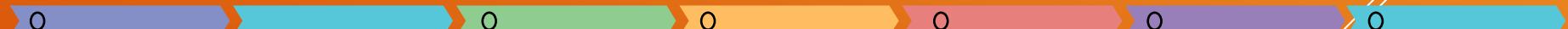


# Business Analytics



SATYAJIT PATTNAIK

# Agenda

- ❑ What is Power BI?
- ❑ Components
- ❑ Architecture
- ❑ Product Portfolio
- ❑ Life Hack: Small guide to install Pro
- ❑ Desktop Features: Get, Analyze, Visualize, Publish
- ❑ Power BI Services
- ❑ Integration with various Apps
- ❑ Power Query Editor: The heart of Power BI
- ❑ Understanding on DAX
- ❑ Live connectivity & datasources
- ❑ On-premises data gateway
- ❑ Dashboard Implementation



# Power BI



Power BI is **business analytics solution** that lets you visualize the data and share the insights to the concern stakeholders and the business owners.

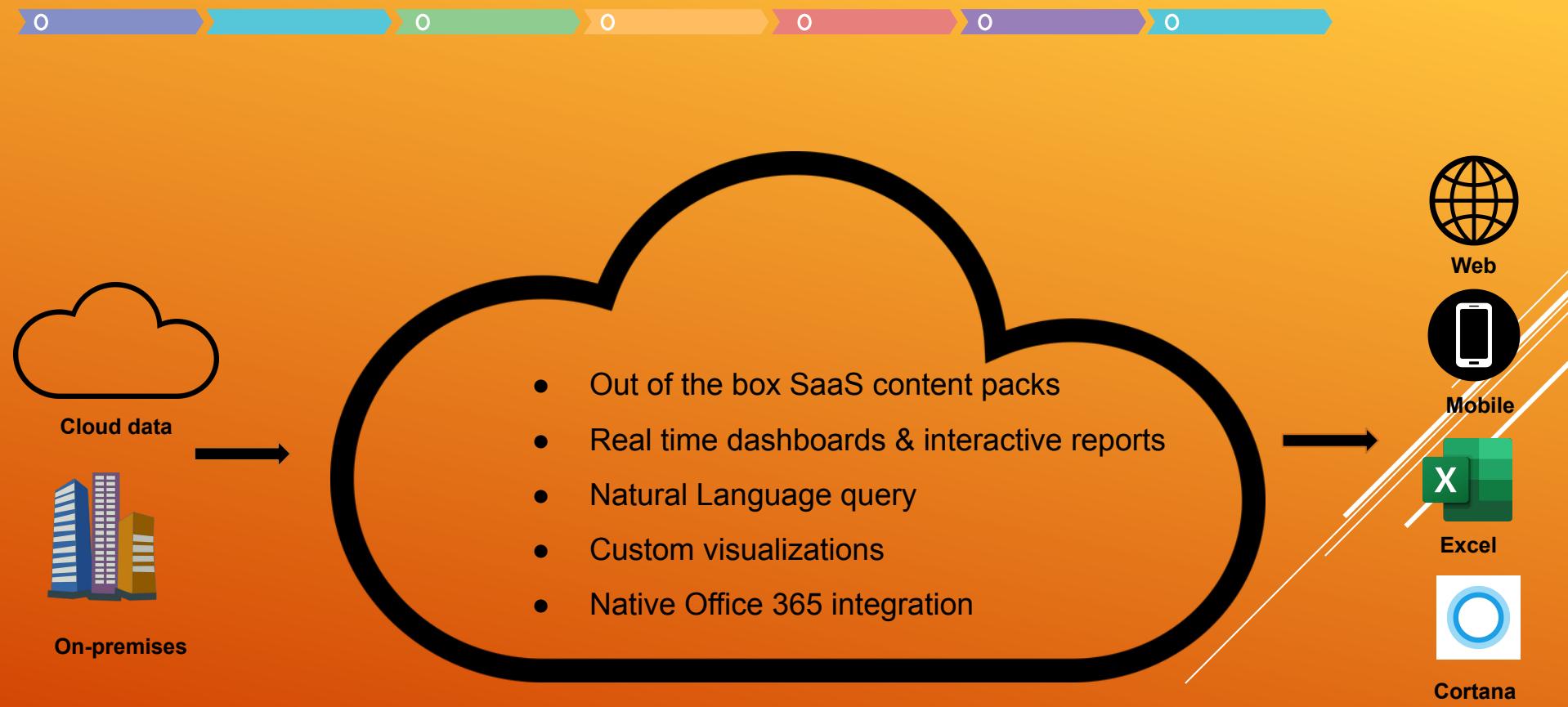
## Power BI Components:

- Power BI Desktop
- Power BI service (*SaaS –Software as a Service*)
- Power BI Mobile Apps

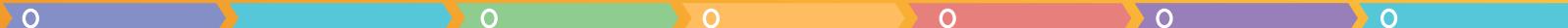


Power BI begins by connecting to data sources and building a report in Power BI Desktop. You then publish that report from **Power BI Desktop** to the Power BI service, and share it so end users in the **Power BI Service** and **Mobile Devices** can view and interact with the report. This workflow is common and shows how the three main Power BI elements complement one another.

# Power BI Architecture



# Power BI Product Portfolio



Author



**Power BI  
Desktop**

Share & Collaborate



**Power BI  
Service**

Large scale deployments



**Power BI  
Premium**

Share & Collaborate



**Power BI  
Report Server**

App dev



**Power BI  
Embedded**

Free data analysis  
and reporting  
authoring tool

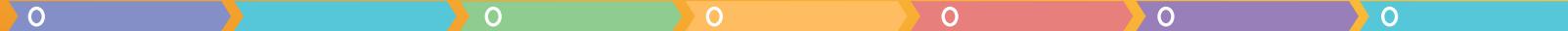
Cloud based modern  
business analytics  
solution

Dedicated capacity  
for increased  
performance

On-premises report  
server

Visual analytics  
embedded in your  
applications

# Power BI Pro - Life Hack



**Download Power BI Desktop :**

<https://powerbi.microsoft.com/en-us/downloads/>



How to sign up for Power BI without a work email

**Incognito:**

Log in to office.com → Enterprise → Plans & Pricing

→ E3 or E5 account

**Try for free**

# Power BI Desktop



## Get Data

Easily connect, clean, and mashup data



## Analyze

Build powerful models and flexible measures



## Visualize

Create stunning interactive reports



## Publish

Share insights with others



## Collaborate

Empower your organization with self-service analytics



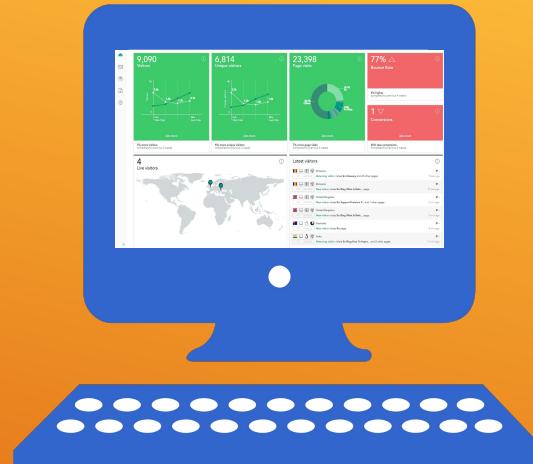
# Power BI Desktop



## Get Data

Easily connect, clean, and mashup data

1. Connect to 80+ data sources, both on-premises and cloud
2. Shape, transform, and clean data for analysis
3. Live connectivity to on-premises and cloud data sources
4. Extend with custom data connectors for any data source
5. Prep your data using the familiar Power Query experience on the web
6. Get started quickly with a common data model
7. Extend self-service prep to Azure Data Lake Storage



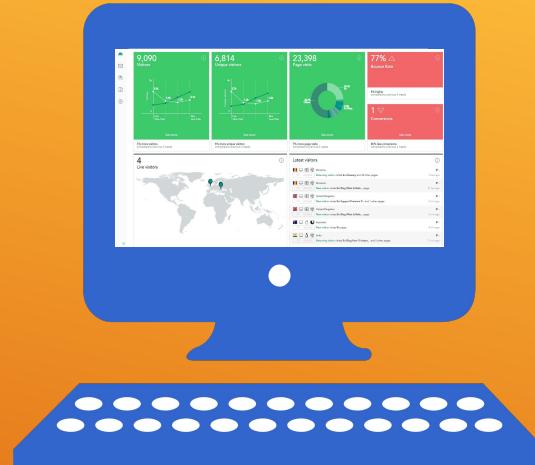
# Power BI Desktop



## Analyze

Build powerful models and flexible measures

1. Automatically created model when connecting to data
2. High performance, in-memory engine
3. Point and click analysis with Quick measures, clustering & binning
4. Create powerful measures with familiar DAX (Data Analysis Expressions) formulas



# Power BI Desktop



## Visualize

Create stunning interactive reports

1. Author reports using 150+ visuals via a drag-drop canvas
2. Explore data across multiple interactive visualizations
3. Provide insights in the context of the business with Customer Visuals
4. Visualize data story with bookmarks and customer navigation



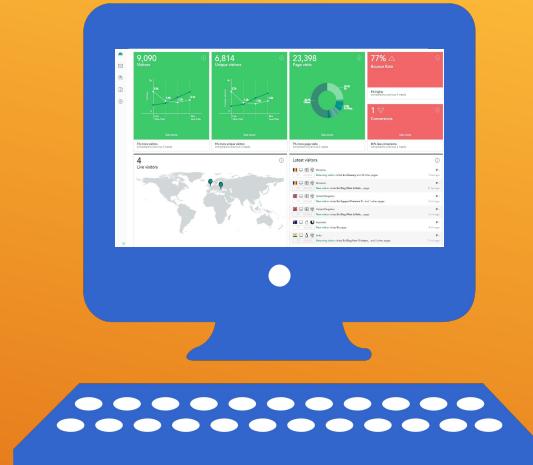
# Power BI Desktop



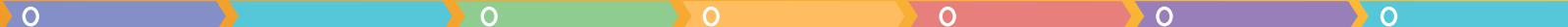
## Publish

Share insights with others

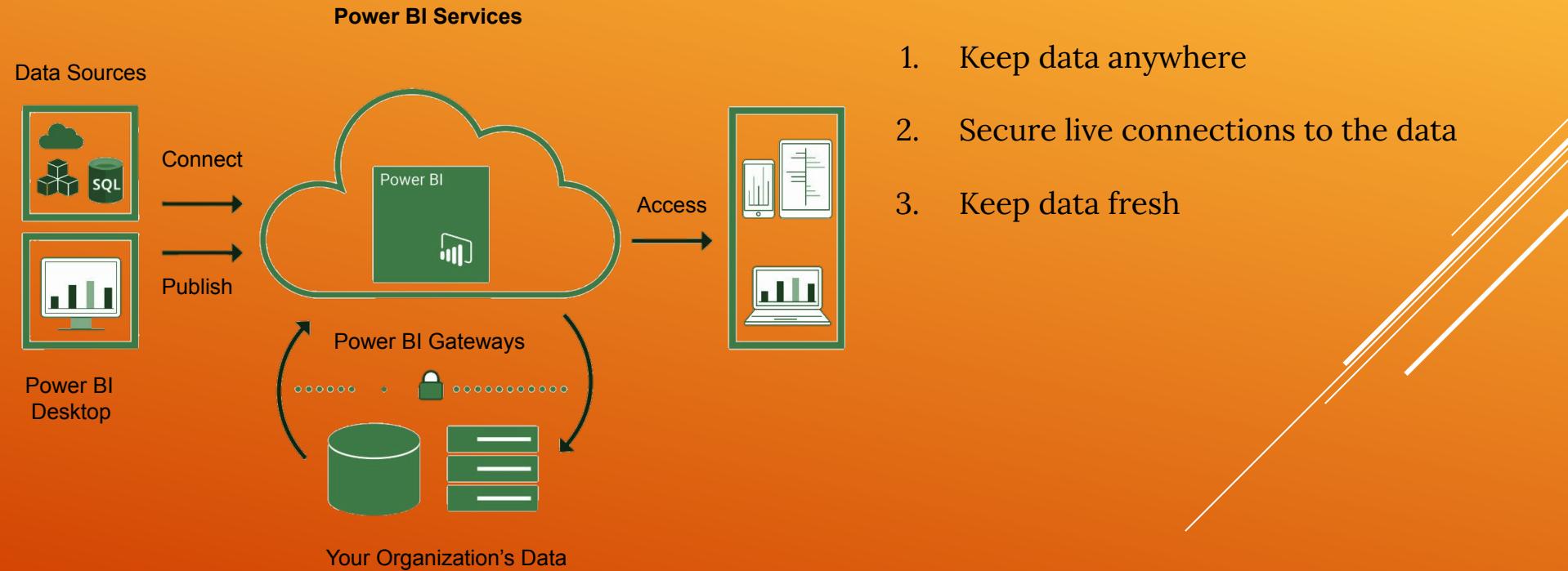
1. Publish directly to the cloud or on-premises
2. Automatic data refresh, so the reports are always up to date
3. Package your reports in apps for easy consumption and control
4. Manage analytics content with admin and governance tools



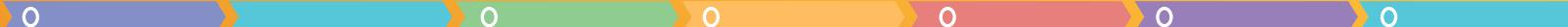
# Power BI Services



**Secure, live connection to the data sources  
on-premises and in the cloud**



# Integration with Power BI



**Deliver insights through other services**

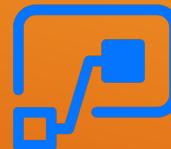
1. Collaborate and share insights with teams

in your organization using existing  
services.



2. Fully interactive reports integrated into the

service



# Excel & Power BI



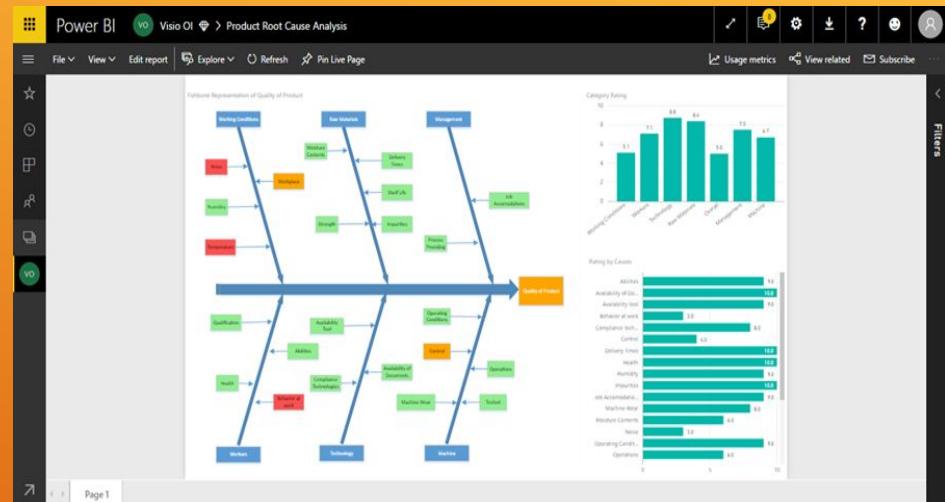
Easily aggregate objects from multiple Excel files on the same dashboard in Power BI

Analyze in Excel

Use Excel to view and interact  
with a dataset you have in Power BI

Import Excel data into Power BI

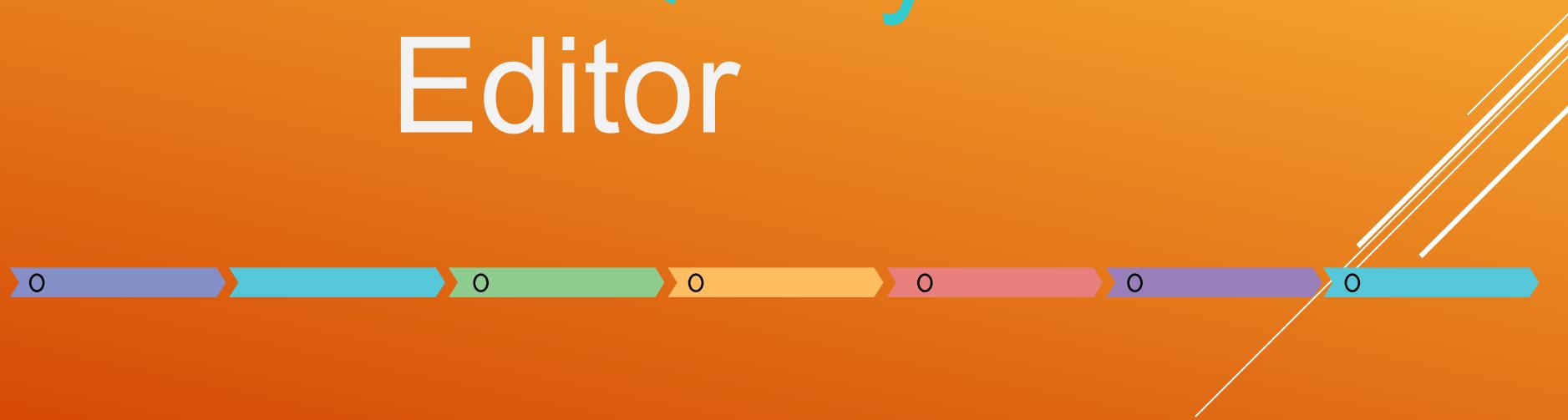
Connect to the data in your workbook so you can  
create Power BI report and dashboards



Upload your Excel file to Power BI

Bring your Excel file into Power BI to view and  
interact with it just as you would in Excel Online.  
Pin ranges to Dashboards

# Power Query Editor





## User Experience

The Power Query editor represents the Power Query user interface, where you can add or modify queries, manage queries by grouping or adding descriptions

to query steps, or visualize your queries and their structure with different views.

The Power Query user interface has five distinct components.

The screenshot shows the Power Query - Edit queries window with the following numbered components:

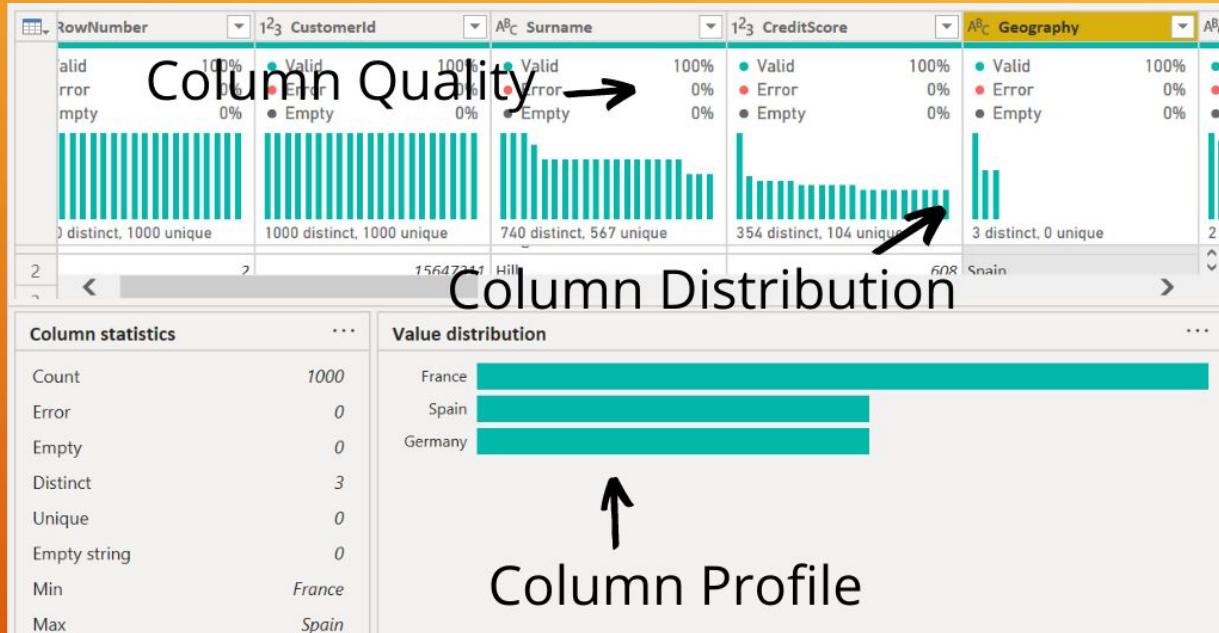
- 1**: The ribbon menu bar at the top, which includes Home, Transform, Add column, View, Help, and various query management and transformation tools.
- 2**: The Queries [1] pane on the left, which lists the current query named "Customers" and provides a search bar.
- 3**: The main data grid area displaying a table of customer data with columns like CustomerID, CompanyName, ContactName, ContactTitle, Address, City, Region, and Country.
- 4**: The Query settings pane on the right, which includes sections for Properties (set to "Customers"), Entity type (set to "Custom"), Applied steps, and a Source section.
- 5**: The status bar at the bottom of the window.

CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region	Country
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	Sales Representative	Matsäderos 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	Berguvsgatan 8	Luleå	null
6	BLAUS	Blauer See Delikatessen	Hanna Moos	Sales Representative	Forsterstr. 57	Mannheim	null
7	BLONP	Blondesdís Íþrði og flíði	Frédérique Citeaux	Marketing Manager	24, place Kléber	Strasbourg	null
8	BOLID	Bólido Comidas preparadas	Martin Sommer	Owner	C/ Aragó, 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 Móvil	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 Lusíadas, 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	Waisenweg 21	Aachen	null
18	DUMON	Du monde entier	Janine Labrune	Owner	67, rue des Cinquante Otages	Nantes	null
19							

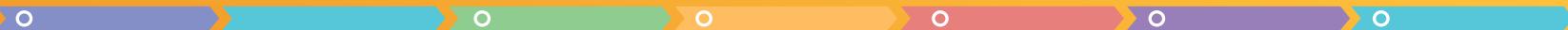
# Data Profiling Tools

The data profiling tools provide new and intuitive ways to clean, transform, and understand data in Power Query Editor. They include:

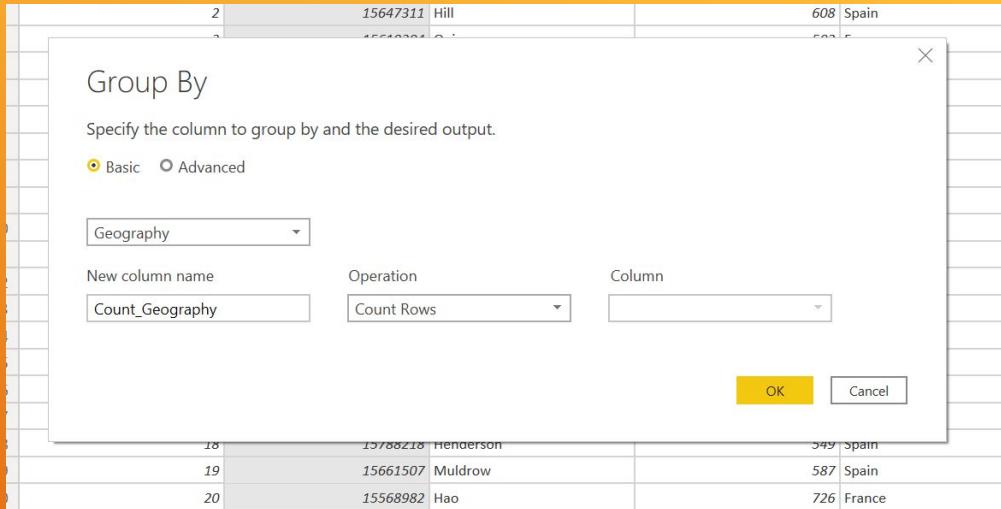
- Column quality
- Column distribution
- Column profile



# Group By Dialog



In the Group by dialog, set the Group by operation to group by the Geography and count the number of supplier rows per Geography.



	A <sup>B</sup> C Geography	1 <sup>2</sup> 3 Count_Geography
1	France	5014
2	Spain	2477
3	Germany	2509

# Applied Steps



Any steps performed in Power BI is logged under the Applied Steps, which can be deleted or added anytime during the process

APPLIED STEPS

Source	⚙️
Promoted Headers	⚙️
Changed Type	⚙️
Replaced Value	⚙️
Replaced Value1	⚙️
X Replaced Value2	⚙️

# Appending vs Merging



When you have one or more columns that you'd like to add to another query, you merge the queries. When you have additional rows of data that you'd like to add to an existing query, you append the query.

Merge

Select a table and matching columns to create a merged table.

Salary

Customer_ID	Salary
15634602	10000
15701354	20000
15767821	30000
15600882	40000

Churn\_Modelling

RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance
1	15634602	Hargrave	619	France	Female	42	2	0
2	15647311	Hill	608	Spain	Female	41	1	83807.86
3	15619304	Onio	502	France	Female	42	8	159660.8
4	15701354	Boni	699	France	Female	39	1	0

Join Kind

Inner (only matching rows)

Use fuzzy matching to perform the merge

▷ Fuzzy matching options

✓ The selection matches 4 of 4 rows from the first table, and 4 of 10000 row...

OK Cancel

# Welcome to DAX



# Power BI - DAX



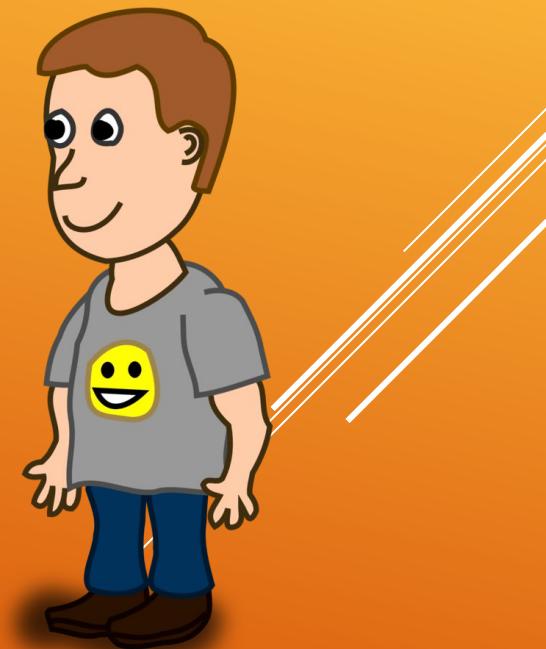
**In order to say that you know DAX, you need:**

**You need to know these functions**

SUM, AVERAGE, MIN, MAX, COUNT, COUNTROWS,  
CALCULATE, FILTER etc.

**Contexts:** Row Context & Filter Context

**Other things:** Formatting, Best practices, X vs non X  
functions, Time Intelligence Functions



# First DAX Expression



- DAX: Data Analysis Expression
- Two business logics:  
Measures & Calculated Columns
- As per google, Measures and calculated columns both use DAX expressions. The difference is the context of evaluation. A measure is evaluated in the context of the cell evaluated in a report or in a DAX query, whereas a calculated column is computed at the row level within the table it belongs to.

# Calculated Columns



- Represents a single value per row
- Computed at compile time
- Results are dynamic, based on filters
- This is called the row context

Tenure\_Months := Churn[Tenure]\*12

# Measures



- Represents a single value per data model
- Computed at run time
- Results are dynamic, based on filters
- This is called the filter context
- Not attached to any specific table

TotalQuantity := SUM(Sales[Quantity])

# Implicit Measures



- If we use a calculated column as a value/result, it creates an implicit measure.
- For example:
- If we have columns such as Tenure in years, Monthly average usage, and let say we want to create the overall average usage for that particular customer.
- $\text{Churn}[\text{Tenure\_Months}] = \text{Churn}[\text{Tenure}] * 12$
- Total usage for that customer will be,
- $\text{Churn}[\text{Total Usage}] = \text{Churn}[\text{Tenure\_Months}] * \text{Churn}[\text{Monthly\_Average\_Usage}]$
- Which means, a change in the primitive column i.e. tenure, will impact the change in the Total Usage column



# DAX is good at two things



- Aggregations
- Filtering

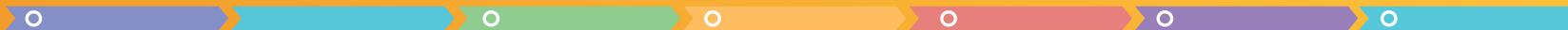
## Aggregations:

Agg is combining a group of values into one value.

## Examples:

- Sum
- Average
- Min
- Max
- Distinctcount

# Power BI



Let's do a **SUM(Column)**

How to check whether it's correct?

If you are using **select  
SUM(quantity) from tablename;**

# Power BI



## DAX Breakdown

### DAX Expression Breakdown

Built in DAX formula



Total Sales = SUM('Sales OrderDetails'[Order Line Total])



Name the measure.

You'll use  
that in the  
visualization



Equals sign separates  
expression name from  
expression formula



Table name



Column name

# Power BI



**Easy Peasy**

- **SUM**
- **AVERAGE**
- **MIN**
- **MAX**
- **COUNT**
- **COUNTROWS**
- **DATEDIFF**
- **DATEADD**

# Power BI

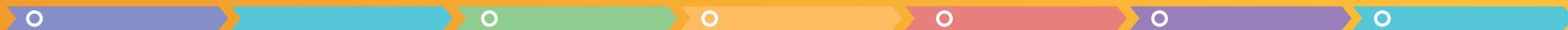


## AVERAGE & DATEDIFF

Probation Period = DATEDIFF(column1,  
column2, DAY)

Average = AVERAGE(column)

# Power BI



## Calculated Table

Dates = CALENDAR(range)

- Creates a dates table with a date per day between the specified range
- Also creates a Date Hierarchy

# Power BI



## Now on to Contexts!!

Two different contexts:

- Row context
- Filter context

# Power BI



We already know how it works!

We've been using it for all our calculated columns so far, let's revisit our first DAX

Tenure in Years = ROUND(Churn\_Modelling[Tenure]/12,2)

- Notice we expect a value per row in a table
- This runs at import and gets stored
- Might increase file size

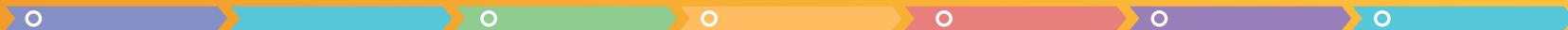
# Power BI



## Filter Context

Easy to show with measures

# Power BI



## CALCULATE: Breaking out of the filter context

```
Total Sales - Beverages = CALCULATE  
(  
    sum('Sales OrderDetails'[Order Line Total])  
    , 'Production Categories'[categoryname] = "Beverages"  
)
```

Year	Total Sales	Total Sales - Beverages
2006	\$2,26,298.5	\$53,879.2
2007	\$6,58,388.75	\$1,10,424
2008	\$4,69,771.34	\$1,22,223.75
<b>Total</b>	<b>\$13,54,458.59</b>	<b>\$2,86,526.95</b>

Year	categoryname	Meat/Poultry		Produce		Seafood		Total		
		Sales	Total Sales - Beverages	Total Sales	Total Sales - Beverages	Total Sales	Total Sales - Beverages	Total Sales	Total Sales - Beverages	Total Sales - Beverages
2006	Meat/Poultry	0,292.2	\$53,879.2	\$15,134.2	\$53,879.2	\$21,589.6	\$53,879.2	\$2,26,298.5	\$53,879.2	\$53,879.2
2007	Produce	621.03	\$1,10,424	\$57,718.55	\$1,10,424	\$71,320.65	\$1,10,424	\$6,58,388.75	\$1,10,424	\$1,10,424
2008	Seafood	275.57	\$1,22,223.75	\$32,415.85	\$1,22,223.75	\$48,712.84	\$1,22,223.75	\$4,69,771.34	\$1,22,223.75	\$1,22,223.75
<b>Total</b>		<b>,188.8</b>	<b>\$2,86,526.95</b>	<b>\$1,05,268.6</b>	<b>\$2,86,526.95</b>	<b>\$1,41,623.09</b>	<b>\$2,86,526.95</b>	<b>\$13,54,458.59</b>	<b>\$2,86,526.95</b>	<b>\$2,86,526.95</b>

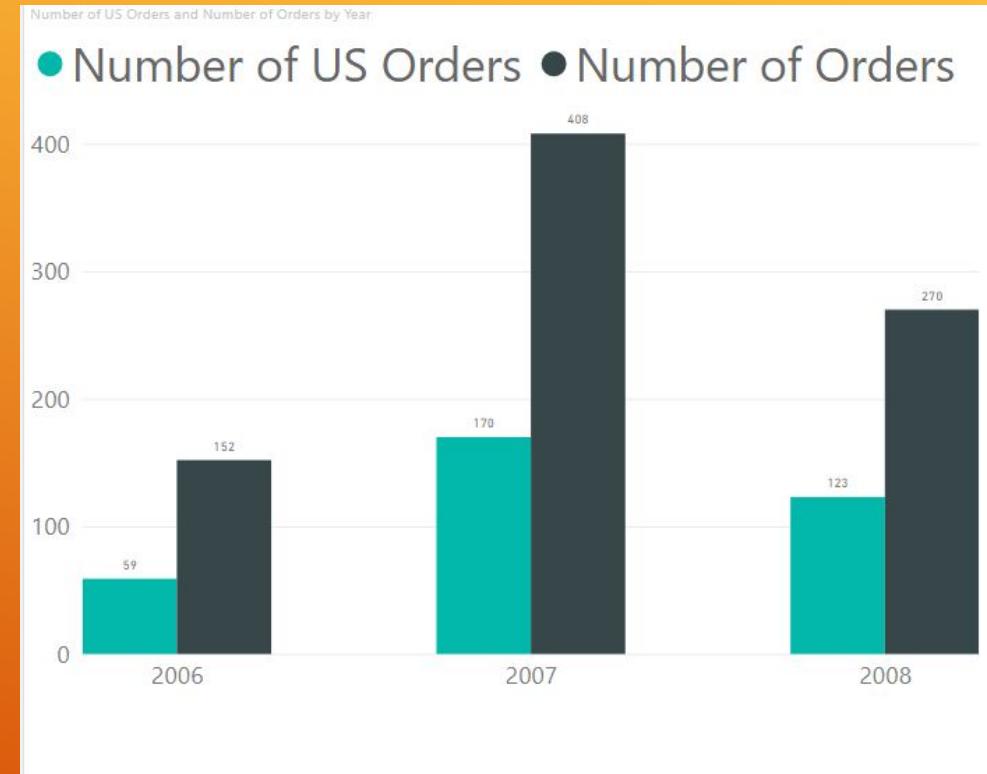
# Power BI



## Filter

```
Number of US Orders = CALCULATE  
( COUNT  
( 'Sales OrderDetails'[orderid])  
, FILTER (  
'Sales Customers' , 'Sales Customers'[country] = "USA" ))
```

```
Number of Orders = COUNT('Sales  
Orders'[orderid])
```



# Power BI



## Variables

**VAR myVar=1**



Data Type



Variable Name



variable value

**RETURN myVar + 25**

# Power BI



## IF-ELSE & NESTED IF BLOCKS

Similar concepts like other programming languages.

```
Age_Bins = IF(Churn_Modelling[Age]>=60, "Above 60", "Below 60")
```

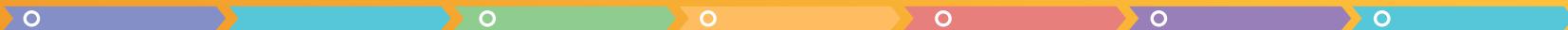
# Power BI



## Time Intelligence Functions

Time intelligence functions enable you to manipulate data using time periods such as years, quarters, months, and days and creating calculations over those time periods. The most common time periods that we encounter in business scenarios are usually Year-to-Date, Quarter-to-Date, Month-to-Date, Last Year Full Year, and Rolling 12 Months. There are many other time intelligence functions in DAX.

# Power BI



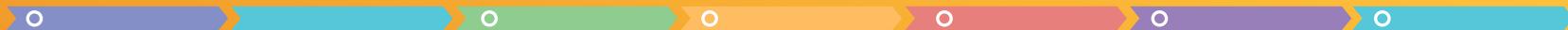
## Time Intelligence: TOTALYTD

Month	2006	2007	2008	Total
January		\$66,692.8	\$1,00,854.72	
February		\$1,07,900	\$2,05,416.67	
March		\$1,47,879.9	\$3,15,242.12	
April		\$2,03,579.29	\$4,49,872.68	
May		\$2,60,402.99	\$4,69,771.34	
June		\$2,99,490.99	\$4,69,771.34	
July	\$30,192.1	\$3,54,955.92	\$4,69,771.34	
August	\$56,801.5	\$4,04,937.61	\$4,69,771.34	
September	\$84,437.5	\$4,64,670.63	\$4,69,771.34	
October	\$1,25,641.1	\$5,34,999.13	\$4,69,771.34	
November	\$1,75,345.1	\$5,80,912.49	\$4,69,771.34	
December	\$2,26,298.5	\$6,58,388.75	\$4,69,771.34	
<b>Total</b>	<b>\$2,26,298.5</b>	<b>\$6,58,388.75</b>	<b>\$4,69,771.34</b>	

YTD Total Sales = TOTALYTD

```
(  
    SUM('Sales OrderDetails'[Order Line Total])  
    , Dates[Date].[Date]  
)
```

# Power BI



**How to find the YTD for last year?**

**How to find the passengers in last year but same month**

# Power BI



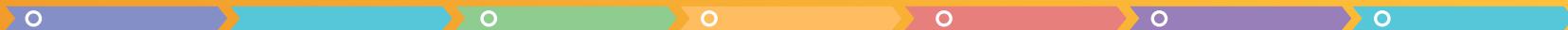
## Time Intelligence: PREVIOUSMONTH

Total Sales Previous Month = CALCULATE

```
(  
    sum('Sales OrderDetails'[Order Line Total])  
    , PREVIOUSMONTH(Dates[Date])  
)
```

Year Month	2006		2007		2008		Total		
	Total Sales	Total Sales Previous Month	Total Sales	Total Sales Previous Month	Total Sales	Total Sales Previous Month	Total Sales	Total Sales Previous Month	Total Sales Previous Month
December	\$50,953.4		\$49,704	\$77,476.26		\$45,913.36			\$1,28,429.66
November	\$49,704		\$41,203.6	\$45,913.36		\$70,328.5			\$95,617.36
October	\$41,203.6		\$27,636	\$70,328.5		\$59,733.02			\$1,11,532.1
September	\$27,636		\$26,609.4	\$59,733.02		\$49,981.69			\$87,369.02
August	\$26,609.4		\$30,192.1	\$49,981.69		\$55,464.93			\$76,591.09
July	\$30,192.1			\$55,464.93		\$39,088			\$85,657.03
June				\$39,088		\$56,823.7		\$19,898.66	\$39,088
May					\$56,823.7	\$55,699.39	\$19,898.66	\$1,34,630.56	\$76,722.36
April						\$55,699.39	\$39,979.9	\$1,34,630.56	\$1,90,329.95
March							\$41,207.2	\$1,09,825.45	\$1,49,805.35
February								\$1,04,561.95	\$1,45,769.15
January									\$1,00,854.72
<b>Total</b>	<b>\$2,26,298.5</b>		<b>\$6,58,388.75</b>		<b>\$50,953.4</b>	<b>\$4,69,771.34</b>		<b>\$77,476.26</b>	<b>\$13,54,458.59</b>

# Power BI

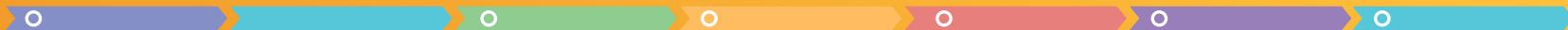


## X vs nonX functions(SUM vs SUMX)

- SUM is an aggregator function. It works like a measure, calculating based on the current filter context.

SUMX is an in-memory iterator function. It works row by row. SUMX has awareness of rows in a table, hence can reference the intersection of each row with any columns in the table.

# Power BI



## SUM VS SUMX: EXAMPLE

Total Sales SUMX = SUMX(

'Sales OrderDetails'

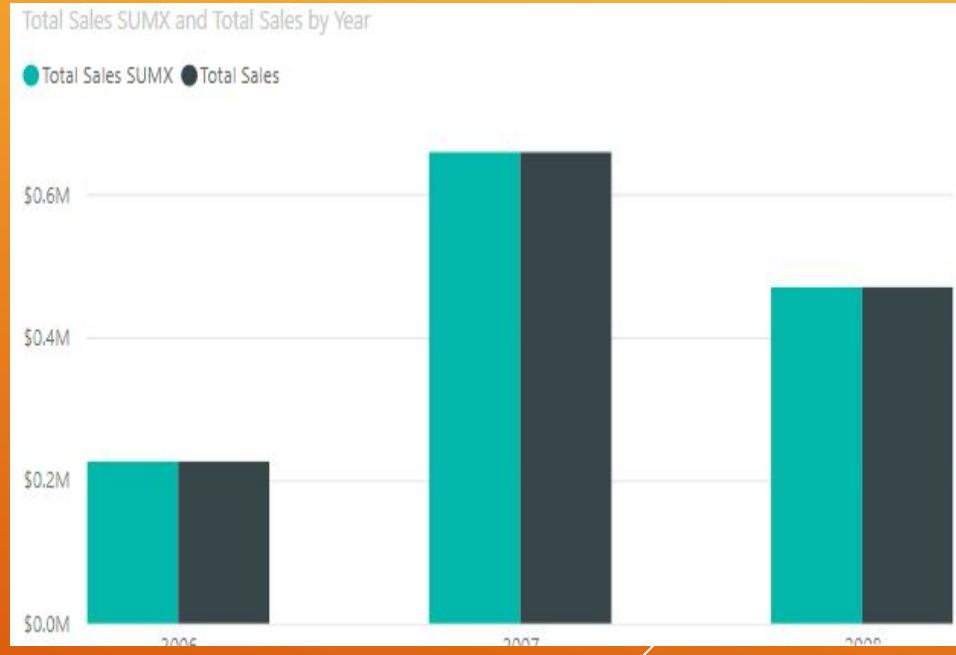
, 'Sales OrderDetails'[qty]

\* 'Sales OrderDetails'[unitprice]

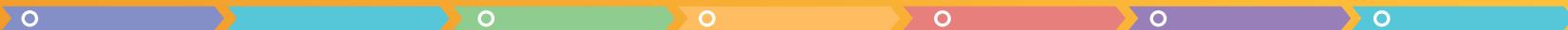
)

Total Sales =

sum('Sales OrderDetails'[Order Line Total])



# Power BI

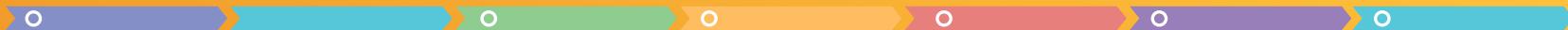


## AVERAGE, AVERAGEA, AVERAGEX

- AVERAGE → Averages out the data
- AVERAGEA → Considers non integer values as null
- AVERAGEX → Creates In memory measure

AVERAGEX is also an iterator function. It works row by row. AVERAGEX has awareness of rows in a table, hence can reference the intersection of each row with any columns in the table.

# Power BI



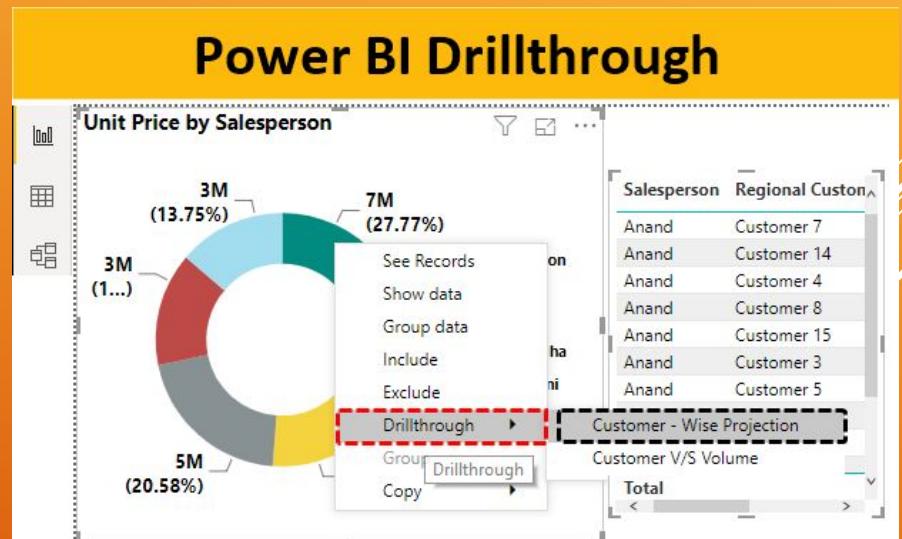
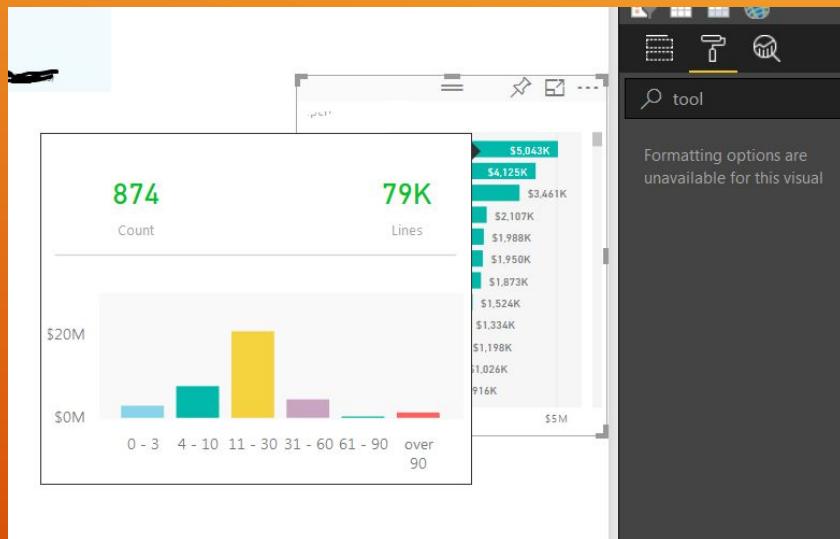
## Best Practice: Organize your code

- Create a separate table for measures
- Limit Visuals: As visuals interact with each other, if we have more visuals, it might take a lot of time to refresh. Tool tips & Drill through can be used.
- Process as much data as required in the original source
- Certified Visuals are recommended
- Use a lighter background

# Power BI



## Tool tips & Drill Throughs



# Power BI



## Page Navigation

The screenshot shows the Power BI ribbon interface. The **Insert** tab is active, indicated by a yellow underline. Below the tabs, there are several groups of icons:

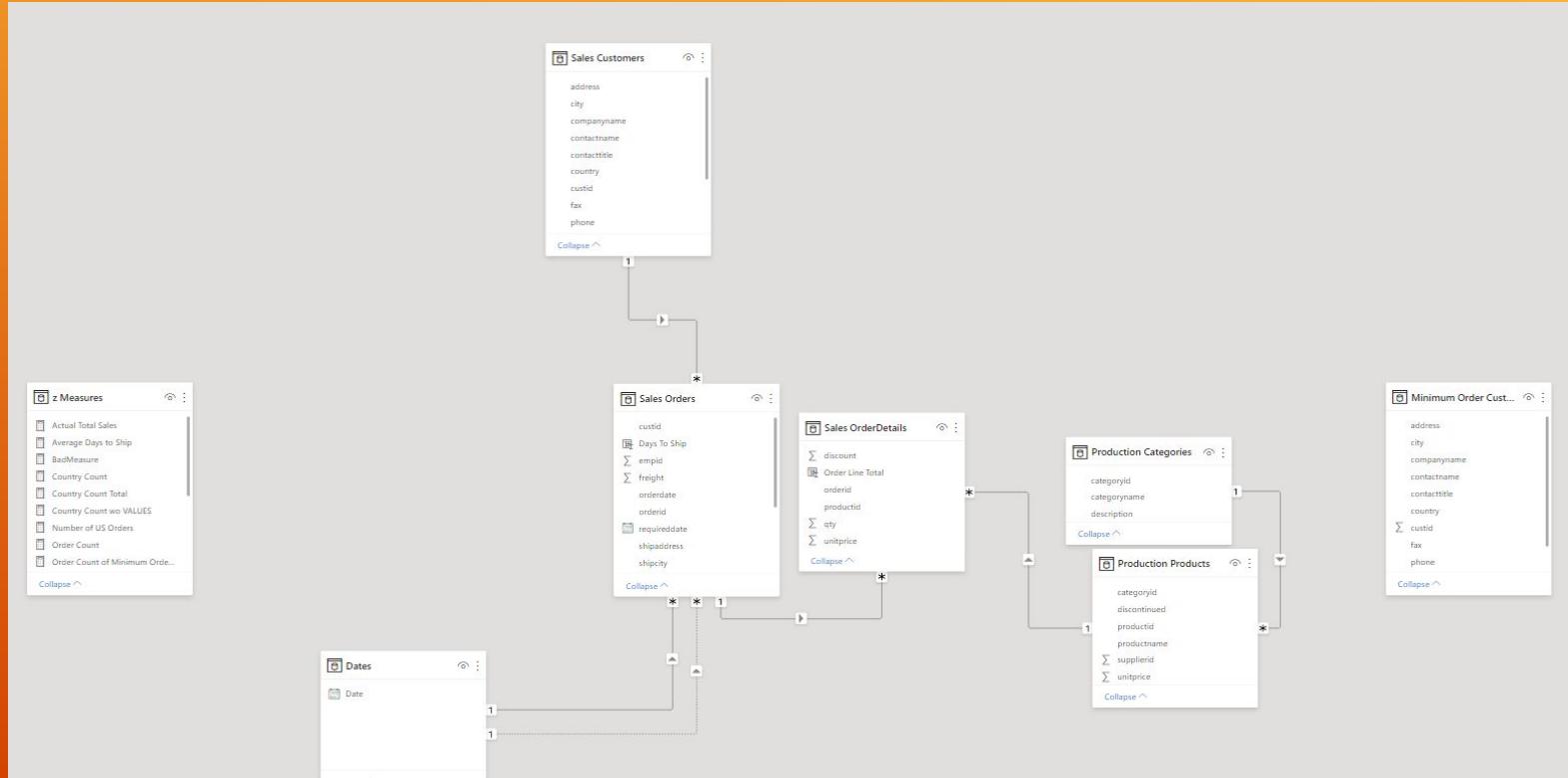
- Pages**: Includes **New page** (with a dropdown menu), **Visuals**, and a separator line.
- Visuals**: Includes **New visual** (with a dropdown menu), **More visuals** (with a dropdown menu), and a separator line.
- AI visuals**: Includes **Q&A**, **Key influencers**, and **Decomposition tree**.
- Power Platform**: Includes **Power Apps** and **Power Platform**.
- Elements**: Includes **Text box**, **Buttons** (with a dropdown menu), **Shapes** (with a dropdown menu), and **Image** (with a dropdown menu).

A red box highlights the **Buttons**, **Shapes**, and **Image** buttons in the **Elements** section. A white line points from the bottom right towards this red box.

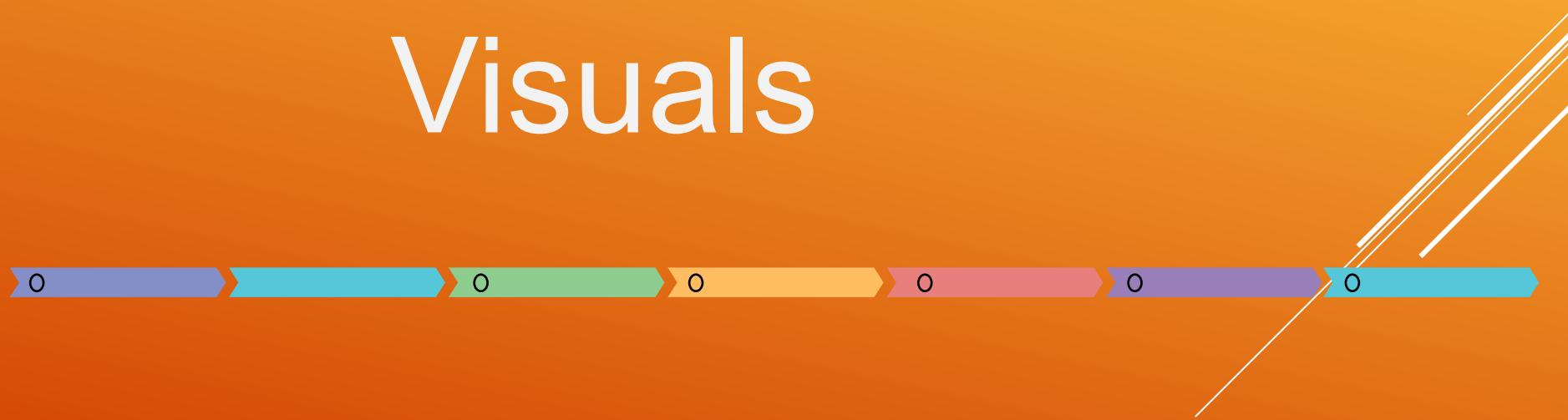
# Power BI



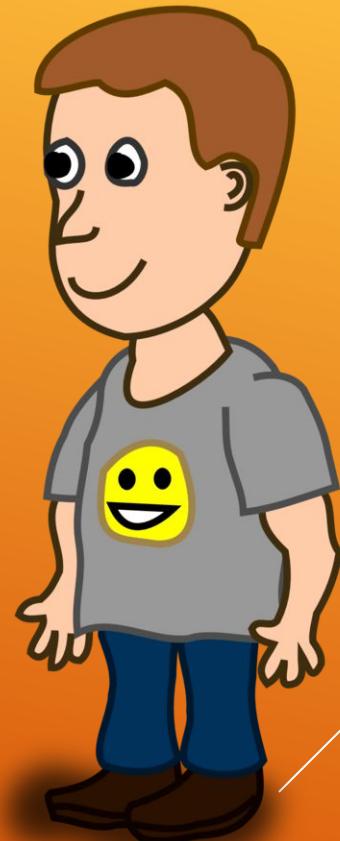
## RELATIONSHIP



# Power BI Visuals



# Building Blocks of Power BI



# Building Blocks of Power BI



**Visualizations**

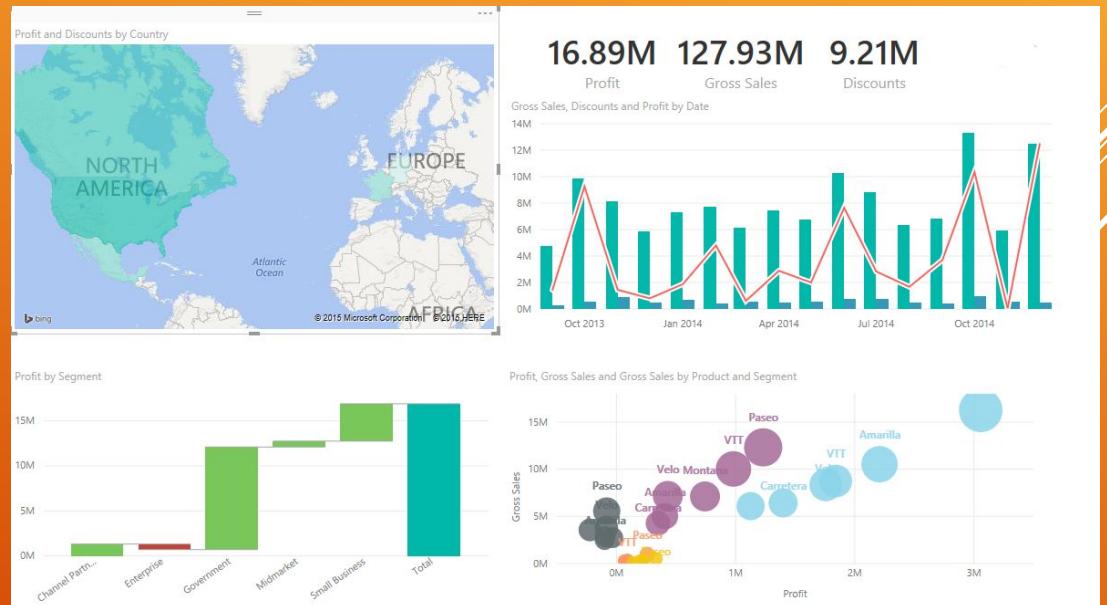
A visual representation of data is called visualization. For example, a chart, or a graph can be used to represent data visually.

Datasets

Reports

Dashboards

Tiles



# Building Blocks of Power BI



Visualizations

Datasets

Reports

Dashboards

Tiles

A dataset is a collection of data or information

RowNumber	Customerid	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance
1	15634602	Hargrave	619	France	Female	42	2	0
2	15647311	Hill	608	Spain	Female	41	1	83807.86
3	15619304	Onio	502	France	Female	42	8	159660.8
4	15702354	Boni	699	France	Female	39	1	0
5	15737888	Mitchell	850	Spain	Female	43	2	125510.82
6	15574012	Chu	645	Spain	Male	44	8	113755.78
7	15592551	Bartlett	822	France	Male	50	7	0
8	15656148	Obinna	376	Germany	Female	29	4	115046.74
9	15792365	He	501	France	Male	44	4	142051.07
10	15592389	H?	684	France	Male	27	2	134603.88
11	15767821	Bearce	528	France	Male	31	6	102016.72
12	15737173	Andrews	497	Spain	Male	24	3	0
13	15632264	Kay	476	France	Female	34	10	0
14	15691483	Chin	549	France	Female	25	5	0
15	15600882	Scott	635	Spain	Female	35	7	0
16	15643968	Goforth	616	Germany	Male	45	3	143129.41
17	15737452	Romeiro	651	Germany	Male	58	1	132602.88
18	15788218	Henderson	549	Spain	Female	24	9	0
19	15661507	Mulrrow	587	Spain	Male	45	6	0
20	15568982	He	726	France	Female	24	6	0
21	15577857	McDonald	732	France	Male	41	8	0
22	15597945	Delucci	636	Spain	Female	32	8	0
23	15699309	Gerazimov	510	Spain	Female	38	4	0
24	15725737	Mosman	669	France	Male	46	3	0
25	15625047	Yen	846	France	Female	38	5	0
26	15738191	Maclean	577	France	Male	25	3	0
27	15736816	Young	756	Germany	Male	36	2	136815.64
28	15700772	Nebechi	571	France	Male	44	9	0
29	15728693	McWilliams	574	Germany	Female	43	3	141349.43
30	15656300	Lucciano	411	France	Male	29	0	59697.17
31	15584745	Azikiwe	591	Spain	Female	39	3	0
32	15706552	Odinakachukwu	533	France	Male	36	7	85311.7
33	15750181	Sanderson	551	Germany	Male	41	9	110112.54
34	15659428	Maggard	520	Spain	Female	42	6	0

# Building Blocks of Power BI



Visualizations

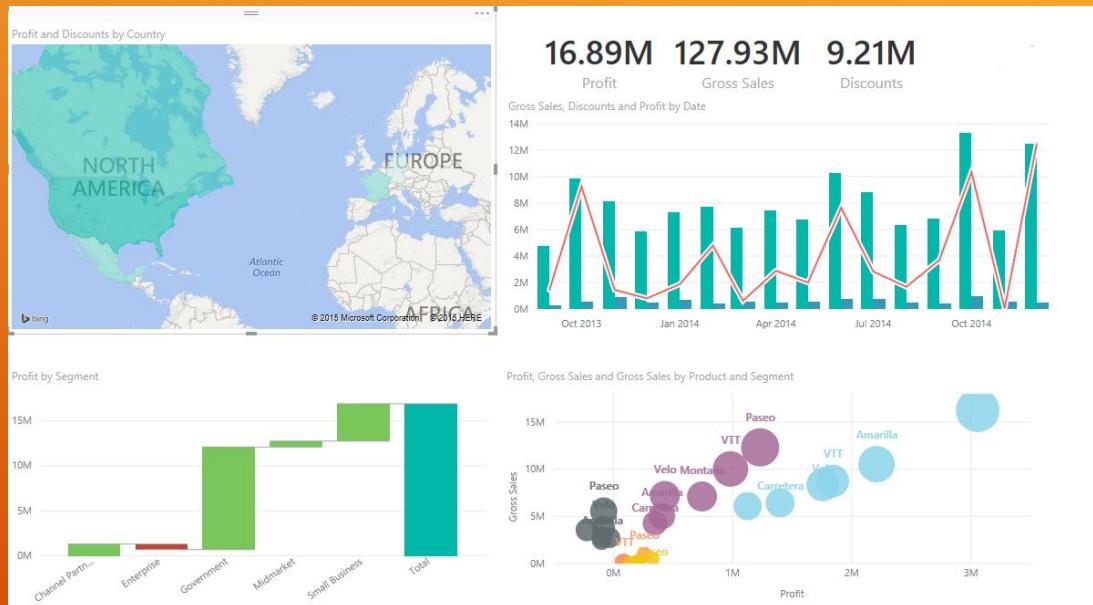
Datasets

Reports

Dashboards

Tiles

A collection of visualizations that appear together on one or more pages is a report in Power BI. It is a collection of items that have common motive.



# Building Blocks of Power BI



Visualizations

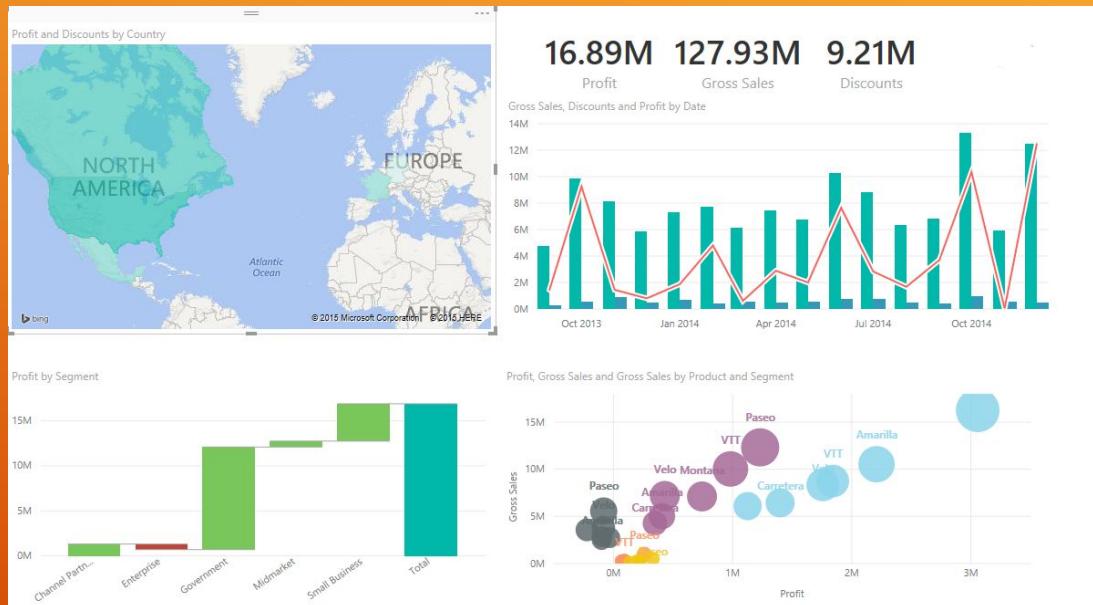
Datasets

Reports

**Dashboards**

Tiles

A Power BI dashboard is a single page interface that uses the most important elements of a report to tell a story.



# Building Blocks of Power BI



Visualizations

Datasets

Reports

Dashboards

Tiles

In Power BI, a tile is a single visualization found in a report or on a dashboard



Pin to dashboard

Select an existing dashboard or create a new one.

Where would you like to pin to?

Existing dashboard

New dashboard

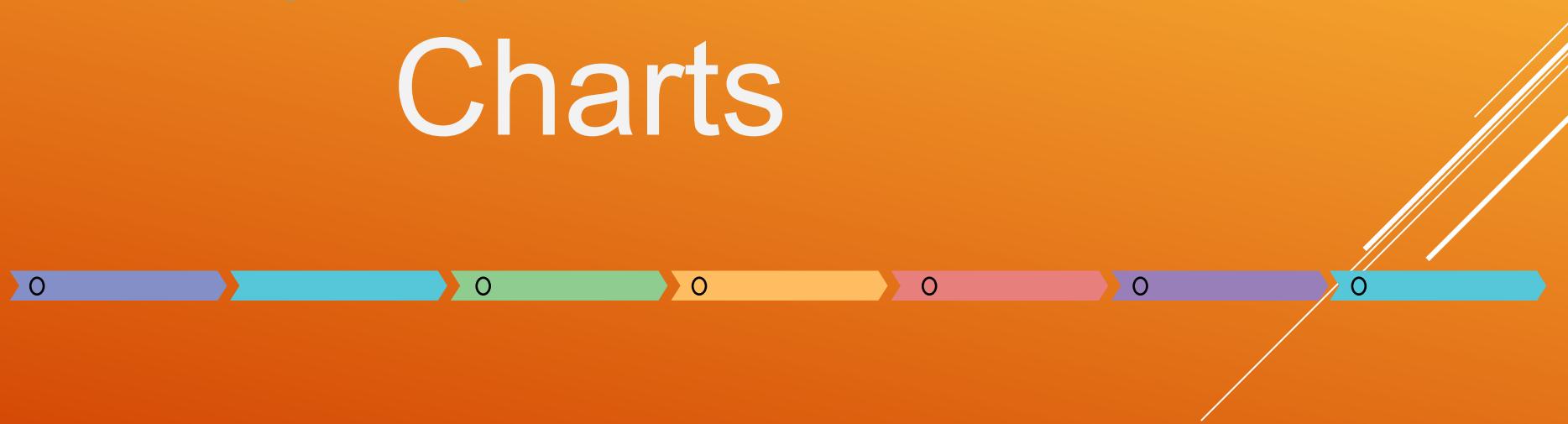
Select existing dashboard

Hate Crime - Dashboard

Pin

Cancel

# Power BI Charts



# Different Charts in Power BI



Bar, Column, Line & Area Charts

Combination Charts

Pie-Charts, Doughnut charts

Maps, Funnel Charts

5

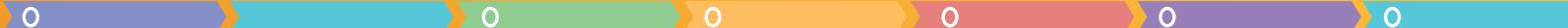
Gauge, Cards, Tables & Matrices



# Power BI KPIs



# Topics to be covered.

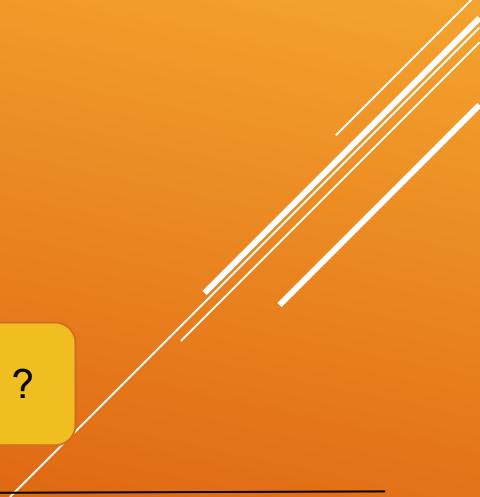


What is KPI ?

When to use KPI ?

What do you require for KPI ?

How to use KPI visualizations ?



# When to use KPI?



1

What is KPI ?

2

When to use?

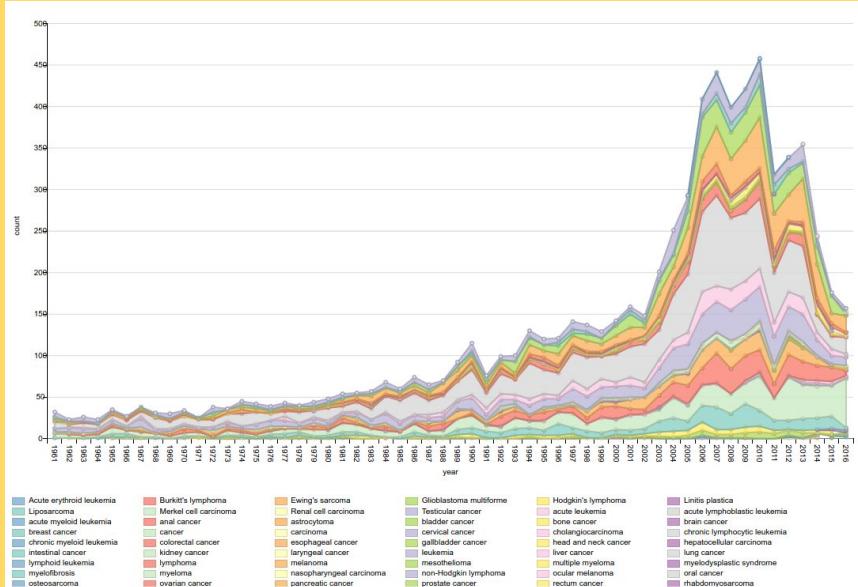
3

Requirements for KPI

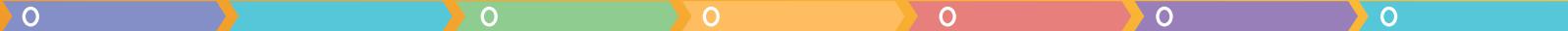
4

KPI  
Visualizations

A key performance indicator (KPI) is a visual cue that communicates the amount of progress made toward a target.



# When to use KPI?



What is KPI ?



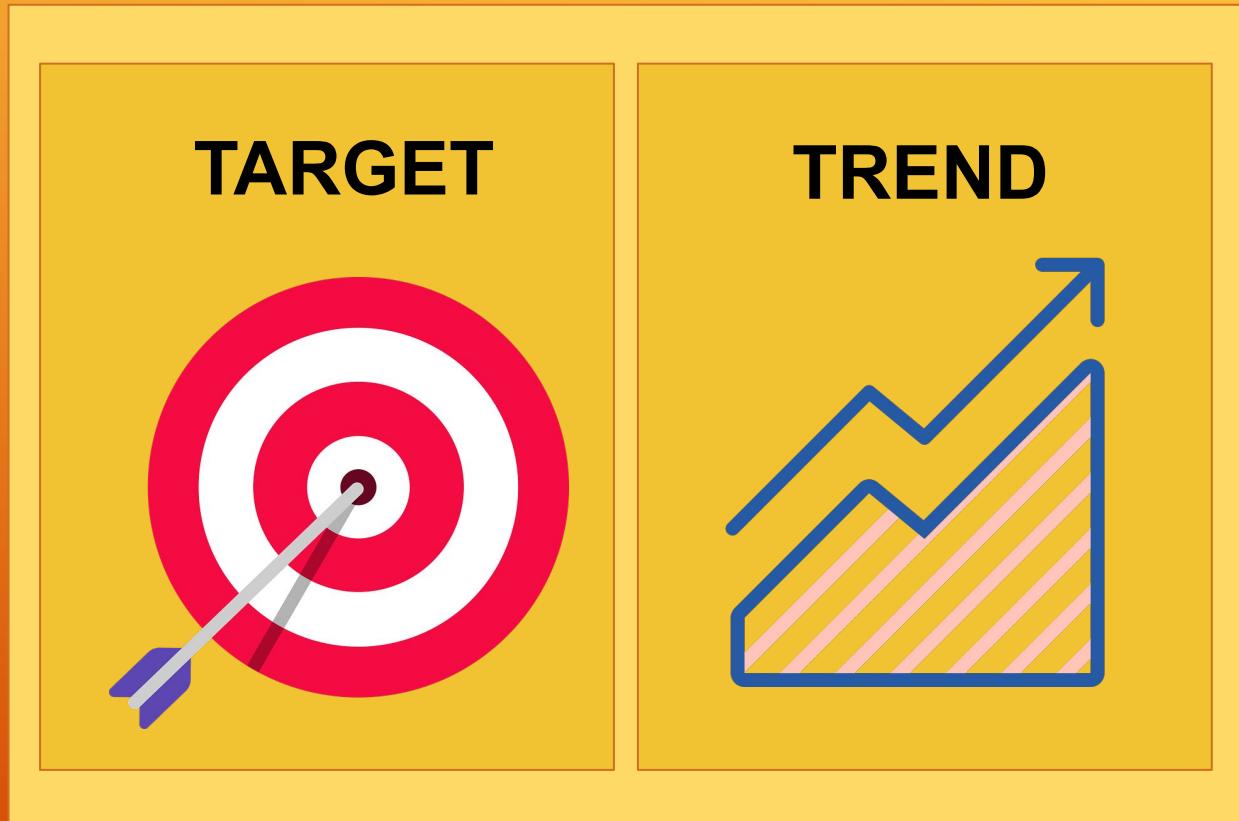
When to use?



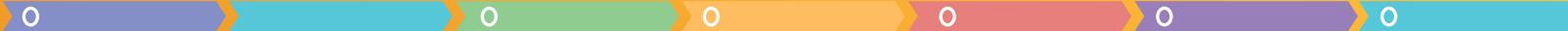
Requirements for KPI



KPI  
Visualizations



# When to use KPI?



What is KPI ?



When to use?



Requirements for KPI



KPI  
Visualizations

**BASE MEASURE**

**TARGET MEASURE**

**THRESHOLD**

# When to use KPI?



What is KPI ?



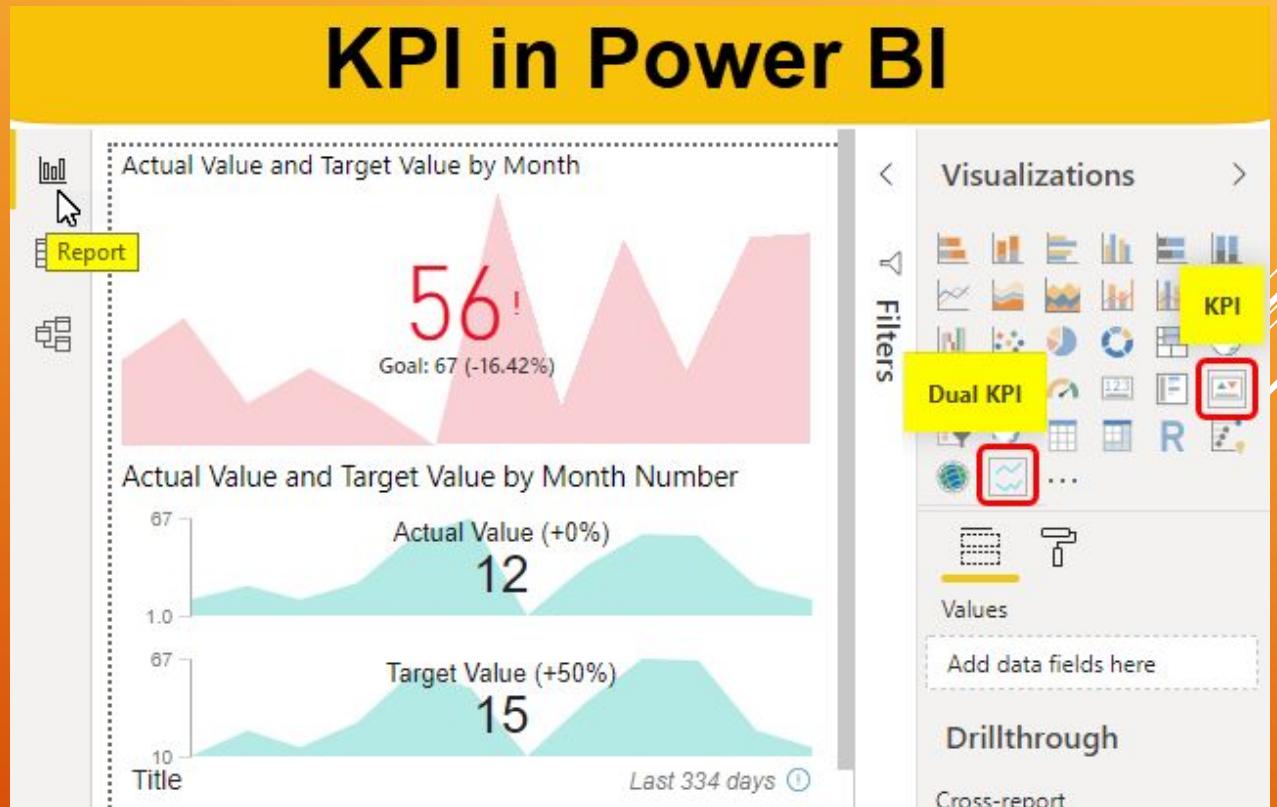
When to use?



Requirements for KPI



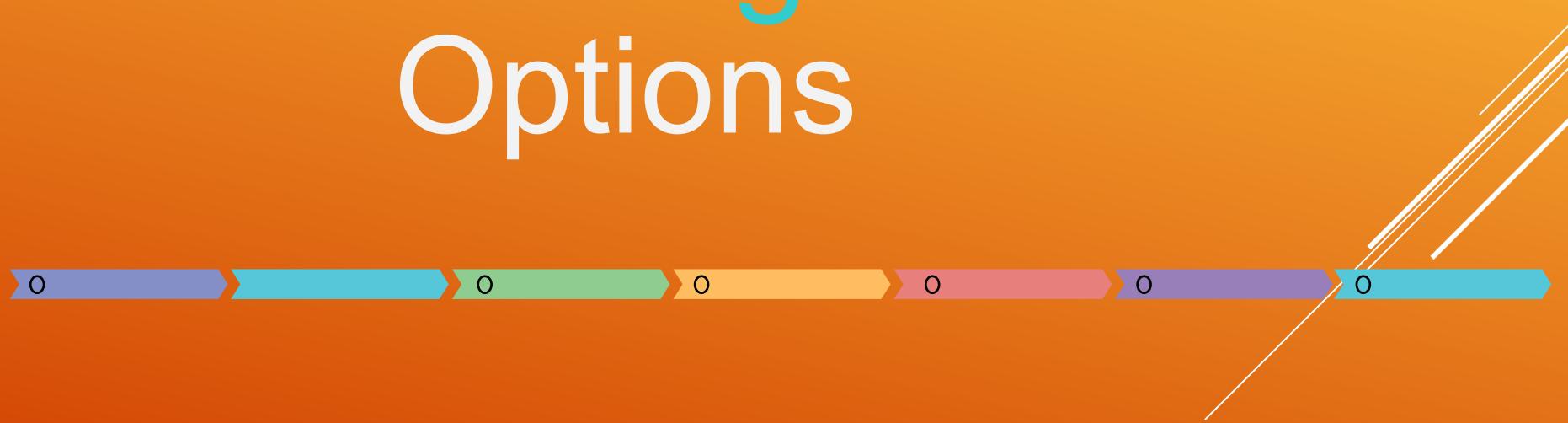
KPI  
Visualizations



# Edit Interactions



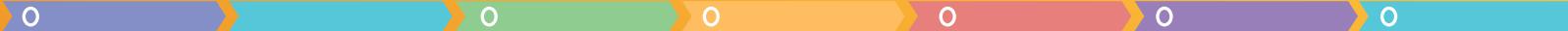
# Formatting Options



# Administration Options



# Different Roles in Power BI Service



Admin

Member

Contributor

Viewer



# Different Roles in Power BI Service



**Link:**

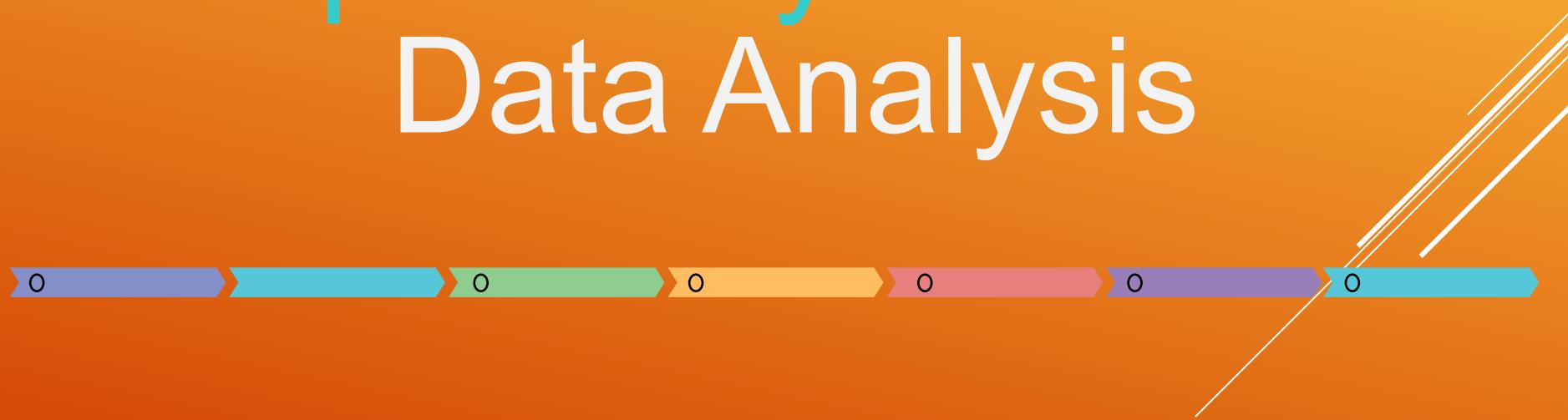
<https://docs.microsoft.com/en-us/power-bi/collaborate-share/service-roles-new-workspaces>

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

# Security in Power BI



# Exploratory Data Analysis



# Visualization

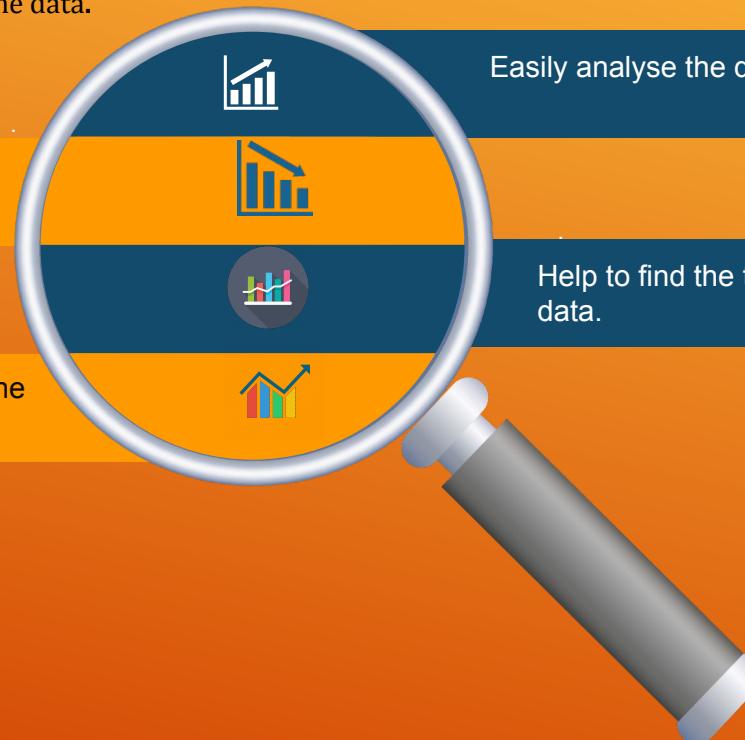
Visualisation is the presentation of the data in the graphical or visual form to understand the data more clearly. Visualisation is easy to understand the data.

Easily understand the features of the data.

Help to get meaningful insights from the data.

Easily analyse the data and summarize it.

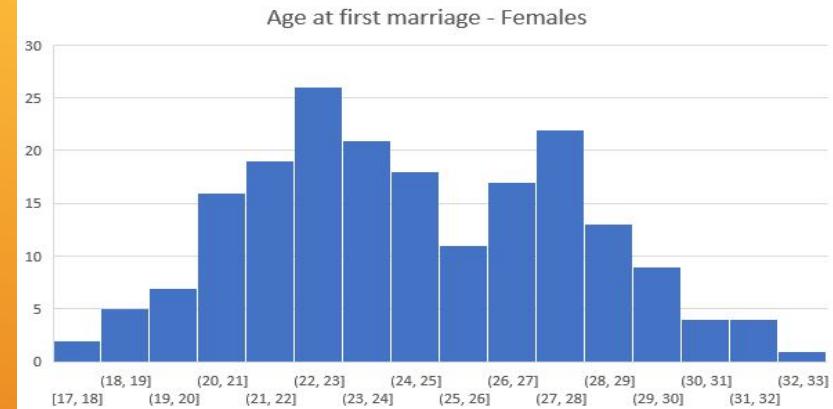
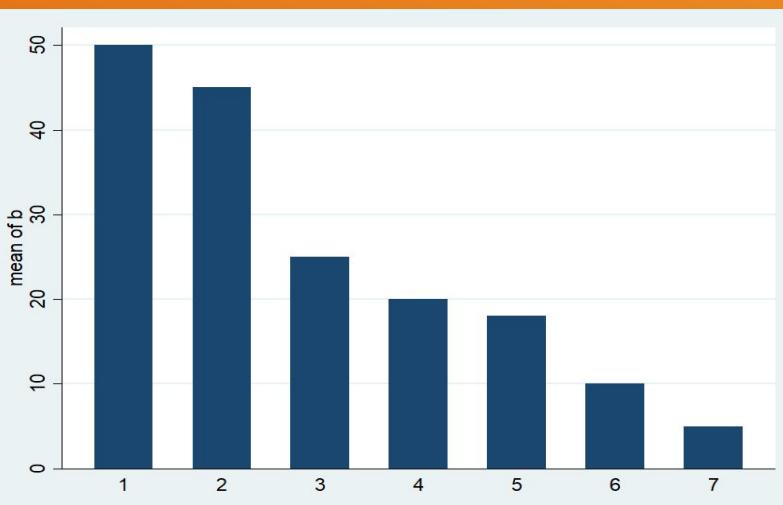
Help to find the trend or pattern of the data.



# Important Charts for Visualisation

## Histogram

Histogram represent the frequency distribution of the data

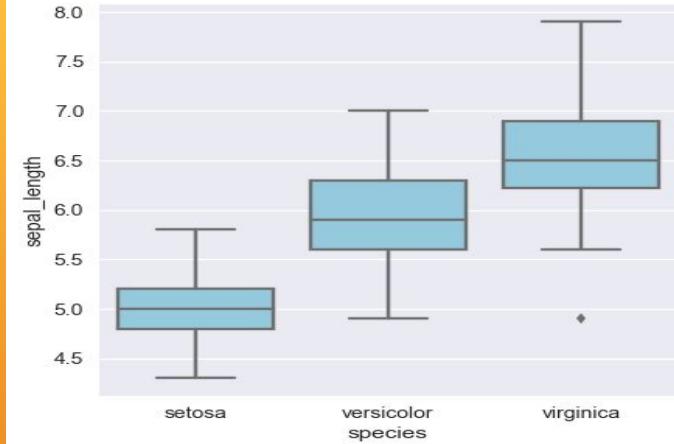


## Bar Chart

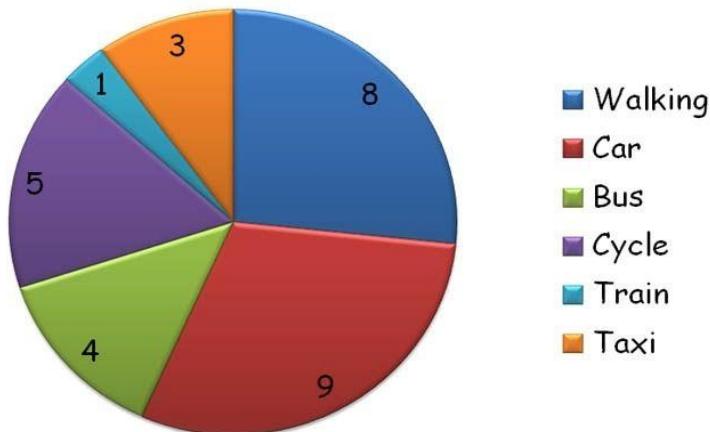
Bar graph represent the total observation in the data for a particular category.

# Box Plot

Boxplot display the distribution of the data based on five number summary(minimum, first quartile, median, third quartile, maximum)



Methods of Travelling to School

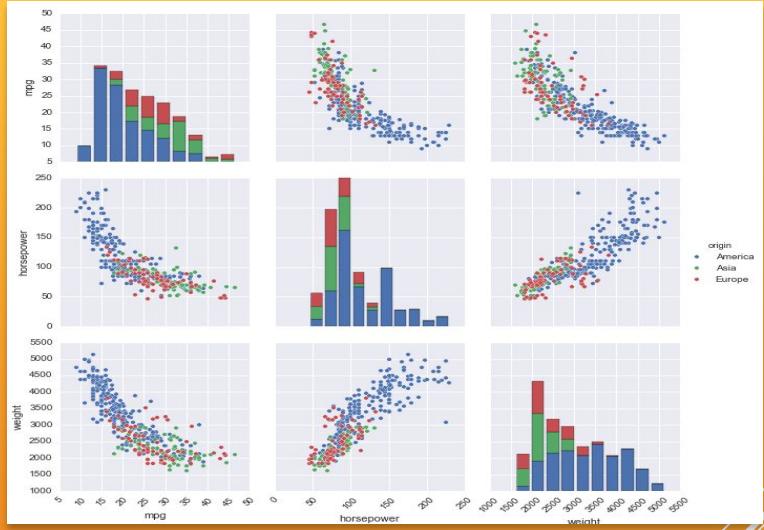
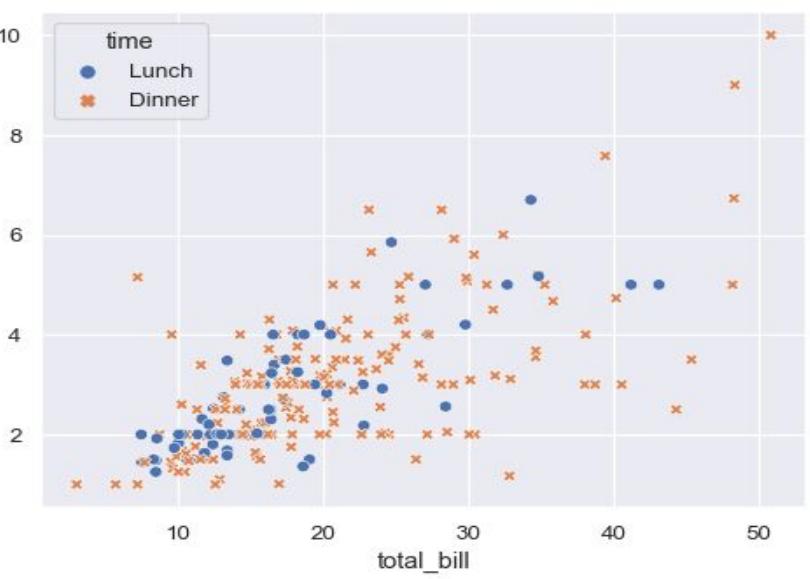


# Pie Chart

Pie chart represent the percentage of the data by each category.

## Pair-plot

Pair plot show the bivariate distribution of the datasets. It show the pairwise relationship between the variable



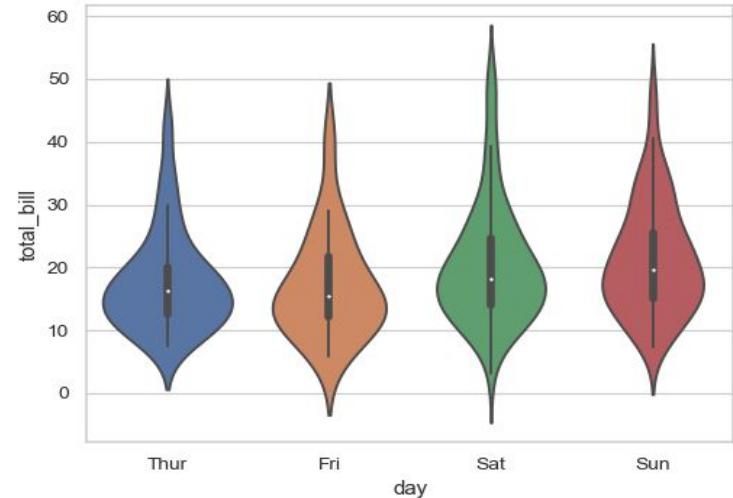
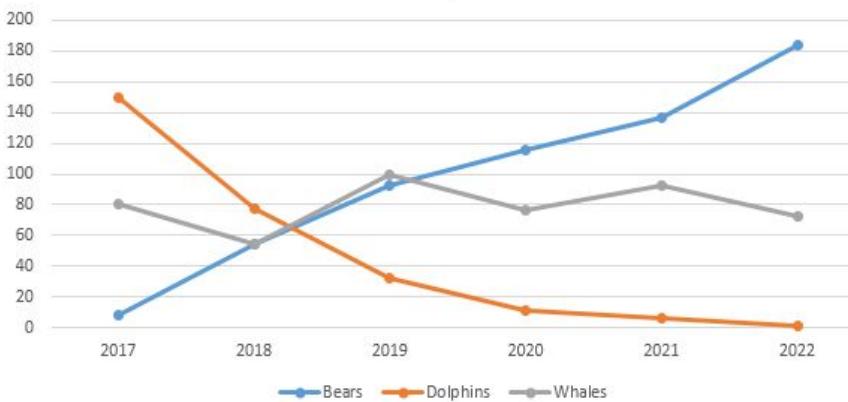
## Scatter Plot

Scatter plot represent the relationship between two numerical variable. It show the correlation between two variable.

## Violin Plot

Violin chart are used to plot numeric data

Wildlife Population



## Line Chart

Line chart are used to track change over line and short period of time. Line chart are used in time series data.

# Steps Involved in EDA

01

**Data Sourcing**



02

**Data Cleaning**

03

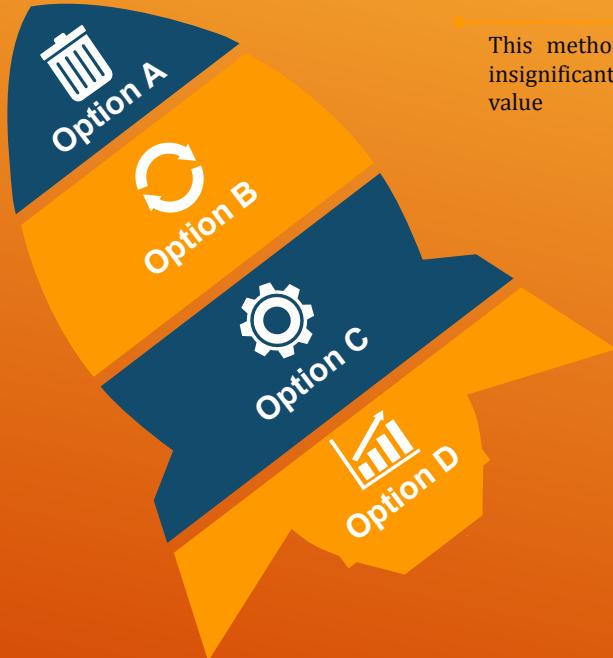
**Categorical Data Analysis:  
Univariate/Bivariate/Multivariate Analysis with Visualisation**

04

**Numerical Data Analysis**

**Derived Metrics**

# Handle Missing Value



This method we commonly used to handle missing values. Rows can be deleted if it has insignificant number of missing value Columns can be delete if it has more than 75% of missing value

## Delete Rows/Columns



This method can be used on independent variable when it has numerical variables. On categorical feature we apply **mode** method to fill the missing value.

## Replacing with mean/median/mode



Some machine learning algorithm supports to handle missing value in the datasets. Like KNN, Naive Bayes, Random forest.

## Algorithm Imputation

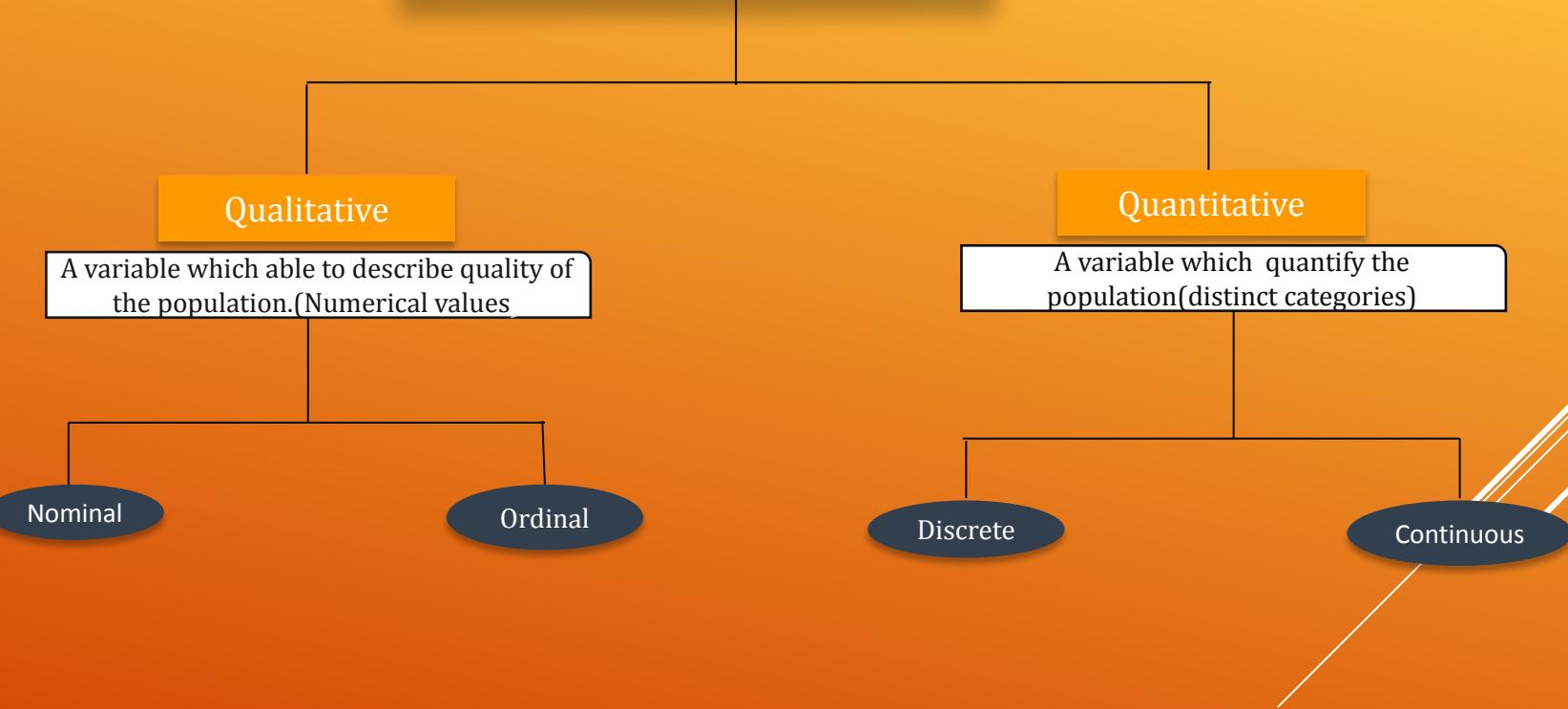


Prediction model is one of the advanced method to handle missing values. In this method dataset with no missing value become training set and dataset with missing value become the test set and the missing values is treated as target variable.

## Predicting the missing values



# Types of Data



# Types of Data



## Discrete

It has a discrete value that means it take only counted value not a decimal values. Like count of student in class



## Continuous

A number within a range of a value is usually measured, such as height.



## Nominal

It represent qualitative information without order. Value represent a discrete units.

**Like** Gender: Male/Female ,Eye colour.

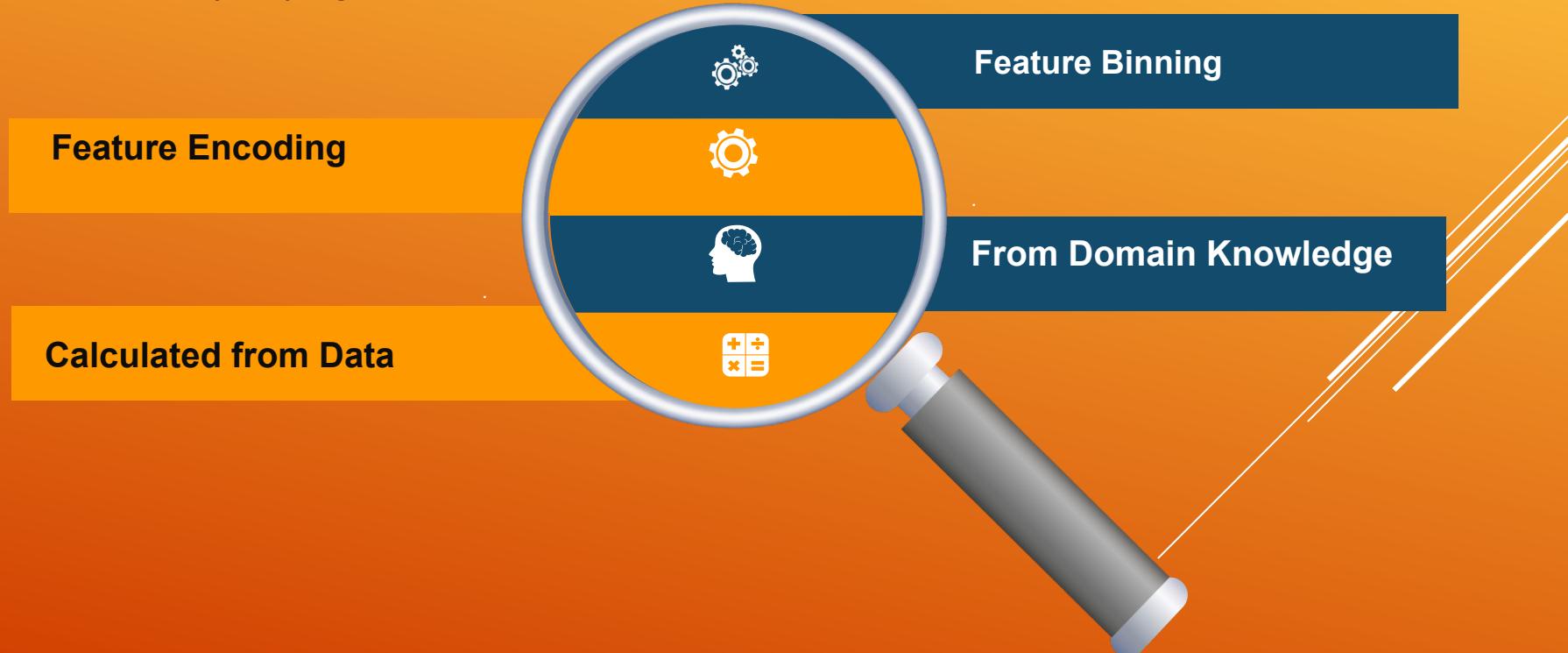


## Ordinal

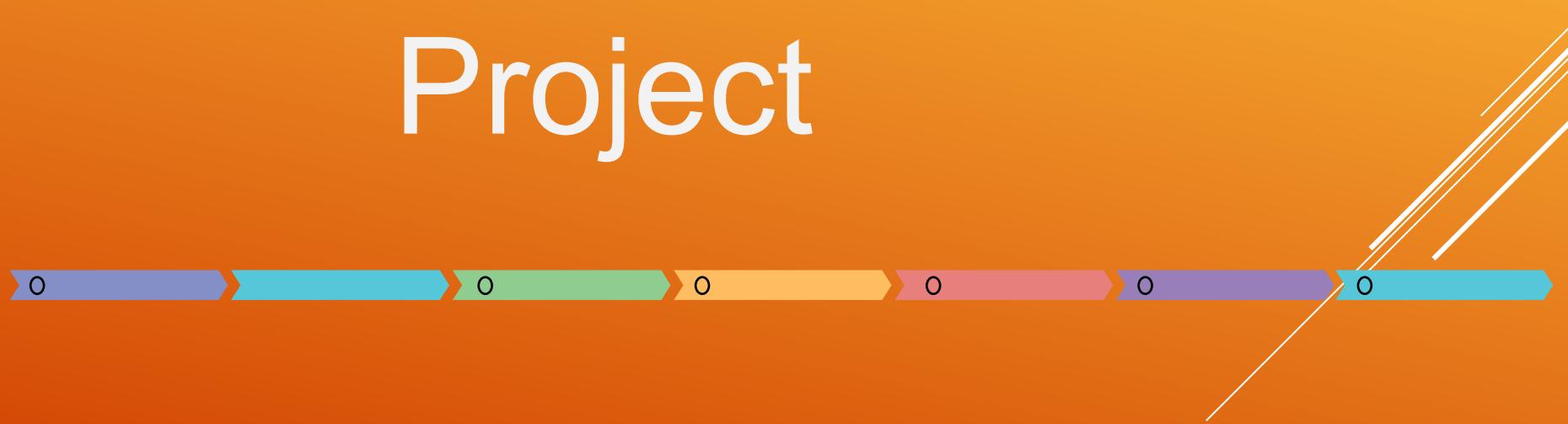
It represent qualitative information with order. It indicate the measurement classification are different and can be ranked. Lets say Economic status: high/medium/low which can ordered as low,medium,high.

# Derived Metrics

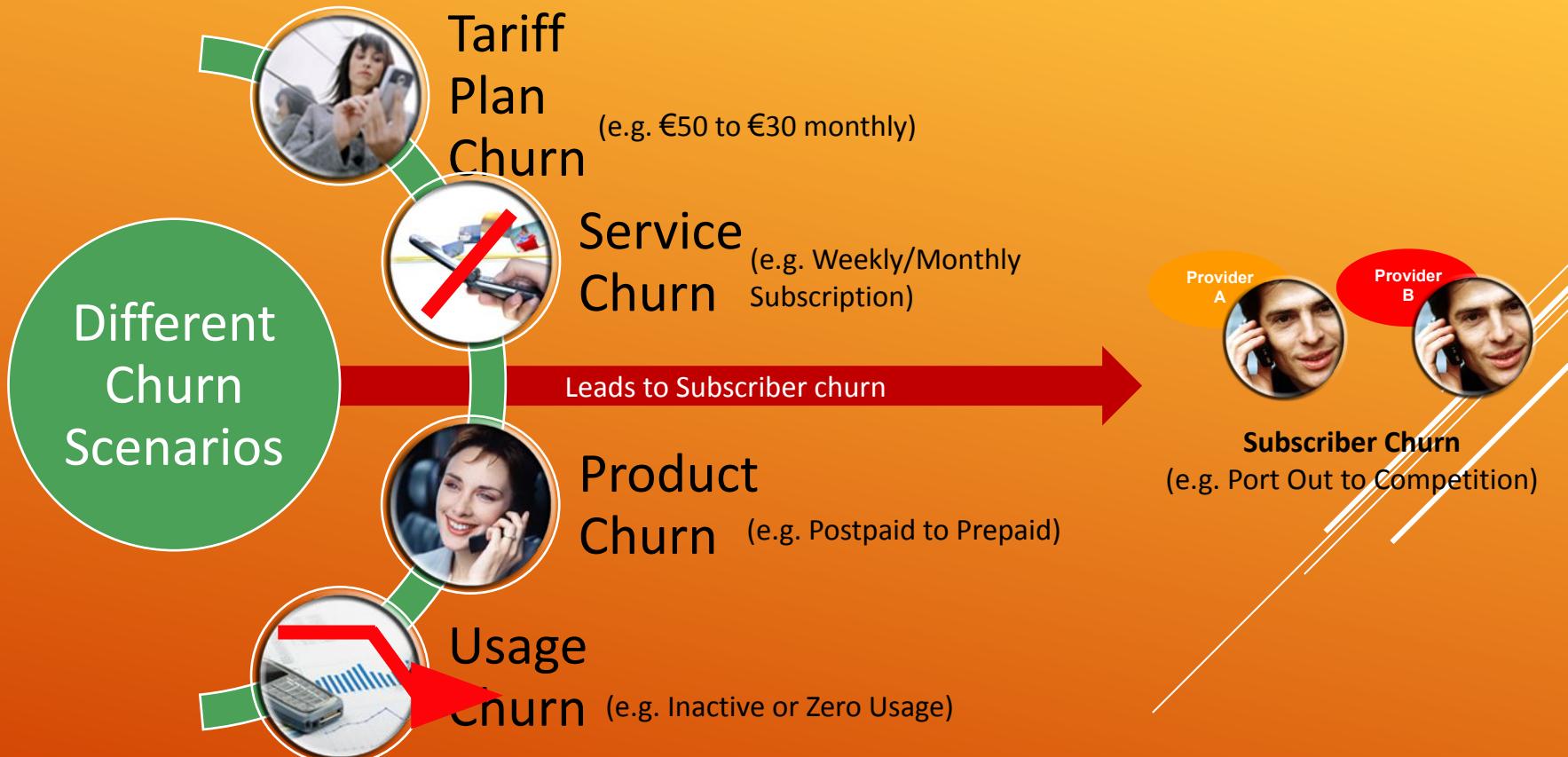
Derived metrics create a new variable from the existing variable to get a insightful information from the data by analysing the data.



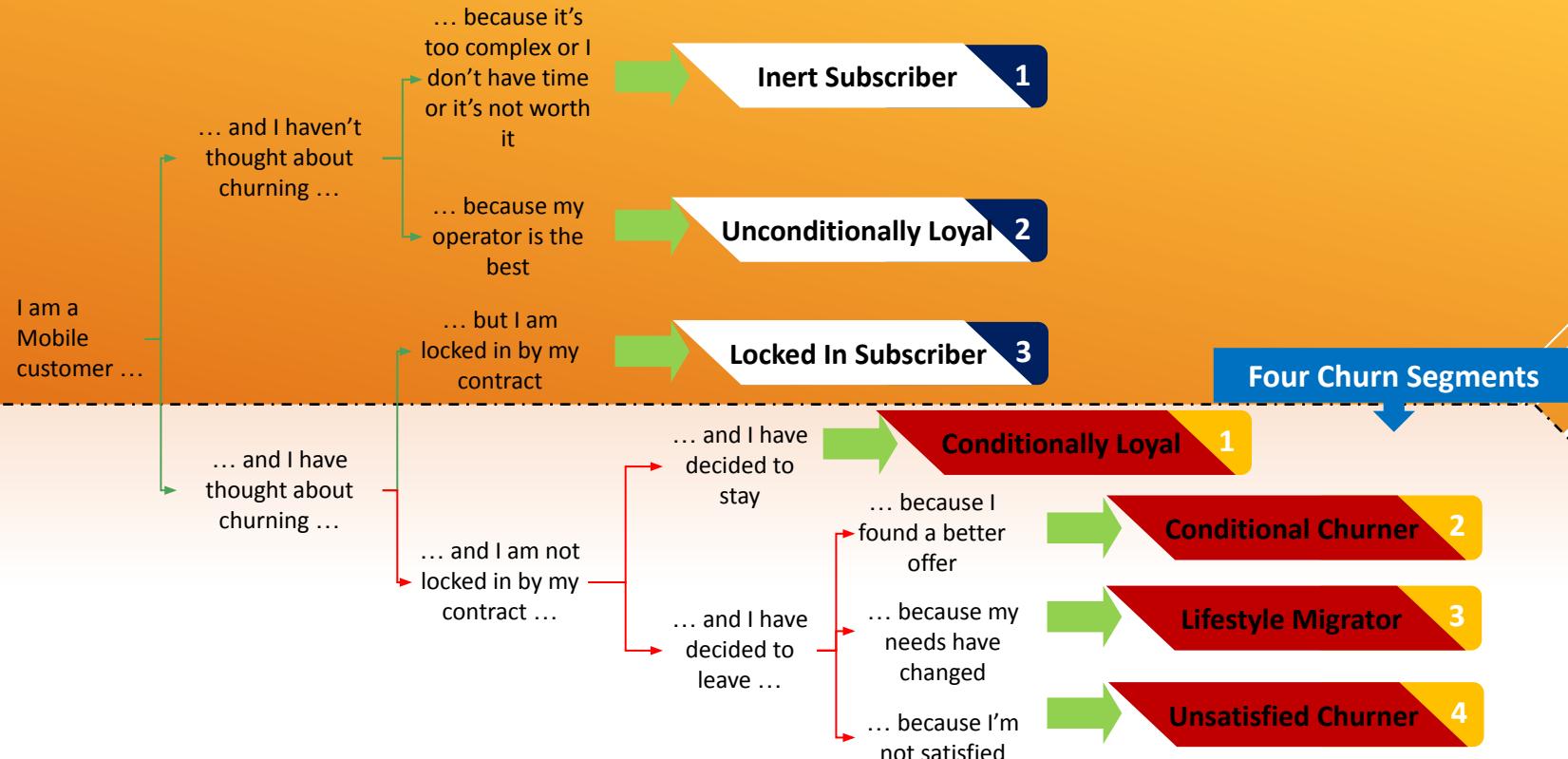
# Live Project



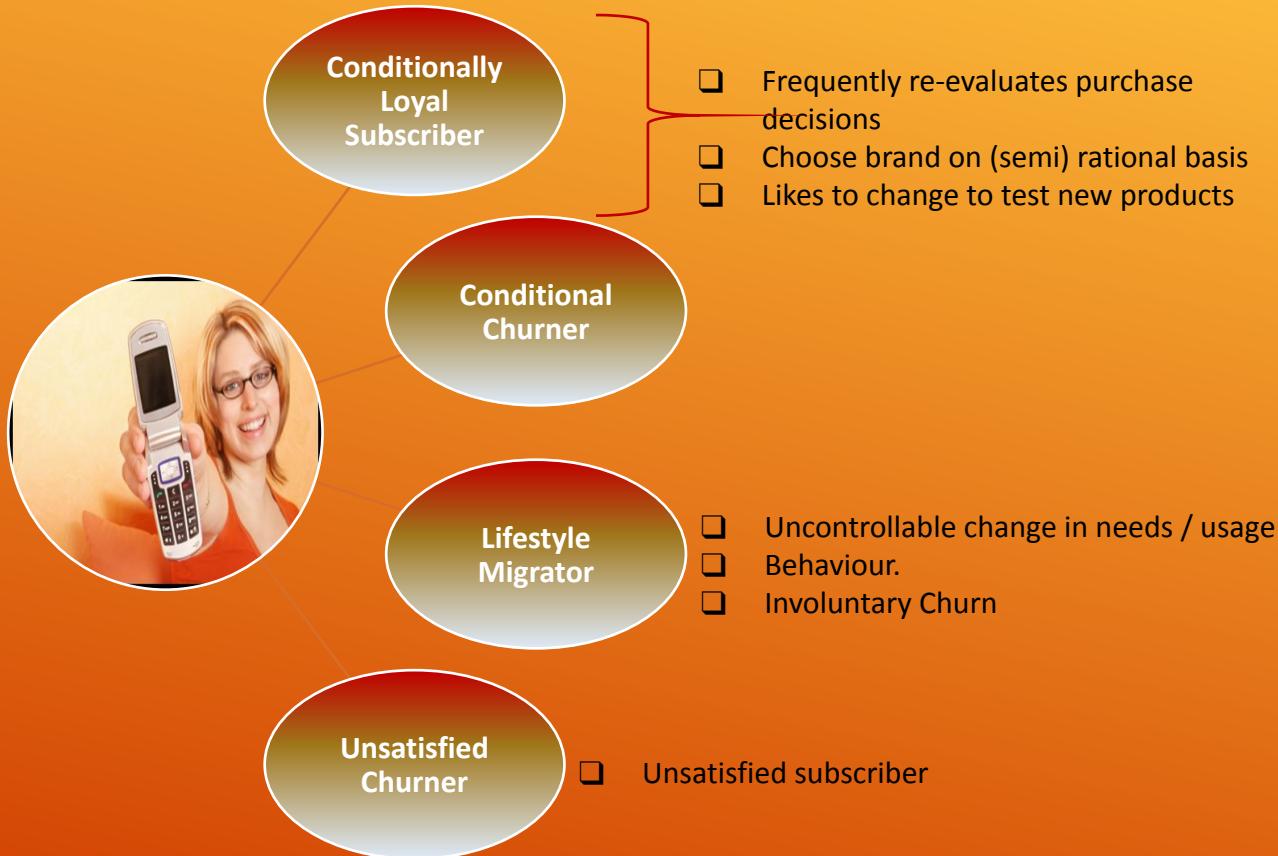
# Subscriber Churn can be in different forms and not just exit from the base



# Decision cycle of a subscriber: Changes as per needs and/or experiences

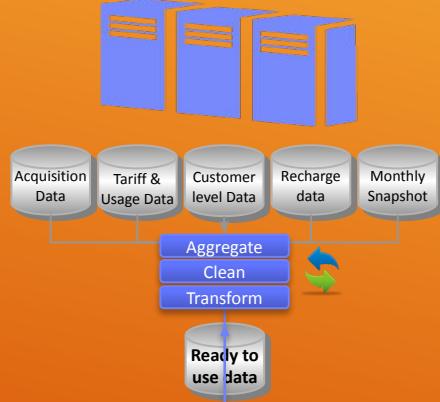


# Four Churn Segments: Loyalty drivers for each segment

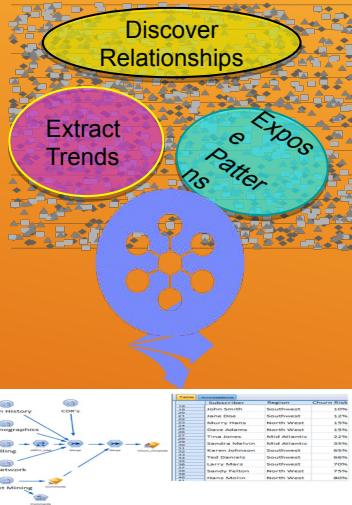


# High level Overview of a Data Science led approach to manage churn

## Capture & Analyze



## Report & Predict



## Engage & Act

### Predictive Model Output



- List of churn drivers / KPI's for tracking and monitoring
- A generated list of recommended subscribers for targeted churn campaigns
- Recommendations on monthly churn initiatives

- Business Understanding
- Identify data requirements and explore data availability
- Request and extract data required to build a model
- Aggregate, Clean and Standardize data in desired format for model

- Business Analysis of standardized data
- Predictive model design
- Development and Implementation of Predictive model

# Project Link

Part I: <https://www.youtube.com/watch?v=Xu5x-vn8J6M>

Part II: <https://www.youtube.com/watch?v=HCpmbhS2kBs>

Part III: <https://www.youtube.com/watch?v=g2BXlb6E5cl>



## Resources

- Power BI Documentation  
<https://docs.microsoft.com/en-us/power-bi/>
- Power BI Guided Learning
  - <https://docs.microsoft.com/en-us/power-bi/guided-learning/>
  - <https://www.youtube.com/playlist?list=PL1N57mwBHtNOJFoKSR0n-tBkJHeMP2cP>
- Power BI White Paper  
<https://docs.microsoft.com/en-us/power-bi/guidance/withepapers>
- Power BI Blogs  
<https://powerbi.microsoft.com/en-us/blog/>