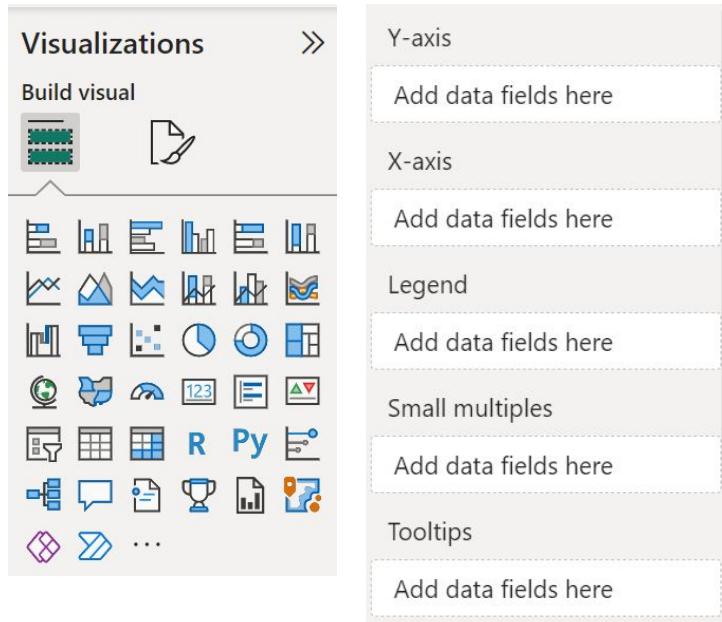
Charts Available on Power BI

- Stacked bar chart
- Stacked column chart
- Area Charts
- Line Charts
- Bar Charts
- Column Charts
- Combo Charts
- Pie Charts
- Doughnut Charts
- Gauge Charts

and more!!!



Creating Charts in Power BI



Data

Think about what data you want to explore and include in your visualisations

Chart

Select the type of charts that best represent your data

Fields

Drag and drop the relevant fields to the respective columns

Chart Creation Tips

1. **Know your audience** → What is the purpose of the chart?
2. **Know what are you trying to show** → What is your chart trying to convey?
3. **Readability** → Is your chart comprehensive and easy to understand?
4. **Color and visual effects** → Does the colour aid in explaining the charts?
5. **Chart Labels** → Are the labels unobstructed and easily identified?



Overall: Create a chart that is visually **interesting** and **functional**

Deviation

Emphasise variation (V) or have a field reference point. Typically the reference point is the mean, median, mode, range or a long-term average. Can also be used to highlight outliers.

Example FT uses
Trade surplus/deficit; climate change

Diverging bar



A simple standard bar chart where bars have both positive and negative values.

Spine



Perfect for presenting survey results which are measured against a neutral baseline - either against a single point or between two series.

Surplus/deficit bar/bat



The shaded area above or below a central line represents a surplus or deficit - either against a single point or between two series.

Correlation

Show the relationship between two or more variables. Most often the relationship is linear, although non-linear or a long-term average. Can also be used to highlight outliers.

Example FT uses
Inflation and unemployment; income and life expectancy

Scatterplot



The standard way to show the relationship between two continuous variables. Each data point has its own coordinates.

Column + line timeline



A good way of showing the relationship between an amount (column) and a rate (line).

Bubble



Like a scatterplot, but adds additional detail by adding size according to a third variable.

KV heatmap



A good way of showing how data changes across different categories (dots, less dots, more dots, etc.)

Line



Perfect for showing data that has changed over time or has a clear trend.

Step



Perfect for showing data that has changed over time or has a clear trend.

Bar



Effective for showing data across multiple categories.

Population pyramid



A standard way of showing the age and sex distribution of a population.

Frequency polygon



For displaying multiple distributions of data.

Besidearm



Used to emphasise individual points in a distribution.

Ranking

Show where an item's position is in an ordered list that is more important than others. It's often used to rank things, but can also be used to highlight the points of interest.

Example FT uses
House prices; league tables; constituency election results

Ordered bar



Standard bar chart where the order of values much more clearly highlights the order in which they are listed.

Ordered column



See above.

Dot strip plot



A simple way of showing change or movement over time when there are multiple categories.

Barcode plot



Like a dot strip, good for showing all data at once, but each dot has the same width.

Slope



Good for showing changing data as it is often easier to see the trend when simplified into 1 or 2 dimensions.

Boxplot



Summarise multiple distributions of data by showing the median, quartiles and range of the data.

Cumulative curve



A good way of showing a cumulative total is a set of data, such as frequency, size and density.

Vertical timeline



Presents time on the Y axis. Good for displaying detailed information that would otherwise be hard to read when stacked on top of each other.

Stacked bar



Another alternative to the circle timeline for showing data over time when there are big variations in the data.

Distribution

Show values in a distribution and how often they occur. The shape can reveal a lot about the data, such as whether it's skewed or bell-shaped.

Example FT uses
Income distribution; population; geographic distribution; brewing industry

Histogram



The simplest way to show a distribution - keep the data separate so that they can be easily compared.

Dot plot



A simple way of showing change or movement over time when there are multiple categories.

Dot strip plot



Good for showing many dots have the same width.

Bar



Good for showing changing data as it is often easier to see the trend when simplified into 1 or 2 dimensions.

Area chart



Good with these data types as they are often easier to compare than raw data.

Marimekko



A good way of showing the relationship between two variables when the data are not too complex.

Proportional symbol



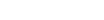
Similar to a dot strip but the symbols can be scaled up or down with more than 2 dimensions.

Violin plot



Similar to a dot strip but more effective with multiple categories. Shows the median, quartiles and range of the average.

Confetti



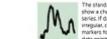
Usually focused on day-to-day activity, such as news stories, showing overlapping and moving data points of varying sizes.

Change over Time

Give emphasis to changing trends. These can be short (one day) or longer (months, years, decades or centuries). Usually these show a trend, but it's also important to provide suitable context.

Example FT uses
Share price movements; economic time series; sectoral changes in a market

Line



The standard way to show a changing trend, if the data are not too noisy, it's best to use lines to represent the data.

Bar



See above. Good when the data are not too noisy, but for long periods of time, it's better to use a line chart.

Column + line timeline



Column used for showing change over time while the line is used for multiple categories (columns).

Paired bar



As per standard bar chart, but allows for multiple series. Can be used for more than 2 series.

Paired column



As per standard bar chart, but allows for multiple series. Can be used for more than 2 series.

Dot



Similar to a chart - but the dots can be a bit noisy. Good for showing the size of the data (big dots).

Dot map



Similar to a chart - but the dots can be a bit noisy. Good for showing the size of the data (big dots).

Dot density



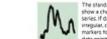
A hemispherical projection of individual locations - useful for showing the density of particular data.

Gridplot



Good for showing information, they look best when used for geographical data, but work well in other formats.

Radar



A space-efficient way of showing value of multiple variables, but make sure they are clearly defined so that it makes sense to reader.

Parallel coordinates



An alternative to radar charts, the arrangement of the axes is key to the story.

Violin



Excellent solution in this case as it shows the median, quartiles and range of the data at the same time as showing the distribution.

Treemap



Use for hierarchical relationships, can be very effective when there are many small segments.

Chord



Similar to a treemap but for showing connections between nodes.

Network



Used for showing the strength and complexity of relationships between any number of nodes.

Dot density



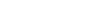
Used to show the strength of individual interactions - useful for showing the density of particular data.

Heat map



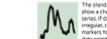
Grid-based data values mapped with an intensity colour scale - useful for showing data that is not shaped in an obvious form.

Venn



Generally only used for schematic representation.

Waterfall



Can be useful for showing pain points or reasons where some components are negative.

Bar



Good for showing a measurement against a target or performance range.

Grouped symbol



Another alternative to bar charts when being able to count individual elements is useful.

Vertical timeline



Presents time on the Y axis. Good for displaying detailed information that would otherwise be hard to read when stacked on top of each other.

Stackgraph



Another alternative to the circle timeline for showing data over time when there are big variations in the data.

Streamgraph



A type of area chart; the areas represent changes in proportions over time. Very important than individual values.

Magnitude

Show data comparisons. These can be relative (just being able to see the magnitude of one thing compared to another) or absolute (absolute value of something).

Example FT uses
Population density; natural resource location; economic output; carabiner area; variation in election results

Stacked column/bar



The standard approach for showing parts of whole relationships that can be added together to get the total.

Bar



See above. Good when the data are not too noisy, but for long periods of time, it's better to use a line chart.

Marimekko



A good way of showing the relationship between two variables when the data are not too complex.

Pie



A common way of showing part of whole data - but the data must be circular for this to work.

Tree map



Use for hierarchical relationships where the data is too large to fit into a single pie chart.

Equated categories



Ensuring each unit on the grid is the same size and equally-sized shape - useful for showing varying regions with equal value.

Scaled categories (outline)



Ensuring each unit on the grid is the same size and equally-sized shape - useful for showing varying regions with equal value.

Dot



Used to show the strength of individual interactions - useful for showing the density of particular data.

Dot density



Similar to a chart - but the dots can be a bit noisy. Good for showing the size of the data (big dots).

Dot map



Similar to a chart - but the dots can be a bit noisy. Good for showing the size of the data (big dots).

Dot density



A hemispherical projection of individual locations - useful for showing the density of particular data.

Heat map



Grid-based data values mapped with an intensity colour scale - useful for showing data that is not shaped in an obvious form.

Venn



Generally only used for schematic representation.

Waterfall



Can be useful for showing pain points or reasons where some components are negative.

Bar



Good for showing a measurement against a target or performance range.

Grouped symbol



Another alternative to bar charts when being able to count individual elements is useful.

Part-to-whole

Show how a single value can be broken down into its component elements. If the components are not equally important to the reader than anything else.

Example FT uses
Population density; natural resource location; economic output; carabiner area; variation in election results

Stacked column/bar



Shows the relative (just being able to see the magnitude of one thing compared to another) or absolute (absolute value of something).

Bar



See above. Good when the data are not too noisy, but for long periods of time, it's better to use a line chart.

Marimekko



A good way of showing the relationship between two variables when the data are not too complex.

Pie



A common way of showing part of whole data - but the data must be circular for this to work.

Tree map



Use for hierarchical relationships where the data is too large to fit into a single pie chart.

Equated categories



Ensuring each unit on the grid is the same size and equally-sized shape - useful for showing varying regions with equal value.

Spatial



Show from location maps only when the reader is interested in the spatial context of the data.

Flow



Show the movement between or more items in a sequence or process.

Floor

Show the relative volumes or intensity of movement between two or more items in a sequence or process.

Example FT uses
Movement of funds; trade; migration; leisure; inflation; retailing; grocery shopping

Dot



Shows changes in flows from one location to at least one other - good for showing the outcome of a complex process.

Waterfall



Designed to show the flow of data through a series of processes, usually from raw materials to final product.

Chord

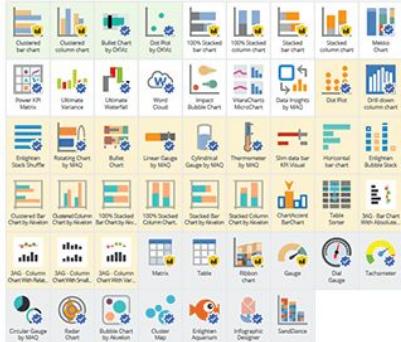


A complex, layered diagram which can be used to show the flow of data through a series of processes.

</div

COMPARISON

Display measures compared by their magnitude

**CHANGE OVER TIME**

Display the changing trend of measures

**RANKING**

Display measures by their rank order

**SPATIAL**

Display measures over spatial maps

**FLOW**

Display a flow or dynamic relations

**PART-TO-WHOLE**

Display the parts of a measure

**DISTRIBUTION**

Display the distribution of a measure

**CORRELATION**

Display relations between measures

**SINGLE**

Display single values

**FILTER**

Control report filters

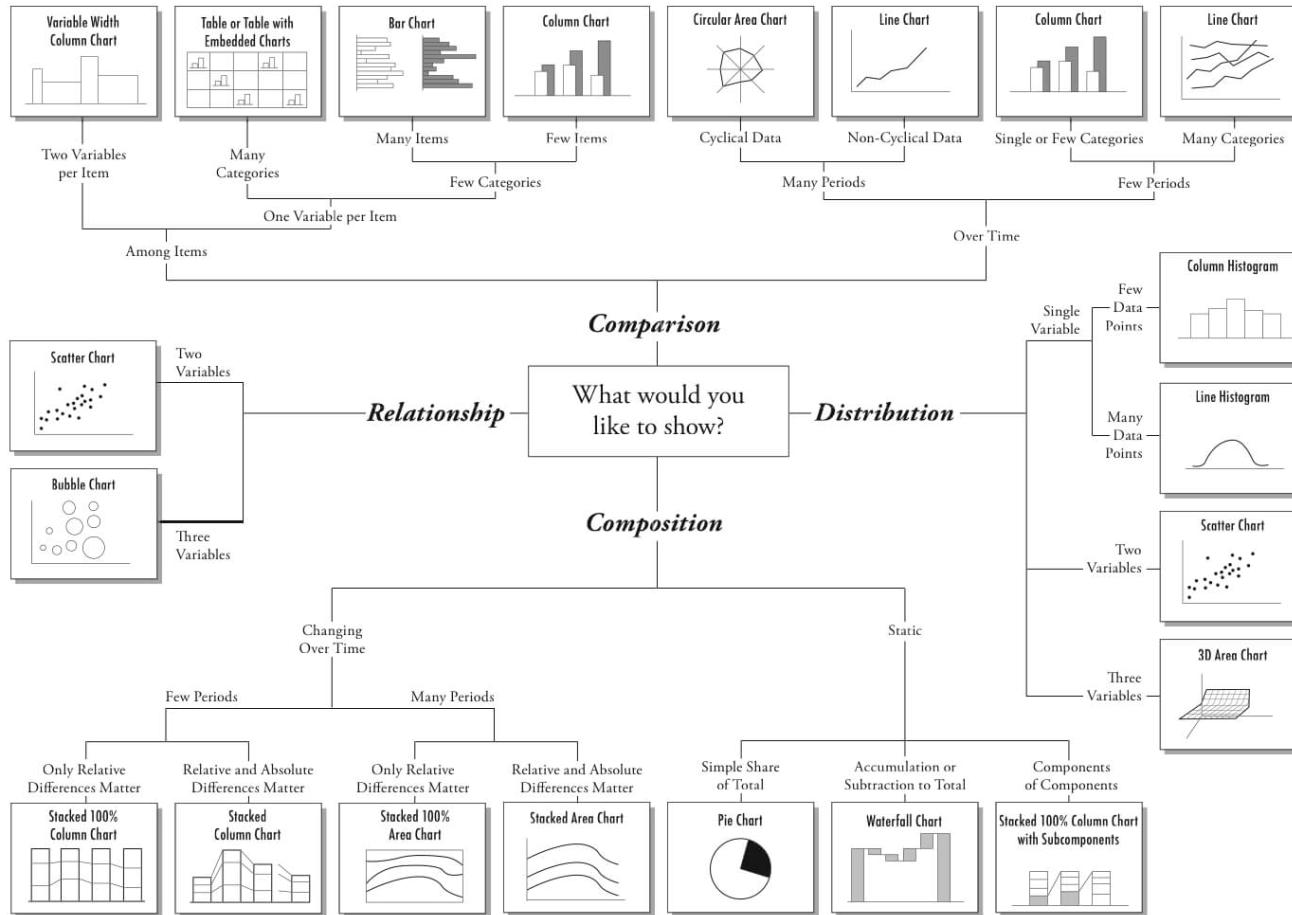
**NARRATIVE**

Tell a story with data

**MISCELLANEOUS**

Chart Suggestions—A Thought-Starter

www.ExtremePresentation.com
© 2009 A. Abela — a.v.abela@gmail.com



Source: <https://infogram.com/page/choose-the-right-chart-data-visualization>

Summary

- **PowerBI Features**
 - Report, Data, Model
 - Power Query, DAX
- **Connecting Data Sources**
 - Excel
- **Data Transformation with Power Query Editor**
 - Update Row Headers, Delete Duplicate Rows
 - Check Column Quality, Data Distribution
- **Creating Charts**
 - Bar Chart, Pie Chart, Cards, Treemap, Line Chart
- **Modifying Chart Visuals**
 - Title, Data Labels, Axis, Chart Colours

Microsoft
POWER BI

Lesson 2



Filters



Multiple ways to filter

Three main methods, but can be further broken down into sub-methods

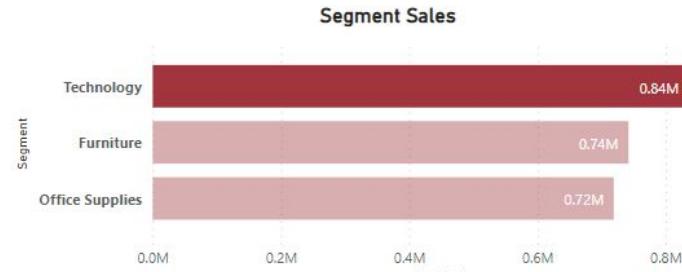
1. Cross-filter and Cross-highlight
2. Slicers
3. Filters Pane

Cross-filter and Cross-highlight

Filters the data without using filters or slicers

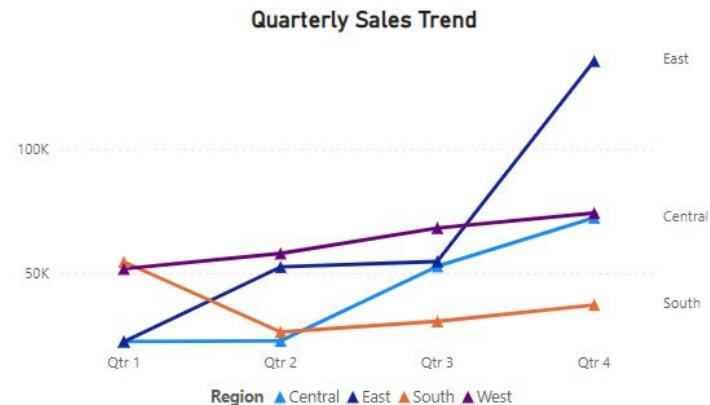
- **Cross-highlighting**

- i. Selecting a value in one visual highlights the related data in visuals such as column and bar charts.
- ii. The unrelated data is still visible but dimmed.



- **Cross-filtering**

- i. Selecting a value in one visual acts more like a filter in other visuals, such as line charts, scatter charts, and maps.
- ii. The unrelated data isn't visible, just as you'd see with a filter.



Slicers

Basic

Person

- Select all
- Anna Andreadi
- Cassandra Brandom
- Chuck Magee
- Kelly Williams

Numeric

Profit

-2,938.71

4,111.06

-

Filters numeric columns such as between numbers, less than or equal to a number etc

Relative Date

Order Date

Last

▼

1

Years

▼

⌚ 19/1/2022 - 18/1/2023

E.g. Show items within the last day or week

Relative Time

Order Date

Last

▼

1

Minutes

▼

⌚ 11:57:45 AM - 11:58:45 AM

E.g. Show items within the last minute or hour

Responsive, resizable

Region

Select all	East	West
Central	South	

Resize to fit any space on the report

Hierarchical / Multiple Fields

Category, Sub-Category

- Select all
- Furniture
 - Bookcases
 - Chairs
 - Furnishings

Filter multiple related fields in a single slicer

Filters Pane

1. Visual filter

- Applies to a single visual on a report page
- You see visual-level filters when you select a visual on the report canvas

2. Page filter

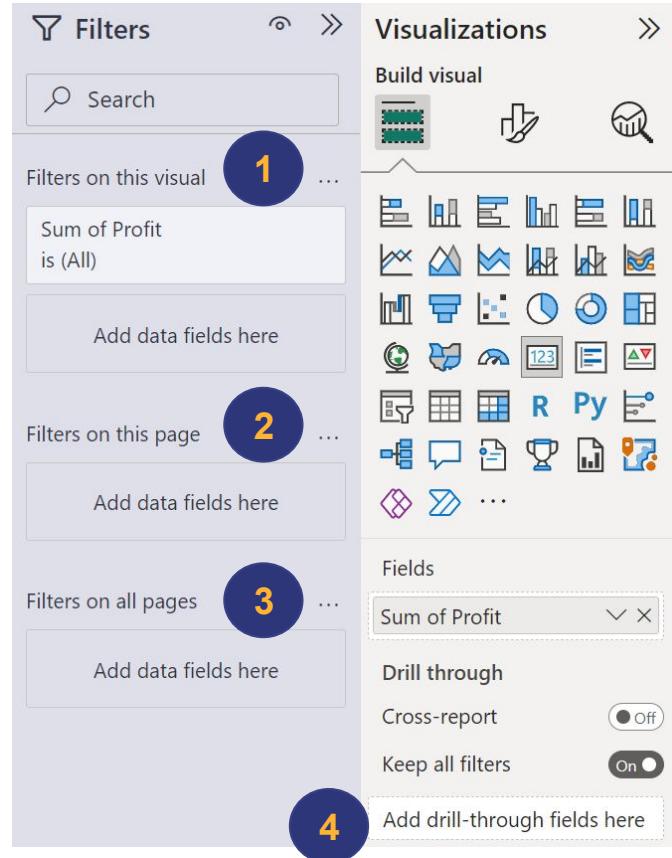
- Applies to all the visuals on the report page

3. Report filter

- Applies to all pages in the report

4. Drillthrough filter

- Create a destination report page that focuses on a specific entity, such as a supplier. From the other report pages, users can right-click a data point for that entity and drill through to the focused page.
- More will be explored in lesson 4



Other types of Filters

Filter type	Edit	Clear	Delete	Hide	Lock	Sort	Rename
Automatic filters	Y	Y	N	Y	Y	Y	Y
Manual filters	Y	Y	Y	Y	Y	Y	Y
Include/Exclude filters	N	N	Y	Y	Y	Y	N
Drill-down filters	Y	Y	N	N	N	N	N
Cross-drill filters	N	N	N	N	N	N	N
Drillthrough filters (Invokes drillthrough)	Y	Y	Y	Y	Y	N	N
Drillthrough filters (Transient)	Y	Y	Y	N	N	N	N
URL filters - transient	Y	Y	Y	N	N	N	N
Pass-through filters	N	N	Y	Y	N	Y	N



Data Modelling

Power BI Desktop Workflow

Data & Model View

Data Analysis

Inspect, Explore &
Understand Data

View & Edit
Relationships
between tables

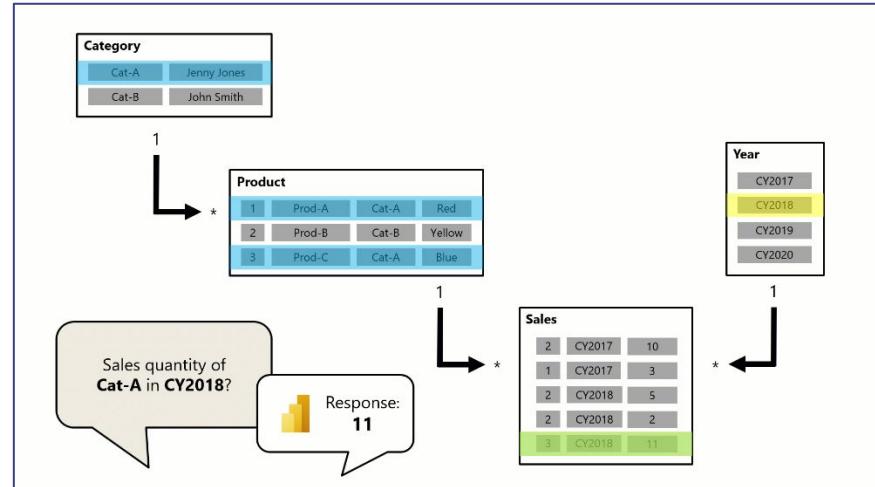
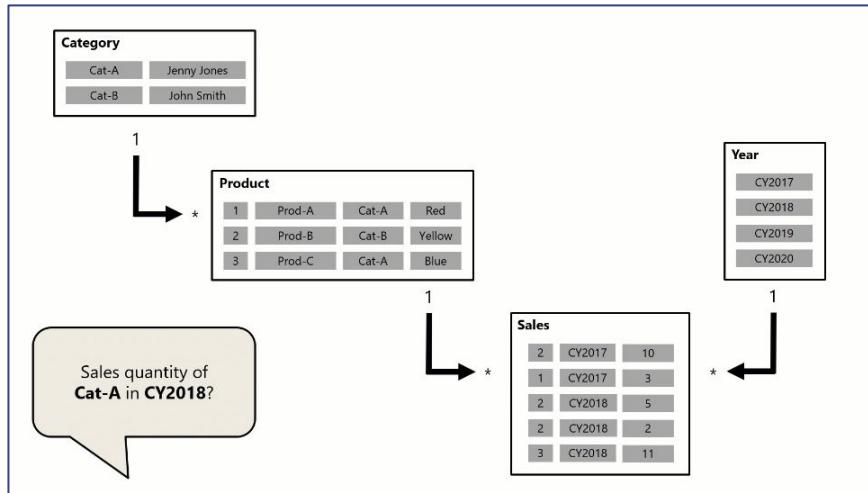
Data Model



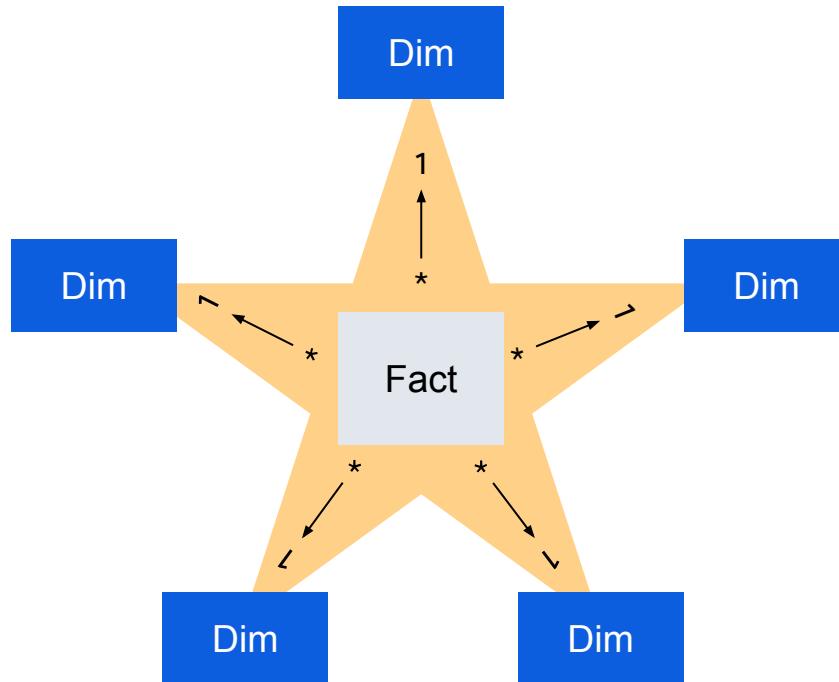
What is Data Modelling?

- Data Modeling is one of the features used to connect multiple data sources in BI tool using a relationship.
- A relationship defines how data sources are connected with each other and you can create interesting data visualizations on multiple data sources.
- A model relationship propagates filters applied on the column of one model table to a different model table

Sometimes data is stored across multiple tables



Star Schema Design



- Dim: dimension tables contain a relatively small number of rows
- Fact: Fact tables contain a very large number of rows and continue to grow over time

Example

ID	Name	Street	Country
1	Aaron	Anchorvale	Singapore
2	Benjamin	Bras Basah	Singapore
3	Calista	Commonwealth	Singapore
4	Danny	Commonwealth	Singapore
5	Eugenia	Anchorvale	Singapore
6	Frederick	Johor Bahru	Malaysia

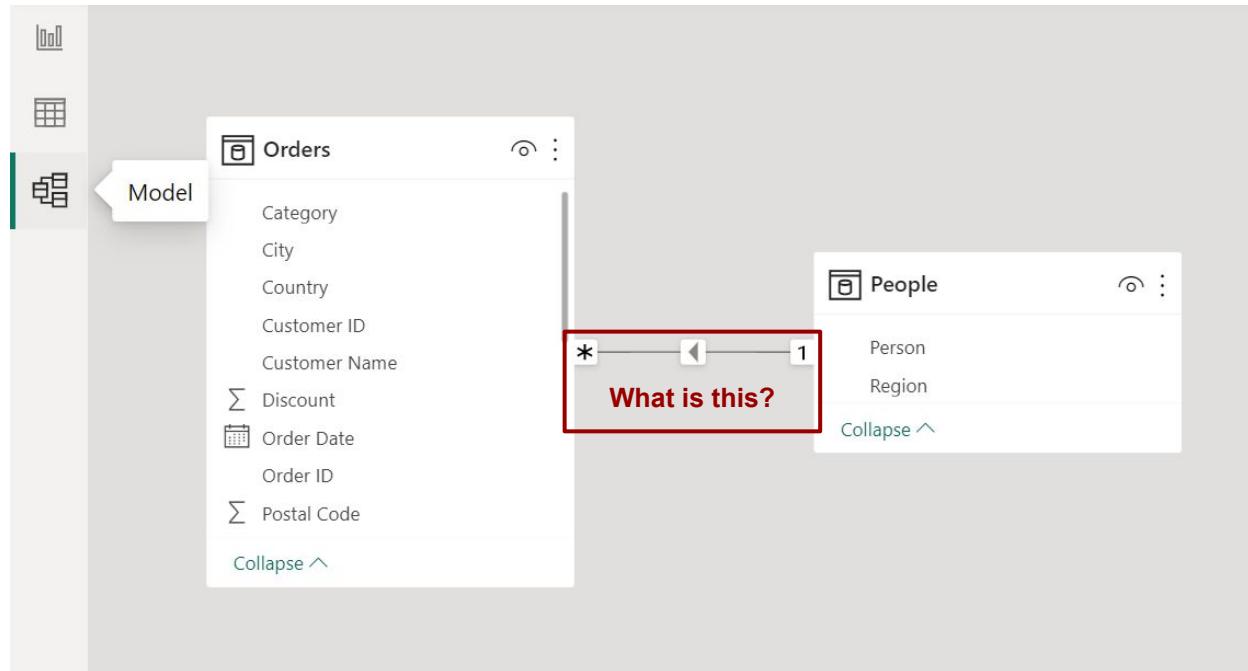
Example

ID	Name	Street
1	Aaron	Anchorvale
2	Benjamin	Bras Basah
3	Calista	Commonwealth
4	Danny	Commonwealth
5	Eugenia	Anchorvale
6	Frederick	Johor Bahru

* → 1

Street	Country
Anchorvale	Singapore
Bras Basah	Singapore
Commonwealth	Singapore
Johor Bahru	Malaysia

Data Modelling



Data Modelling

Relationships

A model relationship propagates filters applied on the column of one model table to a different model table.

Relationship paths are deterministic, meaning that filters are always propagated in the same way and without random variation.



Each model relationship is defined by a cardinality type.

Cardinality

Cardinality Type	Description	Cross Filter Options
One-to-many (or Many-to-one)	One of the columns contains unique values (most common)	Single Both
One-to-one	Both columns contain unique values (uncommon)	Both
Many-to-many	Both columns contain duplicate values (infrequently used)	Single (Table1 to Table2) Single (Table2 to Table1) Both

Data Modelling

Edit relationship

Select tables and columns that are related.

Orders

Customer ID	Customer Name	Segment	Country	City	State	Postal Code	Region	
RA-19885	Ruben Ausman	Corporate	United States	Los Angeles	California	90049	West	OF
BN-11515	Bradley Nguyen	Consumer	United States	Los Angeles	California	90049	West	OF
BN-11515	Bradley Nguyen	Consumer	United States	Los Angeles	California	90049	West	OF

People

Person	Region
Anna Andreadi	West
Chuck Magee	East
Kelly Williams	Central

Cardinality Cross filter direction

Many to one (*:1) Single

Make this relationship active Apply security filter in both directions

Assume referential integrity

What is this?

OK Cancel

Creating Relationships

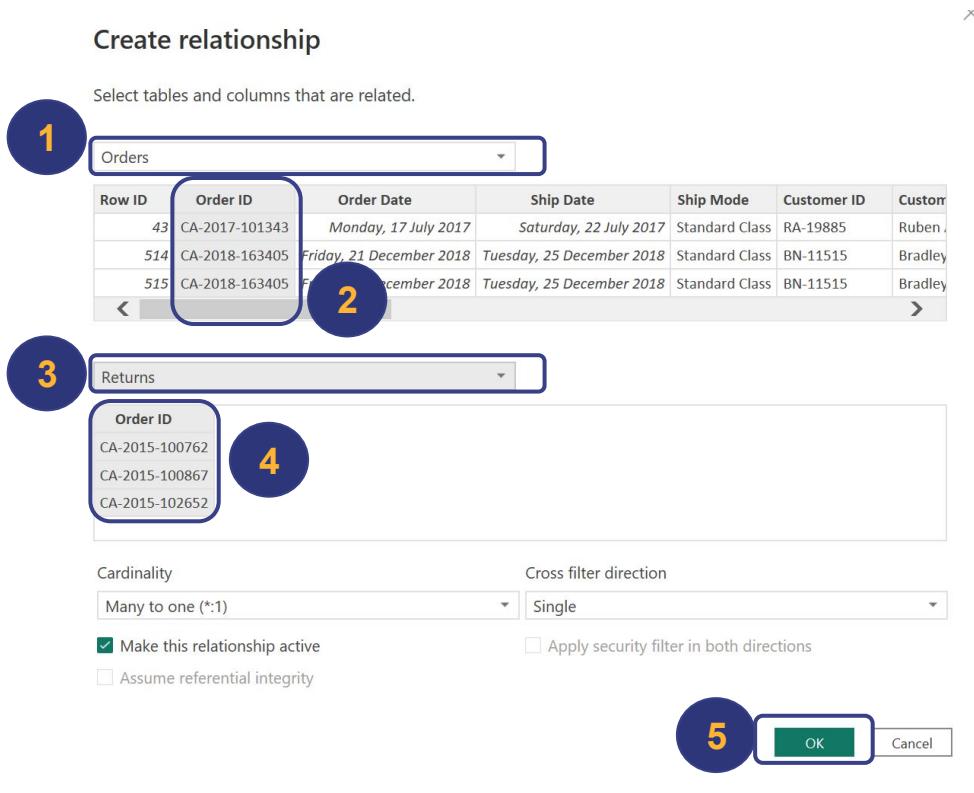
Method 1

- On the Modeling tab, select Manage relationships > New.
- In the Create relationship dialog box, in the first table drop-down list, select a table.
 - Select the column you want to use in the relationship.
- In the second table drop-down list, select the other table you want in the relationship.
 - Select the other column you want to use, and then select OK

Method 2

- Select both tables first, and the relationship will be automatically detected

Creating Relationships



- 1 In the Create relationship dialog box, in the first table drop-down list, select a table.
- 2 Select the column you want to use in the relationship.
- 3 In the second table drop-down list, select the other table you want in the relationship.
- 4 Select the other column you want to use
- 5 Select OK



Dashboard Creation

PowerBI Themes

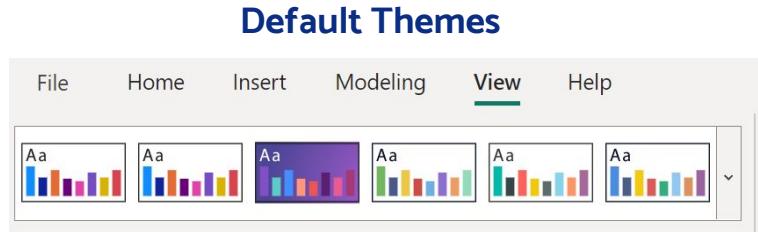
Apply design changes to your entire report

i.e.

- using corporate colors
- changing icon sets
- applying new default visual formatting

* You should apply a theme before amending the chart designs

** You can also customize your own themes



View ribbon → Themes section → Select dropdown arrow → Select theme

Advanced / Community added themes



<https://community.powerbi.com/t5/Themes-Gallery/bd-p/ThemesGallery>

Go to website: Select Theme → Download Json file

Go to PowerBI: View ribbon → Themes section → Select dropdown arrow → "Browse for themes" → Upload Json file downloaded

Dashboard Creation Tips



Consider your audience

Your readers can drill into the reports from your dashboard, so don't put a detail on the dashboard unless that's what your readers need to monitor.



Use the right visualisation

Visualizations should paint a picture and be easy to read and interpret. For some data and visualizations, a simple graphic visualization is enough. Other data might need a more complex visualization.



Accent the most important info

If the text and visualizations on a dashboard are all the same size, readers have difficulty focusing on what's most important. Card visualizations are a good way to display an important number prominently.



Tell a story on one screen

Dashboards are meant to show important information at a glance, having all the tiles on one screen is best.

Summary

- **Filters**
 - Cross-filter, Cross-highlight
 - Slicers
 - Filters Page
- **Data Modelling**
 - Star Schema and Cardinalities
 - Joining different tables
 - Creating relationships in Power BI
- **Dashboard Creation**
 - Dashboard Creation Tips
 - Creating a dashboard page with a filter pane

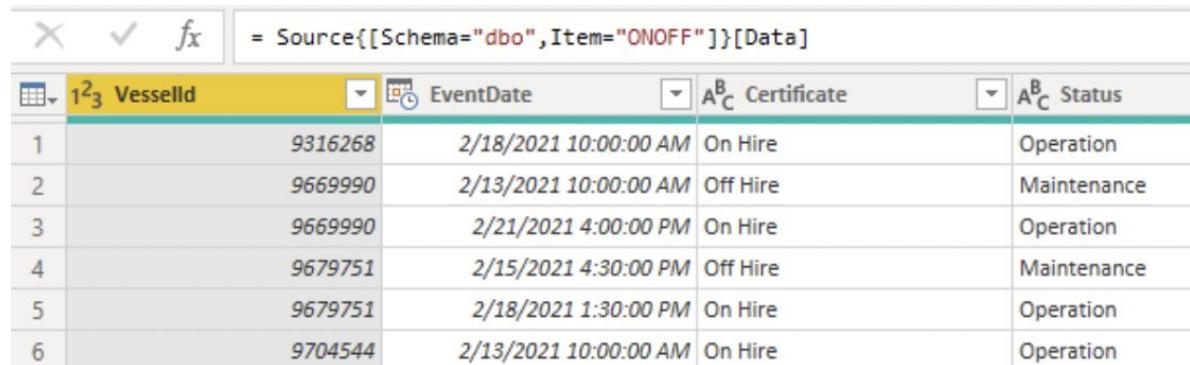
Microsoft
POWER BI

Lesson 3



What is DAX?

- Stands for Data Analysis eXpressions
- A collection of functions, operators, and constants that can be used in a formula, or expression, to calculate and return one or more values.
- DAX helps you create new information from data already in your model.



The screenshot shows a DAX editor interface. At the top, there is a toolbar with icons for close, save, and fx, followed by the formula bar containing the DAX code: `= Source{[Schema="dbo",Item="ONOFF"]}[Data]`. Below the formula bar is a table view showing six rows of data. The columns are labeled: VesselId, EventDate, Certificate, and Status. The data is as follows:

	VesselId	EventDate	Certificate	Status
1	9316268	2/18/2021 10:00:00 AM	On Hire	Operation
2	9669990	2/13/2021 10:00:00 AM	Off Hire	Maintenance
3	9669990	2/21/2021 4:00:00 PM	On Hire	Operation
4	9679751	2/15/2021 4:30:00 PM	Off Hire	Maintenance
5	9679751	2/18/2021 1:30:00 PM	On Hire	Operation
6	9704544	2/13/2021 10:00:00 AM	On Hire	Operation

What is DAX?

- It consists 3 important concepts: **Syntax, Functions and Context**
 - **Syntax** – Proper DAX syntax is made up of a variety of elements, some of which are common to all formulas.
 - **Functions** – DAX functions are predefined formulas that take some parameters and perform a specific calculation.
 - **Context** – DAX uses context to determine which rows should be used to perform a calculation.

Some of the most common DAX functions used in reports are:

1. Simple calculations: COUNT, DISTINCTCOUNT, SUM, AVERAGE, MIN, MAX.
2. SUMMARISE: Returns a table typically used to further apply aggregations over different groupings.
3. CALCULATE: Performs an aggregation along with one or more filters. When you specify more than one filter, the function will perform the calculation where all filters are true.
4. IF: Based on a logical condition, it will return a different value for if it is true or false. This is similar to the CASE WHEN operation in SQL.
5. IFERROR: Looks for any errors for an inner function and returns a specified result
6. ISBLANK: Checks if the rows in a column are blank and returns true or false. Useful to use in conjunction with other functions like IF.
7. EOMONTH: Returns the last day of the month of a given date (column reference in a date format) for as many months in the past or the future.
8. DATEDIFF: returns the difference between 2 dates (both as column references in date formats) in days, months, quarters, years, etc.

What is DAX?

- It can go for as intuitive/simple as this:
- To as complex as this (creating own variables and returning it) or even long queries to manipulate the data

```
1 Average Days to Ship = AVERAGE(Orders[Days to Ship])
```

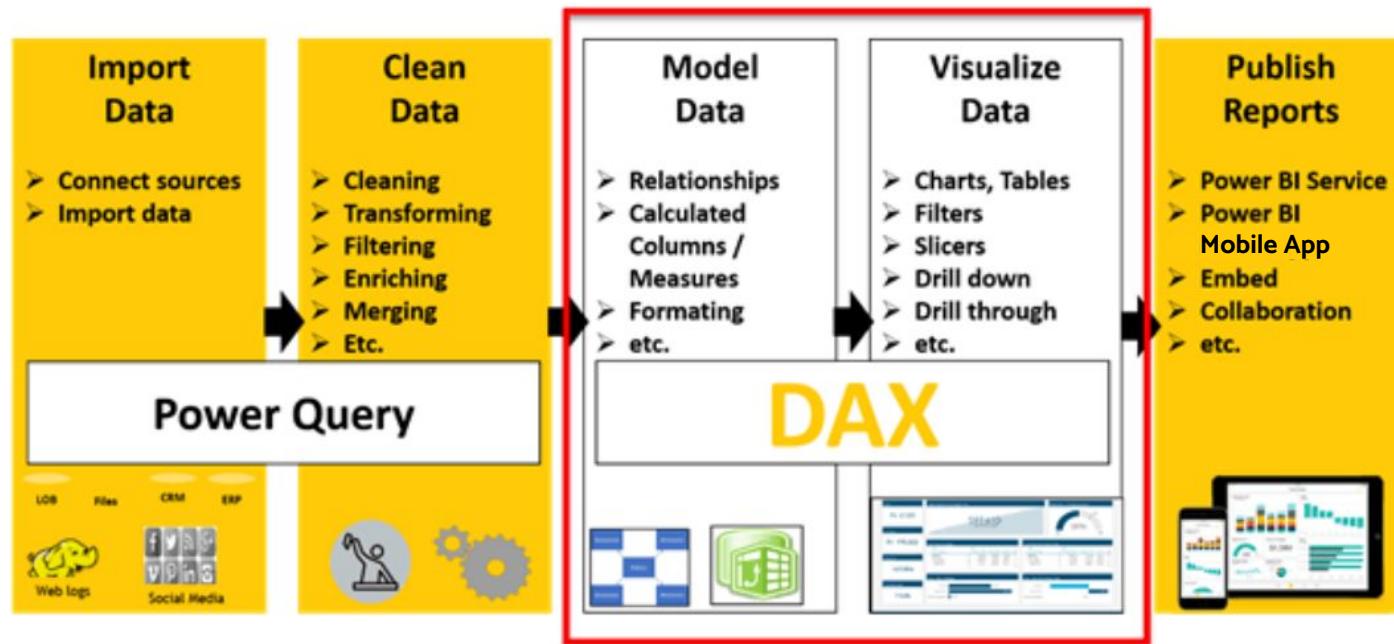
```
1 =
2     CALCULATE (
3         MAX ( Changes[new_value] ),
4         FILTER ( Changes, Changes[member_id] = EARLIER ( Changes[member_id] ) ),
5         FILTER ( Changes, Changes[change_type] = "Type" ),
6         FILTER (
7             changes,
8             Changes[start_date]
9                 = CALCULATE (
10                    MAX ( Changes[start_date] ),
11                    FILTER (
12                        CALCULATETABLE (
13                            Changes,
14                                FILTER ( Changes, Changes[member_id] = EARLIER ( Changes[member_id] ) ),
15                                FILTER ( Changes, Changes[change_type] = "Type" )
16                            ),
17                            Changes[start_date] < EARLIEST ( Changes[start_date] )
18                        )
19                    )
20                )
21            )
```

```
Sales SPLY using Var =
VAR _sales=SUM(FactInternetSales[SalesAmount])
return
CALCULATE(
    _sales,
    SAMEPERIODLASTYEAR(DimDate[FullDateAlternateKey].[Date])
)
```

DAX vs Power Query

DAX	Power Query / M
<ul style="list-style-type: none">• Used for Data Analysis	<ul style="list-style-type: none">• Used for Data Engineering - Extract Transform Load (ETL)
<ul style="list-style-type: none">• Similar to Microsoft Excel functions• Uses a collection of functions and operators	<ul style="list-style-type: none">• Uses the M programming language• Power Query is able to do data engineering without coding (M)
<ul style="list-style-type: none">• Creating measures and calculated columns	<ul style="list-style-type: none">• Download and fetch data from different sources (Data Ingestion)• Combine, clean, and model this data (Data Wrangling)

DAX or Power Query?



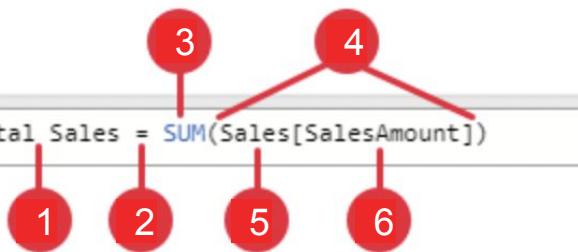
Power BI development phases

Things to remember:

- Power Query is where it all begins to bring in and clean your data.
- M is the language used in Power Query (*you don't have to use M directly, but it makes your life easier in the long run*).
- DAX is the language used once your data is in Power BI to create calculated columns and measures.
- If you *can* do it in Power Query/M, you *should* (*except when you are adding a column to a table that references a column in a different table*).
- If a calculated column or a measure will work, *use a measure*.

DAX Syntax

This formula has **6** syntax elements



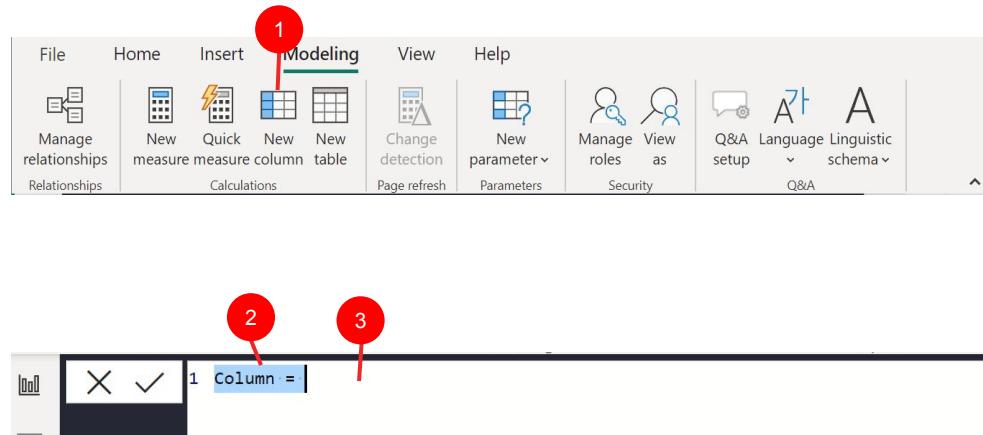
1. **The measure name**, Total Sales.
2. **The equals sign operator (=)**, which indicates the beginning of the formula. When calculated, it will return a result.
3. **The DAX function SUM**, which adds up all of the numbers in the Sales[SalesAmount] column.
4. **Parenthesis ()**, which surround an expression that contains one or more arguments. Most functions require at least one argument. An argument passes a value to a function.
5. **The referenced table, Sales**.
6. **The referenced column, [SalesAmount]**, in the Sales table. With this argument, the SUM function knows on which column to aggregate a SUM.

Measures vs Calculated Columns

	Measures	Calculated Columns
Similarities	Both uses DAX expressions	
Differences	Do not have row context	Rely only on row context
	Computed at query time	Computed based on data that has already been loaded into your data model
	Stored as source code	Stored in the model, increases data model size

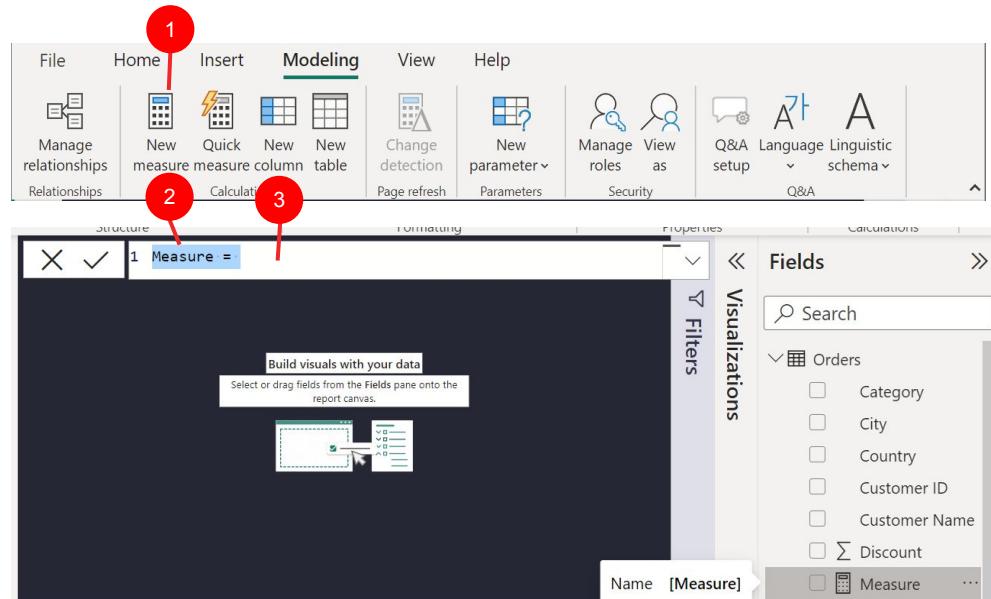
Creating Calculated Columns

1. In Report view, in the field list, right-click the desired table, and then select New column.
2. In the formula bar, replace Column by entering a new column name
3. After the equals sign, type in the function you want to use



Creating Measures

1. In Report view, in the field list, right-click the desired table, and then select New Measure.
2. In the formula bar, replace Measure by entering a new measure name
3. After the equals sign, type in the function you want to use



Returns the same value but behaves differently

Measures:

- By default, do not have a row context, the measure uses the iterator function AVERAGEX in order to create a row context.
- AVERAGEX will iterate through each row of the visual in which the measure is applied one by one and will apply the formula in that row.
- It will then aggregate all of the results at the end by adding up all of the values in each row to produce a Average Days to Ship value.

Calculated column:

- has a row context and the notion of current row, so no aggregator wrapper around the expression is needed.
- The expression is evaluated for each row of the table (Column can be seen in data view)
- For each row in the Orders table, Orders Date is subtracted from the Ship Date to produce a Days to Ship Value. These values are stored within the model in a new calculated column called Days to Ship.

Summary: Measures is usually preferred but it is still scenario dependent

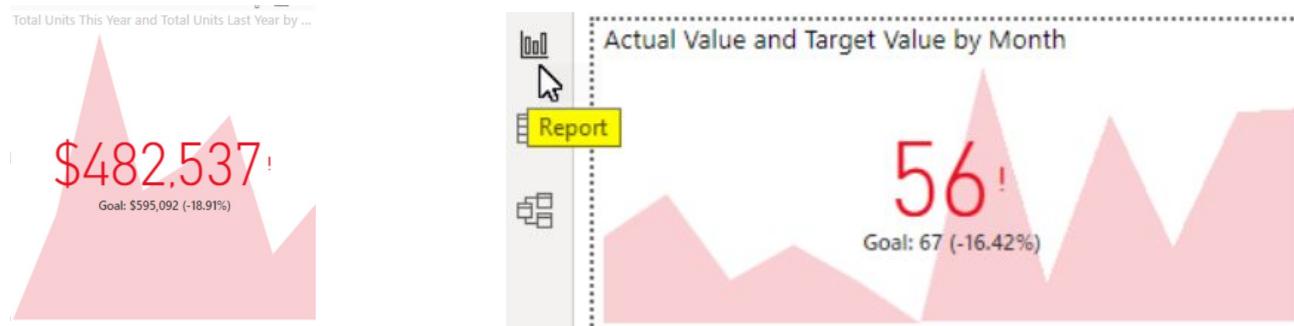
Scenarios	Use	Why
Calculations of numbers that you want to build into your report and add to visuals	Measures	<ul style="list-style-type: none">• Measures only use CPU, whereas calculated columns use space on both disk and RAM.• Thus, it is more space and memory efficient to avoid using calculated columns.• This becomes more crucial the larger the dataset.
Operate on aggregate values instead of on a row-by-row basis	Measures	<ul style="list-style-type: none">• Calculated columns cannot be used to perform this calculation as you cannot use an aggregation of calculated columns.• For example, when computing the aggregate value of a percentage.
Large and complex calculations	Calculated Column	<ul style="list-style-type: none">• Pre-compute intermediate values in a calculated column• Having the expression evaluated at data refresh using a calculated column rather than at query time using a measure may result in a better user experience.• In this case, improvements to the user experience through not having to wait for the calculation at query time may outweigh the cost of using more space in your model.
Physical structure of the calculated column is required	Calculated Column	<ul style="list-style-type: none">• For example, if you need to place the calculated results in a slicer or if you need to use the result as a filter condition, you will have to create a calculated column as you cannot filter/slice by a measure.• Another scenario where you can only use a calculated column is if you want to categorize text or numbers.

KPI Chart



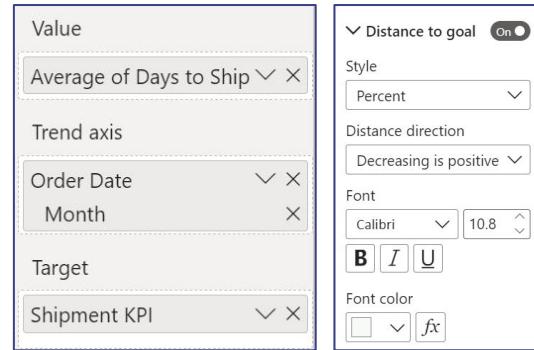
What is a KPI Chart?

- Visual cue that communicates the amount of progress made toward a measurable goal
- The KPI is to help 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*.
- Use it when you are showing an important measure value in the report, and you want to compare it with a target and see if it meets the target or not



Creating the KPI chart for Shipment

1. Selecting the KPI icon from the Visualization pane 
2. Add in the Values to be displayed and the Trend Axis and Target
3. Format the KPI by selecting the paint brush icon to open the Format visual pane
 - a. Target label - when set to On, the visual shows the value's label. Distance to goal sets the style and direction of the distance from the goal.

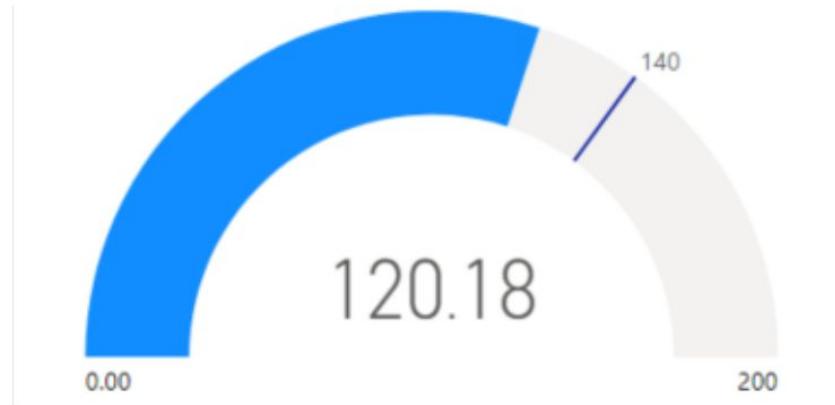
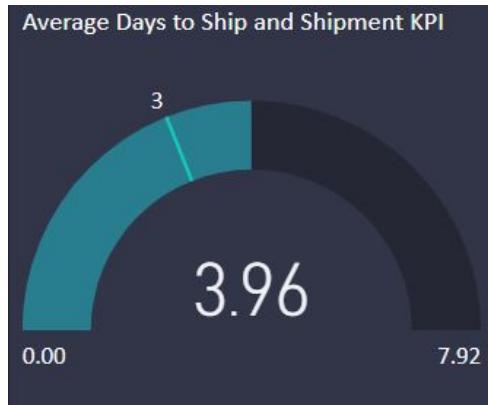


Gauge Chart



What is a Gauge Chart?

- Gauge charts are used to show progress towards a particular goal
- It can represent key performance indicators (KPIs) such as sales, revenue, manpower productivity, or profits
- You can also show the minimum and maximum value to be shown

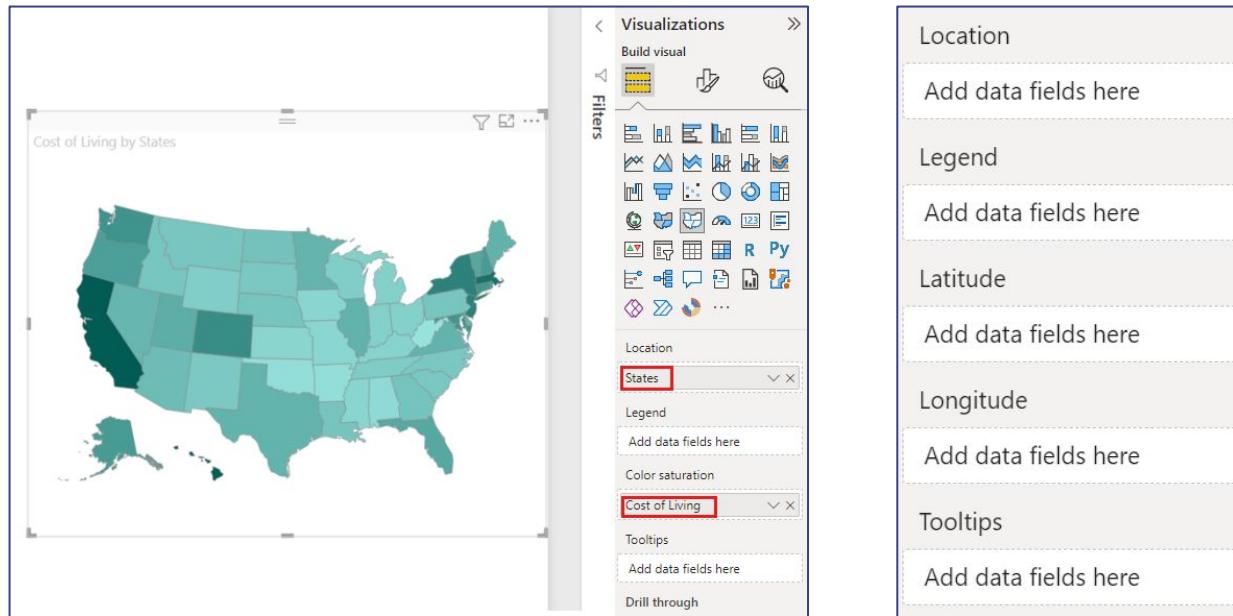


Map Chart



What is a Map Visual?

- Power BI integrates with Bing Maps to provide default map coordinates (a process called geocoding) so you can create maps



Creating a Map Visual

1. From the Data Tab, change the Data Category of State to “State or Province”
2. From the Visualisation Pane, select Map
3. From the Fields pane, select the following:
 - Location: State
 - Tooltips: Gross Profit Margin, Sum of Sales

The screenshot shows the Power BI Data Tab with a table containing four columns: Country, State, County, and City. The 'State' column is selected, and its 'Data category' is set to 'Uncategorized'. A red box highlights this setting.

The screenshot shows the Power BI Fields pane for a map visual. Under 'Location', 'State' is selected. Under 'ToolTips', 'Sum of Sales' is selected.





Tables and Matrix

What is a Table Visual?

- A grid that contains related data in a logical series of rows and columns. It may also contain headers and a row for totals.
- When to use?
 - To see and compare detailed data and exact values (instead of visual representations).
 - To display data in a tabular format.
 - To display numerical data by categories.

Region	State	Category	Sum of Sales	Gross Profit Margin	Count of Items
Central	Illinois	Furniture	28,274.52	-32.10%	
Central	Illinois	Office Supplies	19,907.91	-41.96%	
Central	Illinois	Technology	31,983.67	15.08%	
Central	Indiana	Furniture	11,496.71	18.97%	
Central	Indiana	Office Supplies	15,735.40	33.05%	
Central	Indiana	Technology	26,323.25	41.79%	
Grand Total:			2,297,200.86	12.47%	
Total					

What is a Matrix Visual?

- Matrix visual is similar to a table
- A matrix makes it easier to display data meaningfully across multiple dimensions -- it supports a stepped layout
- The matrix automatically aggregates the data and enables you to drill up/down
- You can also expand and collapse row headers

Area	Region	Total Sales	Gross Margin	Sales YoY Growth	Total Transactions
West	New Mexico	250,128.37	17.51%	33.42%	538
	Washington	2,818.56	29.36%	▲ 4298.50%	10
	Arizona	65,539.90	26.33%	▲ 230.77%	96
	Utah	11,133.54	-11.46%	▲ 78.36%	32
	California	2,460.64	19.39%	▲ 35.02%	7
	Idaho	146,388.34	20.06%	▲ 11.28%	344
	Montana	1,233.55	16.13%	▲ 4.23%	4
	Colorado	4,229.28	34.66%	★	2
	Oregon	10,299.81	-43.07%	▼ -3.44%	24
	Nevada	2,886.59	-13.06%	▼ -47.04%	15
	Wyoming	3,138.16	9.73%	▼ -65.44%	4
South	Tennessee	122,905.86	7.20%	▲ 31.30%	273
	Total	733,215.26	12.74%	▲ 20.36%	1687

Creating a Matrix Visual

- From the Visualisation Pane, select Matrix
- From the Fields pane, select the following:
 - Rows: Region, State, Category
 - Values: Sum of Sales, Gross Profit Margin, Count of Order ID (rename to No. of Transactions)
- ** Multiple rows allow you to drill down the data

Region	Sum of Sales	Gross Profit Margin	No. of Transactions
West	725,457.82	14.94%	1611
East	678,781.24	13.48%	1401
Central	501,239.89	7.92%	1175
South	391,721.91	11.93%	822
Total	2,297,200.86	12.47%	5009



State	Sum of Sales	Gross Profit Margin	No. of Transactions
California	457,687.63	16.69%	1021
New York	310,876.27	23.82%	562
Texas	170,188.05	-15.12%	487
Pennsylvania	116,511.91	-13.35%	288
Illinois	80,166.10	-15.73%	276
Washington	138,641.27	24.09%	256
Ohio	78,258.14	-21.69%	236
Total	2,297,200.86	12.47%	5009



Category	Sum of Sales	Gross Profit Margin	No. of Transactions
Office Supplies	719,047.03	17.04%	3742
Furniture	741,999.80	2.49%	1764
Technology	836,154.03	17.40%	1544
Total	2,297,200.86	12.47%	5009

Conditional Formatting

- Specify customized cell colors, including color gradients, based on field values
- Select Conditional formatting, and then select the type of formatting to apply
- Conditional formatting can be applied to any text or data field, as long as you base the formatting on a field that has numeric, color name or hex code, or web URL values.

TABLE: Top 10 weather states with afford				
State	Affordability	Weather	Overall rank	
Hawaii	◆	45	1	10
Florida	▲	25	2	5
Louisiana	▲	29	3	36
Texas	▲	24	4	17
Georgia	▲	19	5	28
Mississippi	●	6	6	19
Alabama	●	10	7	16
South Carolina	▲	27	8	41
Arkansas	●	4	9	11
Arizona	◆	33	10	38

Format Gross Profit Margin (Icons)

- Select Gross Profit Margin → Conditional Formatting → Icons
- Apply the following settings

Icons - Gross Profit Margin

Format style Apply to

Rules Values only

What field should we base this on?

Gross Profit Margin

Icon layout Icon alignment

Left of data Top Style: ▼ — ▲

Rules

If value \geq -1 and < 0 then ▼

If value \geq 0 and < 0.1 then □

If value \geq 0.1 and \leq 1 then ▲

Reverse icon order + New rule

Learn more about conditional formatting OK Cancel

Region	Sum of Sales	Gross Profit Margin	No. of Transactions
West	725,457.82	14.94%	1611
California	457,687.63	16.69%	1021
Washington	138,641.27	24.09%	256
Arizona	35,282.00	-9.72%	108
Colorado	32,108.12	-20.33%	79
Oregon	17,431.15	-6.83%	56
Utah	11,220.06	22.70%	26
Total	2,297,200.86	12.47%	5009

Summary

- **Data Modelling with DAX**
 - Measures
 - Calculated Columns
 - Measures vs Calculated Columns
- **Creating Charts**
 - KPI, Map, Table, Matrix
 - Additional Charts
- **Modifying Chart Visuals**
 - Conditional Formatting

Microsoft

POWER BI

Lesson 4





Buttons and Navigation

Types of Buttons

Page Navigation

Page navigation buttons take you to a different page in the same report.

Bookmark

The bookmark button takes you to the location and settings as defined for that bookmark.

Back

A back button may have an arrow icon and when you select it, Power BI takes you back to the previous page. Back buttons are often used with drillthrough.

Drillthrough

Drilling through takes you to a different report page and the data on that destination page is presented according to the filters and selections you've made on the source page.

Q&A

Selecting a Q&A button opens the Power BI Q&A Explorer window. The Q&A window displays on top of the report page and can be closed by selecting the X.

Web URL

Web URL buttons open a new browser window. Since the page opens in a separate window, close the window or select your Power BI tab to return to the Power BI report.

Navigation Bar

These links allow users to move through different pages or screens easily

Page Navigation

Sales by Product

Product	Sales
Paseo	32M
VTT	21M
Velo	19M
Amarilla	18M
Montana	15M
Carretera	13M

Profit by Product

Product	Profit
Paseo	5M
VTT	3M
Amarilla	2.5M
Velo	2.2M
Montana	1.8M
Carretera	1.5M

Units Sold by Product

Product	Units Sold
Paseo	35.61M
VTT	21.97M
Velo	19.83M
Amarilla	19.04M
Montana	16.55M
Carretera	14.94M

Gross Sales by Product

Product	Gross Sales
Paseo	35.61M
VTT	21.97M
Velo	19.83M
Amarilla	19.04M
Montana	16.55M
Carretera	14.94M

Page Navigation Buttons:

- First Page
- Second Page
- Third Page
- Fourth Page
- Fifth Page
- Sixth Page
- Seventh Page
- Eight Page
- + (New Page)

Button Demo - Page Navigation

Objective: Create a button that links to the other pages

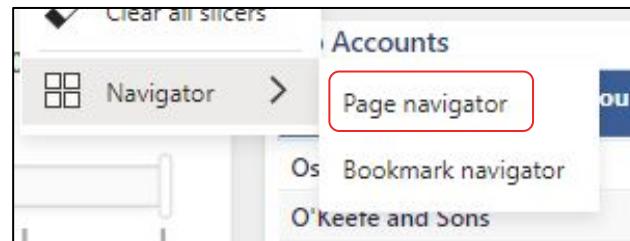
1. Insert ribbon, select Buttons
2. Customize a button (Shape, style, rotation)
3. Select the action for a button (Page Navigation, Destination)



Button Demo - Page Navigation

For page navigation you can also just use the Page Navigator Option but it will not allow you to customize the look of your navigator

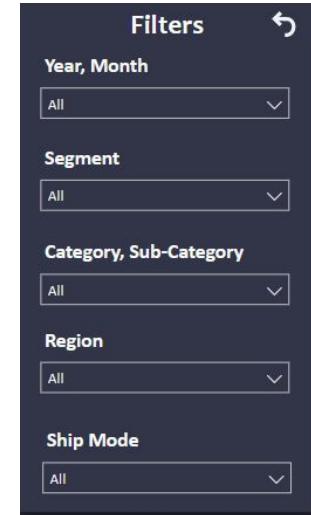
1. Insert ribbon, select Buttons
2. Select Navigator
3. Select Page Navigation



Button/Bookmarks - Clear Filters

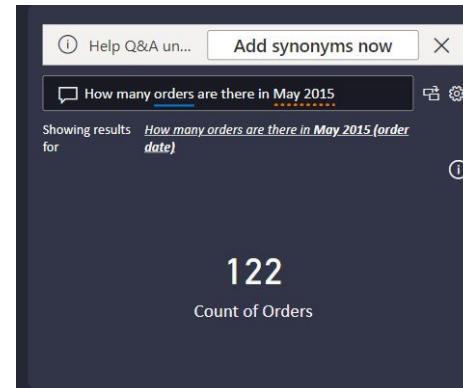
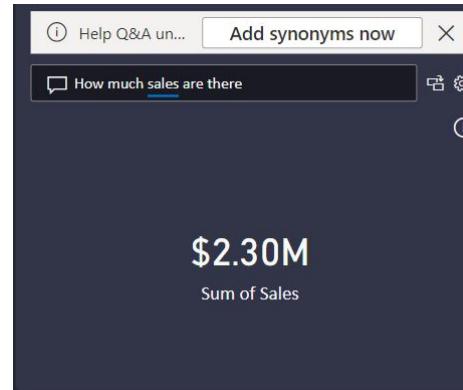
Allows user to reset the filter selected

1. Add a button for reset
2. Go to View -> Bookmarks → Add (Ensure that the page has no set filters)
3. Rename the bookmark to “Clear Filters”
4. Link the “Clear Filters” Bookmark to the Action of the reset button
5. You need to create 1 Bookmark for each page



Q&A

- 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, and in which dataset, to find the answer.
- Q&A also helps you form your question with auto-completion, restatement, and other textual and visual aids.



Web URL

File Home Help External Tools Table tools **Column tools**

Name Website
Data type Text

Format Text
Summarization Don't summarize
Data category Web URL

Structure Formatting Uncategorized

Sort by column
Data groups
Manage relationships

State	Overall rank	Affordability	Weather	Abbreviation	Color	Affor
Alabama	16	10	7	AL	Red	#a50
Arizona	38	33	10	AZ	Red	#b20
Arkansas	11	4	9	AR	Red	#a50
California	43	49	13	CA	Blue	#b20
Colorado	33	36	37	CO	Blue	#b20
Connecticut	30	46	29	CT	Blue	#b20
Delaware	32	30	16	DE	Yellow	#b20
Florida	5	25	2	FL	Pink	#ffc0
Georgia	28	19	5	GA	Gray	#ffc0
Hawaii	10	45	1	HI	Fuchsia	#b20
Illinois	47	40	23	IL	Orange	#b20
Indiana	29	3	25	IN	Orange	#a50
Iowa	2	8	34	IA	Orange	#a50
Kansas	7	7	20	KS	Brown	#a50
Kentucky	6	9	15	KY	Brown	#a50
Louisiana	36	29	3	LA	Violet	#b20

Address
Place
City
County
State or Province
Postal code
Country
Continent
Latitude
Longitude
Image URL
Barcode

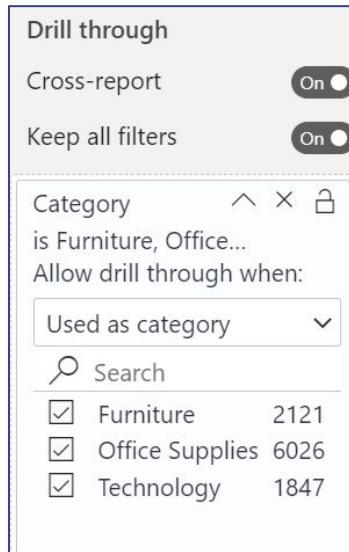
Website //en.wikipedia.org/wiki/alabama
//en.wikipedia.org/wiki/arizona
//en.wikipedia.org/wiki/arkansas
//en.wikipedia.org/wiki/california
//en.wikipedia.org/wiki/colorado
//en.wikipedia.org/wiki/connecticut
//en.wikipedia.org/wiki/delaware
//en.wikipedia.org/wiki/florida
//en.wikipedia.org/wiki/georgia
//en.wikipedia.org/wiki/hawaii
//en.wikipedia.org/wiki/illinois
//en.wikipedia.org/wiki/indiana
//en.wikipedia.org/wiki/iowa
//en.wikipedia.org/wiki/kansas
//en.wikipedia.org/wiki/kentucky
//en.wikipedia.org/wiki/louisiana
//en.wikipedia.org/wiki/maryland

State	Website
Alabama	https://en.wikipedia.org/wiki/alabama
Arizona	https://en.wikipedia.org/wiki/arizona
Arkansas	https://en.wikipedia.org/wiki/arkansas
California	https://en.wikipedia.org/wiki/california
Colorado	https://en.wikipedia.org/wiki/colorado
Connecticut	https://en.wikipedia.org/wiki/connecticut
Delaware	https://en.wikipedia.org/wiki/delaware
Florida	https://en.wikipedia.org/wiki/florida
Georgia	https://en.wikipedia.org/wiki/georgia
Hawaii	https://en.wikipedia.org/wiki/hawaii
Illinois	https://en.wikipedia.org/wiki/illinois
Indiana	https://en.wikipedia.org/wiki/indiana
Iowa	https://en.wikipedia.org/wiki/iowa
Kansas	https://en.wikipedia.org/wiki/kansas
Kentucky	https://en.wikipedia.org/wiki/kentucky
Louisiana	https://en.wikipedia.org/wiki/louisiana
Maryland	https://en.wikipedia.org/wiki/maryland

CLICK ME!!

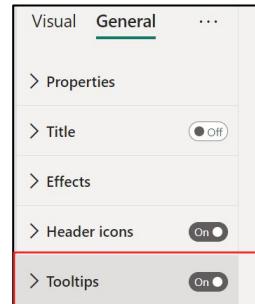
Drillthrough

- Create a destination target page in your report that focuses on a specific entity (i.e. category, product etc)
- Allows user to right-click a data point in other source report pages, they drill through to the target page to get details that are filtered to that context



Toolips

- Provide additional information and context when hovering over or clicking on a visual element
- Tooltips can be a powerful way to enhance the user experience and deliver more insights without cluttering the main view
- Create a tooltip page → Click on the visualisation → enable Tooltips



Order ID	Order Date	Customer ID	Customer Name	City	Total Sales	No. of Items	Returned
Order ID: CA-2015-128055							
CA-2015-128055	31/03/2015	AA-10315					
CA-2015-138100	15/09/2015	AA-10315					
CA-2016-121391	04/10/2016	AA-10315					
CA-2017-103982	03/03/2017	AA-10315					
CA-2018-147039	29/06/2018	AA-10315					
Total							
Product ID	Product Name	Total Sales					
OFF-AP-10002765	Fellowes Advanced Computer Series Surge Protectors	\$52.98					
OFF-BI-10004390	GBC DocuBind 200 Manual Binding Machine	\$673.57					
Total		\$726.55					

Order ID: CA-2015-100006		
Product ID	Product Name	Total Sales
FUR-BO-10000112	Bush Birmingham Collection Bookcase, Dark Cherry	\$825.17
FUR-BO-10000330	Sauder Camden County Barrister Bookcase, Planked Cherry Finish	\$1,064.62
FUR-BO-10000362	Sauder Inglewood Library Bookcases	\$2,154.35
FUR-BO-10000468	O'Sullivan 2-Shelf Heavy-Duty Bookcases	\$723.84
FUR-BO-10000711	Hon Metal Bookcases, Gray	\$851.76
Total		\$2,297,200.86



Dashboard Types and Insights

Types of Dashboards

1. **Operational dashboards** tell you what is happening now
 - o monitoring and managing operations that have a shorter time horizon
2. **Strategic dashboards** track key performance indicators.
 - o monitoring the long-term company strategy
3. **Analytical dashboards** process data to identify trends
 - o contains a vast amount of data created and used by analysts to provide support to executives

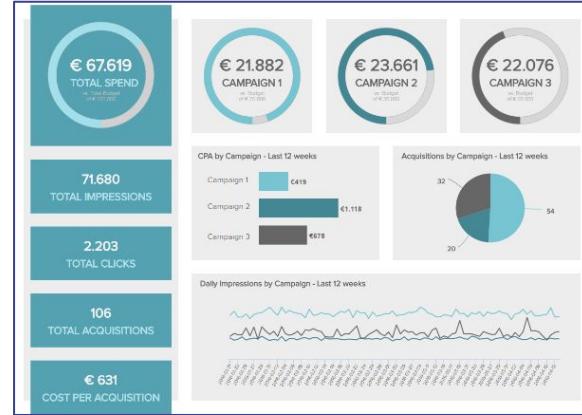


Chart Insights

Here are some questions you may consider:

- What is the purpose of the chart?
- What insight does it give?
- Does my chart contribute in telling the story to the audience?



Publish Dashboard

Publish Dashboard

- In Power BI Desktop, choose File → Publish → Publish to Power BI or select Publish on the Home ribbon.
- Sign in to Power BI
- Select Destination → My workspace



Summary

- **Buttons and Navigation**
 - Page Navigation
 - Navigation Bar
 - Bookmark
 - Drillthrough
 - Back
 - Tooltips
- **Dashboard Types**
- **Chart Insights**
- **Reorganizing Dashboards**
- **Publishing Dashboards**