

Power Bi Notes

Reporting Vs Visualization

• Reporting

- Render the business data in structured format using Tables/Matrix etc

• Visualization

- Graphical representation of the business data using Charts, Graphs, Maps etc

- **Note :** There are more than 200 Visualizations in Power BI

BI Tools/Products

- Power BI Desktop — DEVs
- Power Query — ETL (M Lang — Mashup Language) — Data Preparation
- Power Pivot - OLAP Model (DAX)
- Power View — Reports and Visualizations
- Power BI Service (Azure/Cloud) — 90%
- Deploying the Reports to End user
- Power BI Report Server (On Premises) — 10%
- Deploying the Reports to End user
- Power BI Mobile— Mobile App (iOS, Android, Windows)

Note Big Dis-advantage of Power-BI is Limitation in Storage of Data in Power pivot. Maximum Size Of data Load in power pivot is 10GB at a time means 1000 rows
Unit testing is done by the Developer Himself

SDLC-Software Development Life Cycle

1. we requirement and we get document called software requirement Specification Document
2. We analyzed and Designed.
- 3.Coding

4. Testing
5. Released Report.

Save the Power BI Reports

- Save— Definition — PBIT
- Save- Data + Definition PBIX (default)

PBIT Vs PBIX

What is a PBIT file?

- A PBIT file acts as a Power BI template.
- It doesn't include any data from your source systems.
- So, if you are fetching up data from Excel files with some data from SQL Server and load that data into your Power BI model, when you save that file as PBIT it clears all of your data, but keeps your report structure.

PBIT Vs PBIX

• What is a PBIX file?

- In contrast, Power BI model is in Data Import mode, then not only you store the report structure, but also you store all the data imported from different data sources into Power BI.
- Therefore, when you share the PBIX file with others you are indeed sharing a report along with its underlying data.

Building Blocks in Power BI

- Data Sets
- Power Query and Power Pivot
- Tables, Relationships, Data Modeling, DAX, Enhancements
- Visualization (Power View/Report View)
- Render the data in the form of Images
- Report (Power BI Desktop)
- ETL Data Model + Enhance Data Model + Visualizations etc
- Dashboard— Power BI Services
- High level information from Reports

- Create Dashboard from multiple reports
- Tiles (Each object in the report)
- Logo
- Reports
- Text Boxes etc

Relationships/cardinality

- **1 to 1**
 - any primary key can become a foreign key
 - 2 tables
 - 2 primary keys
 - 2 foreign keys
 - There is no repetition in foreign key
- **1 to many**
 - 2 Tables
 - 2 Primary keys
 - 1 foreign key (parent to child)
 - Only Parent PK becomes a Foreign key not vice versa
 - There can be repetition in foreign key
- **Many to Many**
 - RDBMS/SQL can not deal with Many to many relationships; it needs a Bridge table to be created.
 - 3 tables,2FK,2PK
- **Foreign key is the primary key from other table**
- **Power BI able to create many to many Relationships without having a bridge Table from 2020.**
- **Why do we need relationships.....**
 - To retrieve the data from multiple tables
 - Entity means Tables
 - Attributes/field means Column

Entity instance means [Rows](#)

Filters

- Filter Types
- Basic— Show only North Data
- Advance — Show North, South, West Data

Ex:Filter Date Columns — No Basic here , only Advance
Filtering

- Filter Region Columns
- Never use Basic filtering
- Issues with Basic Filtering- Filter : South, East, West
- Do it with Adv Filtering

Date Filters

- Is in the Previous =
Last 30 days
- Is in the Next = Next 2 days or Next 2 Years
- Is Earliest = Min(date)
- Is Latest = Max(date)

● When should we used transformed ?

If you want to edit or make some changes in it then used transformed column

● When should we use the add column ?

If you do not want to disturbed the data then used add column

Data Types:

Note: If You Want To Change The Datatype Automatic Just Select All The Column And Go To Transform And Select Detect Data Types Data Type Will Selected Automatically

- PBI read 1st the first 1000 rows and assigns the data types

Row Transformations

- Header Rows/ Use First Row as Header
- Use Headers as First Row
- Keep Top Rows/Keep Bottom Rows/ Keep Range — Complete Table
- Keep Errors — Complete Table/Selected Columns
- Remove Error Rows — Complete Table/Selected Columns
- Remove Blank Rows— Complete Table
- Remove Empty Rows— Complete Table
- Keep Duplicates — Complete Table/Selected Columns

Pivot and UnPivot

- Pivot - Convert Rows to Columns
- UnPivot - Convert Columns to Rows

Transpose

- Columns to Rows
And
- Rows to Columns

Questions about PowerBI.....

1. Tell me about your Project ?
- 2.What Kind of schemas are used in your Data warehouse ?
- 3.Tell me some Dimension tables from your data warehouse ?
- 4.What kind of DAX expressions in your Report ?
- 5.Tell me one live scenario, one of your reports that you made?
- 6.How did you load them with the help of SSIS ?
- 7.What are the sql queries you have ?
- 8.What are the Primary Key Foreign Key relationships ?
- 9.Tell me the Dimension Table Name , Fact Table Name?
- 10.

Combine Queries/ Tables

- Joins = Merge Queries
- Union All = Append Queries (Union All)

Joins Types (Merge Queries)

- **Inner Join/Simple Join/Natural Join**-In this we Have to Fetch only common Values From Both Tables .
- Outer Join
 - **Left**-In this join we have to Fetch all values from the left Table and only Matching Values From Right Table.
 - **Right**- In this we Have to Fetch all the values from the Right Table and only Matching values From Left Table.
 - **Full**- In this we have to Fetch all the Values From both the Tables where it Matches or not.
- **Cross Join**- In this join Each row of one Table Multiply with Each row Of another Table.
- **Self Join**-Join the Table with Itself Means Each row in a table is Join to Itself and every other row in that Table.

Joins Types (Merge Queries)

- **Left Anti**
Non Matched from Left Side Table
- **Right Anti**
Non Matched from Right Side Table

Append Queries (Union All)

- Combine data from multiple data sets
- Check Order of columns in all the data sets
- Corresponding Columns data types should be similar
- Keep Duplicates by default
- Same no of columns in all the data sets
- Else, will get null values

Append Queries (Union All)

- **Combine the data from multiple files**

Case I:

- Use Folder with Multiple Files
- Place Homogeneous files in the folder
- Note: Heterogeneous files in the folder will NOT **work**

. Case 2:

- Use folder with Excel with Many sheets

Union vs. Union All

• Union

To remove duplicates

- Slow running

• Union All

To keep duplicates

Fast running

Duplicate Vs. Reference in Power Query

- Duplicate—it means copy as it is in new table
- Reference—same as it is like duplicate but if data is update in table A it automatically will be updated in table B (link both the table)

Refresh

Refresh all— it refresh all the table

Refresh preview— it refresh only selected table

Why joins

1. To get the data from multiple tables/queries.
2. We must have common column to join the tables/queries/data set.
3. Large size of data then join is required.

SQL

Note : We can join 255 Tables

Power Bi

Note : we can Join only 2 tables

- default join in PowerBi is Always Left Outer Join
- Default join in SQL is always inner join

Report with Parameters in power bi

- Dynamic Filters in PBI
- Create a Parameter
- Suggested Values
 - Any Val
 - List of Values
 - Query
- DefaultValue
- Current Value
- Multiple Parameters

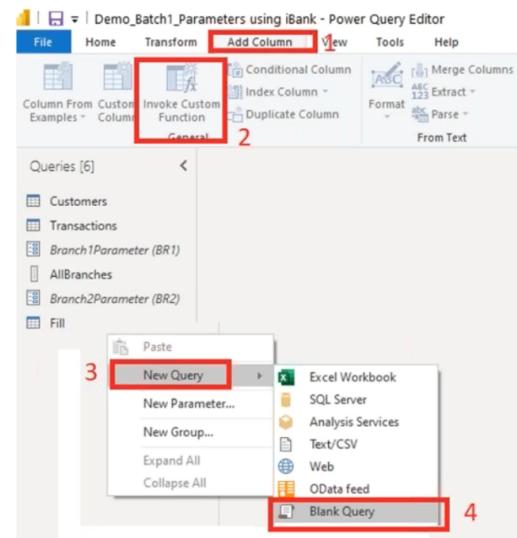
Custom Functions

- Create Function using M code
 - Use it anywhere
 - M Code case sensitive
-
- Ex:
 - Add 2 numbers

Code:



= (x as number, y as number)=> (x + y)



Conditional column

If and else statement

Power Pivot

- In memory Database
- Stores data in Memory
- 10 times Faster
- Compress the data

- Row Databases

SQLServer and Oracle

Slower

Row data stored in harddisk

- Columnar Database

Power Pivot/ SSAS tabular model

Faster

Columnar data stored in Ram

Note: In power pivot we can store 10gb of data that also in compressed more than 10 gb we can't store data

Note: while taking the data from sql there two types

1. **Import query**= in import query we take the data from database and load in power query and power pivot and then power view if we update the data in database so we have to refresh it in power view or in power query then only new data can be seen
 - It is faster
 - It loads data 10 gb
2. **Direct query**= in direct query we take the data from database and load in power query and direct load in power view no need to load data in power pivot we don't have to refresh the data this is live connection if we update the data in database it will automatically updated in power view no need to refresh the data 10 times
 - It is slower
 - It loads data in TB

When to use Direct Query

- When we have large data
- When we wanted to get live data
- Note: It is only for sql databases... not for Excel or csv files

When to use Assume Referential Integrity Options

It is enable only in direct query while modeling by default it is left outer join in this matching data from both the table and unmatching data from right table but using the Assume Referential Integrity option unmatched data will be deleted it means that it becomes inner join

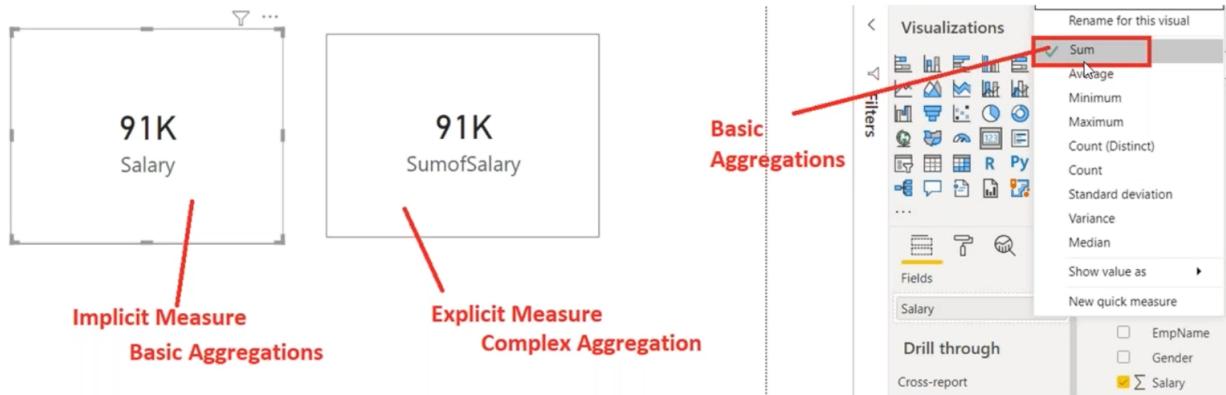
DAX Expressions

- Calculated Columns- In which we Create a Column using DAX formula.
- Measures- It is not Visible until we take it to Visualization.
 - * Implicit
 - *Explicit

Measure is not a static value

- Measure will not be added in the table
- Measure is displayed in visualizations
- **Measures 2 types**
- **Implicit**
 - No formula
 - Basic Aggregations
- **Explicit**
 - With Formula
 - Complex Aggregations

Implicit vs Explicit Measure



New Column vs New Measure

New Column

Calculated column is add in a new data set and increase your space

- When we need a calculation on every Single row
- It will be added as part of table
- Table size will increase
- When we refresh New Column values are re-calculated
- Name must be unique in a table level

New Measure

Measure is generic function which will not stay on data set just drag the any visualization which will give the result

- When we need an aggregation and works on group of rows/all rows
- Eg: Percentages, Ratios, Aggregations Etc

It will not be added in a table, shown in visualizations

- Table size will NOT increase, stores formula
- It's not static

Re-calculated in response to any changes to filters/add any dimension in visualization

Name must be unique across all tables/model

DAX

Arithmetic Operators

- Add (+)

- Subtract (-)
- Multiply (*)
- Division (/)

Comparison Operators

- Equal To (=)
- Greater Than (>)
- Greater Than or Equals To (>=)
- Less Than (<)
- Less Than or Equals To (<=)
- Not Equal To (<>)

Text Concatenation Operators(to Combine)

- Ampersand (&)

EX:

Logical Operators

- && (And) — Double Ampersand Symbol
- || (Or) —Double Pipe Symbol

Eg: When the City = "BLR" and DeptID = 10 then increase salary to 1000

Logical Operators

DAX Functions

- Text/String Functions
- Logical Functions
- Date and Time Functions
- Math and Statistical Functions

- **FullName**
FullName = Fname & " _ " & LName

John_Kennedy I

Filter Function

- Time Intelligence Functions

Text/String Functions

- Len()
- Concatenate()
- Left() ↗
- Right()
- Mid()
 - Similar to substring()
- Upper()
- Lower()
- Trim()
- Substitute()
- Replace()
- Blank()

DAX Logical Functions (Condition Based)

- IF... ELSE()
- Nested IF
- True() and False()
- Switch()
- IfError()

- IFERROR(SalesAmt/Qty, 0)

FORMAT FUNCTION

- To get DayName from Date
- DayName = "dddd")

Nested IF()

- IF within IF
 - If the salary < 2000 then “Low”, salary > 4000 then “High” else “Medium”
- `EmpType = IF(Emp[Salary]<2000, "Low", IF(Emp[Salary] >= 4000, "Medium", "High"))`

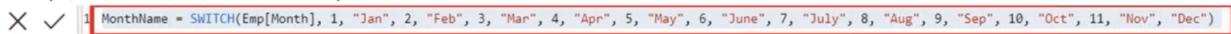
True () and False()

- Commission = IF(ISBLANK(Emp[Bonus]),TRUE(), FALSE())

Switch()

- Use Switch() instead of multiple IF conditions

`MonthName = SWITCH(Emp[Month], 1, "Jan", 2, "Feb", 3, "Mar", 4, "Apr", 5, "May", 6, "June", 7, "July", 8, "Aug", 9, "Sep", 10, "Oct", 11, "Nov", "Dec")`



|N{}

- RevNewSalary = IF (Emp[DeptID]=10 || Emp[DeptID]=20 || Emp[DeptID]=30 || Emp[DeptID]=40, Emp[Salary]+10000, Emp[Salary]+20000)
- RevNewSalary = IF (Emp[DeptID] IN {10, 20, 30, 40}, Emp[Salary]+10000, Emp[Salary]+20000)

IFError()

- Returns 0 when error occurs else the value
- Eg:
 - DailyWage = IFERROR(Emp[Salary]/Emp[NoOfDays], 0)

Date and Time Functions

- Year()
- Quarter()
- Month()
- Week()
- Day()
- EOMONTH()
- DateDiff()
- Calendar()
 - CALENDAR(Date(2015,01,01), Date(2020,12,31))
- CalendarAuto()
 - DimTime = CALENDARAUTO()
- Date()
 - FORMAT()
 - Today()
 - Now()

Diff between calendar and calendar auto

In calendar we have to choose start date and end but in calendar auto just select the date column it automatically detect start date and end date

DAX Math Functions

- INT()
- Currency()
- Round()
- RoundUp()
- RoundDown()
- Divide ()
- Even()
- Odd ()
- Power()
- Sqrt()
- Factorial()
- Sign()
- Note: Use Adv Works Sales and Emp, Dept Data

Math Functions

- INT()
 - Converts into Integer
 - Removes decimals
 - Eg: SalaryInt = INT(Emp[Salary])
- Currency()
 - Converts into Money
 - Eg: SalesAmt = Currency (Sales[SalesAmount])
- Round()
 - It rounds the number to the given number of digits
 - If the decimal point is >=5 then it rounds the number to the next digit
 - Eg: RoundSalary = ROUND(Emp[Salary],0)
- RoundUp()
 - It will take the number to next level
 - Eg: RoundSalary = ROUNDUP(Emp[Salary],0)
 - Eg: RoundSalary = ROUNDUP(Emp[Salary],1)

Structure										Formatting	Properties	Sort	Group
EmpID	EmpName	DeptID	Salary	Bonus	Gender	City	DOJ	SalaryInt	RoundSalary				
1	Achamyeleh	20	1800.92		M	BLR	17 August 2021	1200	1201				
2	Preetham	10	1900.34	200	M	HYD	12 October 2011	1500	1500				
3	Naser	30	2000	240	M	CHN	02 January 2011	2000	2000				

Math Functions

- RoundDown()
 - Round down to nearest integer with decimal places
 - It is same as INT
 - Can pass decimal or integer
- Divide()
 - Divide (Numerator/Denominator,[AlternateResult])
 - Eg: DivSalary = DIVIDE(Emp[Salary],Emp[Bonus],0)
 - If you do not give 0, then shows null
- Even()
 - Round up the number to the next even nearest integer
- Odd()
 - Round up the number to the next odd nearest integer

Math Functions

- Power()
 - Power (2,2)
 - Square Root of the Number
- Sqrt()
- Factorial()
 - Factorial (5)
 - Output: $5 \times 4 \times 3 \times 2 \times 1$

Math Functions

- **Sign()**
 - Returns 1 when the number is Positive
 - Return 0, when the number is 0
 - Returns -1 when the number is Negative
 - **Eg: ProfitSign = SIGN(Sales[Profit])**
- **Requirement**
 - Show no of positive profit orders
 - Show no of negative profit orders
 - Show no of zero (0) profit orders

DAX Statistical Functions

- SUM()
- SUMx(Table, Expression)
- MIN()
- MINx()
- MAX()
- MAXx()
- COUNT()
- COUNTx()
- AVG()
- AVGx()
- COUNTROWS()
 - Count of rows in a table
- COUNTBLANK()
 - Get the count of blank values in a column
- RANKx()
- Summarize()

DeptName	SumOfSal	SumOfNetSalary
----------	----------	----------------

	5,750.57	6,510.57
Accounts	9,951.68	11,801.68
Auditing	3,000.00	3,120.00
Marketing	15,060.23	17,130.23
R and D	22,650.56	26,525.56
Sales	13,770.35	15,695.35
Security	14,055.89	16,845.89
Technical	5,950.00	8,570.00
Total	90,189.28	1,06,199.28

Sum() Vs SumX()

- Sum()

- Adds all the values in a given column
- SUM(Col Name)
- $\text{SumOfSalary} = \text{SUM}(\text{Emp}[Salary])$

- SumX()

- Returns sum of an expression evaluated for each row in table
- SumX(Table, Expression)
- $\text{SumOfNetSalary} = \text{SUMX}(\text{Emp}, \text{Emp}[Salary]+\text{Emp}[Bonus])$

DeptName	SumOfSal	SumOfNetSalary
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www.GoOnlineT

Diff between sum and sumx is while calculating the net salary by using sum option we have to add salary and bonus and we have to create another column it occupy space in ram instead of that use sumx

Min() Vs MinX()

- Min()

- Gets the min value in a given column
- MIN(Col Name)
- $\text{MinSalary} = \text{MIN}(\text{Emp}[Salary])$

- MinX()

- Returns min value of an expression evaluated for each row in table
- MinX(Table, Expression)
- $\text{MinNetSalary} = \text{MINX}(\text{Emp}, \text{Emp}[Salary]+\text{Emp}[Bonus])$

DeptName	SumOfNetSalary	Min of Salary	MinNetSalary
R and D	26,525.56	1,600.00	1,950.00
Marketing	17,130.23	1,800.00	1,900.23
Security	16,845.89	1,800.89	2,380.00
Sales	15,695.35	110.01	255.01
Accounts	11,801.68	1,200.92	1,200.92
Technical	8,570.00	1,100.00	1,600.00
	6,510.57	2,300.57	3,060.57
Auditing	3,120.00	3,000.00	3,120.00
Total	1,06,199.28	110.01	255.01

Count() Vs CountX()

- Count()
 - Counts no of rows in a given column
 - Count(Col Name)
 - **NoOfOrders = Count(Sales[SalesOrderNumber])**
 - **NoOfEmps = Count(Emp[Bonus])**
 - Note: It counts non null values, Always provide non null column to the count()
- CountX()
 - Returns no of rows of an expression evaluated for each row in table
 - CountX(Table, Expression)
 - **NoOfOrders = CountX(Emp, Emp[Salary]+Emp[Bonus])**

RankX()

- RankX(Table, Expression, [Value], [Order], [Ties])
 - It assigns Rank Number based on given column
 - RankNo = RANKX(Emp, Emp[Salary])
 - TIES
 - DENSE or SKIP
- DenseRankNo = RANKX(Emp, Emp[Salary],,,DENSE)



EmplID	EmpName	DeptID	Salary	Bonus	Gender	City	DOJ	RankNo
6	Prasad Rao Thamada	10	4700	350	D	CHN	17 March 2012	1
8	Sewan Das	50	4670.23	800	M	HYD	19 March 2012	2
33	Valbhav Borse	30	4550	610	M	PUNE	19 April 2021	3
22	Krishna Kanduri	50	4550	660	M	BLR	15 September 2016	3
23	Kalyan Phaniendar	20	3670	480	M	PUNE	25 November 2016	5
14	Ramana Sripani	50	3560.33	955	M	CHN	14 June 2013	6
16	Sesikumar Rajagopal	50	3500		M	CHN	16 July 2013	7
32	Arvind Reddy	60	3500	720	H	HYD	15 July 2019	7
21	Kusuma Ranjith Kumar	60	3500	790	M	HN	23 September 2016	7

Dept Wise Ranking Based on Sum of Salary

- RankBasedOnSumSalary = Rankx(All(Dept[DeptName]),
[SumOfSal],,,DESC,Dense)

DeptName	SumOfSal	RankBasedOnSumSalary
IT	100000	1

Summarize()

- Summarize()
 - It gives you aggregated values to speed up the PBI report
- Requirement
 - Get **Order year wise Sales Amount**
 - Create an aggregated table and use it, instead of aggregating values on the fly
- Steps:
 - Create New Column and Add OrderYearNo
 - Create New Table and New Table
 - OrderYearWiseSales = SUMMARIZE(Sales, Sales[OrderYearNo], "TotalSales", SUM(Sales[SalesAmount]))

Summarise is equal to group by statement in sql

Time Intelligence Functions

- It means doing calculations over time or date periods
 - It needs date column to perform operations
 - This date column must contain
 - Continuous Values
 - No Nulls
 - Unique Values
 - To make Intelligence Functions work properly, mark as a Date Table
-
- If you Want to Bring data From Dimension Table to Fact table Then You can use Related.
 - If You want to Bring Data from Fact Table to Dimension Table then You have to use RelatedTable.

Time Intelligence Functions

- Total MTD – Month To Date
 - Create a Measure
 - TotalMTDSales = TOTALMTD(SUM(Sales[SalesAmount]), DimDate[FullDate])
- TotalQTD – Quarter To Date
 - Create a Measure
 - TotalQTDSales = TOTALQTD(SUM(Sales[SalesAmount]), DimDate[FullDate])
- TotalYTD – Year To Date
 - Create a Measure
 - TotalYTDSales = TOTALYTD(SUM(Sales[SalesAmount]), DimDate[FullDate])

Calculate()

- Calculate()
- Eg: Want to create a Measure by Applying Filter
- Filter Functions

Calculate sales for Black Color Product

Time Intelligence Functions

- PreviousDay
 - PDSales = CALCULATE(SUM(Sales[SalesAmount]), PREVIOUSDAY(DimDate[FullDate]))
- PreviousMonth
 - PMSales = CALCULATE(SUM(Sales[SalesAmount]), PREVIOUSMONTH(DimDate[FullDate]))
- PreviousQuarter
 - PQSales = CALCULATE(SUM(Sales[SalesAmount]), PREVIOUSQUARTER(DimDate[FullDate]))
- PreviousYear
 - Create a Measure
 - PYSales = CALCULATE(SUM(Sales[SalesAmount]), PreviousYear(DimDate[FullDate]))

Time Intelligence Functions

- SamePeriodLastYear
 - Create a Measure
 - SamePeroidLastYear = CALCULATE(SUM(Sales[SalesAmount]), SAMEPERIODLASTYEAR(DimDate[FullDate]))

Time Intelligence Functions

- NextDay
- NextMonth
- NextQuarter
 - NextQtrSales = CALCULATE(SUM(Sales[SalesAmount]), NEXTQUARTER(DimDate[FullDate]))
- NextYear
 - Create a Measure



%YoYGrowth

- Year on Year Growth
- Formula = (Current Year Sales – Previous Year Sales)/ Current Year Sales * 100
- Eg:
- %YoYSalesGrowth = ([SumOfSales]-[PYSales])/[SumOfSales]

YearNo	SalesAmount	PYSales	%YoYSalesGrowth
2005	32,66,373.66		100.00%
2006	65,30,343.53	32,66,373.66	49.98%
2007	97,91,014.31	65,30,343.53	33.30%
2008	97,70,899.74	97,91,014.31	-0.21%
2009		97,70,899.74	-Infinity

Filter Functions

- **Calculate()**
- **All()**
- **UseRelationship()**
- **Related()**

Filter Functions

- Calculate()
 - Want to create a Measure by Applying Filter
- Data Source:
 - Adv Works RetailData.xlsx
- Eg:
 - Calculate Sum of Sales
 - Create a Measure
 - BlackColorItemSales = CALCULATE(SUM(Sales[SalesAmount]))
 - Calculate sales for Black Color Product
 - BlackColorItemSales = CALCULATE(SUM(Sales[SalesAmount])), Products[Color] = "Black"

One more solution

- To get %Sales

The screenshot shows a Power Pivot table with columns: SubcategoryName, SalesAmount, and SalesAmount. The third column has a red box around its header. A context menu is open over the third column, with 'Show value as' highlighted. Under 'Show value as', 'Percent of grand total' is selected and also has a red box around it. The background shows the Power Pivot Fields pane with various measures listed.

SubcategoryName	SalesAmount	SalesAmount
Bike Racks	39,360.00	39,360.00
Bike Stands	39,591.00	39,591.00
Bottles and Cages	56,798.19	56,798.19
Caps	19,688.10	19,688.10
Cleaners	7,218.60	7,218.60
Fenders	46,619.58	46,619.58
Gloves	35,020.70	35,020.70
Helmets	2,25,335.60	2,25,335.60
Hydration Packs	40,307.67	40,307.67
Jerseys	1,72,904.69	1,72,904.69
Mountain Bikes	99,52,759.56	99,52,759.56
Road Bikes	1,45,20,584.04	1,45,20,584.04

Need More Active Relationships

- Solution – 1
 - Get the DimDate Table once more
 - DisAdv
 - It will occupy more space in Power Pivot
- Solution – 2
 - Use USERELATIONSHIP()
 - Create a Measure
 - ShipDateSales = CALCULATE(SUM(Sales[SalesAmount]),USERELATIONSHIP(Sales[ShipDate], DimDate[FullDate]))
- Note : DimDate Table is called as Role Playing Dimension Table
- Note : If there is no space issues in Power Pivot, then Solution – 1 is the best one

-Power views

Power View Topics

1. Intro to Power View and Installing Power BI Desktop
2. Basic Visualizations
3. Filters and Visual Interactions
4. Hierarchies and Drill Down Reports /Visualizations
5. Grouping, Binning and Sorting
6. Power BI Visuals
7. Bookmarks and Selection Pane

Power BI Desktop

Visual Interactions / Edit Interactions

- Highlight Action
 - Filter Action
 - None
- Whenever, we select any thing, first priority is **highlight action**
- By default, either Highlight or Filter

- Fields Pane
- Tables are organized in Sorting Order
- Search Option: For Column Search
- Visualization
 - common Visualizations displayed
- 200 Visualizations
- Filters
- To show subset of data
- Menu/Ribbon
- Report View, Data View, Model View
- Report Canvas
- To create visualizations
- Pages

- To add pages, duplicate the page, delete page etc

Filters

- To show subset of data
- Types of filters Power View
 - Visual Level Filters / Filters on this visual / Want to filter the data on the visualization level
 - Page Level Filters / Filters on this page
 - Report Level Filters / Filters on all pages
 - Drill Through Filters

- **Visual level filter means only on that visual**
- **Multiple pages equal to one report**
- **Page level filter means on that page only**
- **Report level filtering all pages filter**
- **Drill through filter means jump one page to another page carrying filter**

Filters Sub Types

- **Basic Filtering**
- **Advanced Filtering**
- **Top n Filtering**
- **Relative Date Filtering**

Drill Through Filters

- Filter the data across pages, we can use drill through filters
- Jumping from one page to another using filters



Text Filters – Adv Level

- Starts With
- Does Not Starts With
- Contains
- Does Not Contains
- Is Blank or Is Not Blank etc
- And / OR



- Text Filters are **case insensitive**

Top N

- Get the Top 5 Customers list based on highest sales amount
- Note: Top N is available only on Visuals level, but NOT on page or report level

The screenshot shows a Power BI report. On the left is a table visual titled "Filters" with the following data:

FirstName	SalesAmount
Morgan	1,45,044.58
Ian	1,38,315.87
Jennifer	1,34,931.19
Kaitlyn	1,32,208.01
Chloe	1,32,085.40
Total	6,82,585.05

On the right is the "Filters" pane, which displays the applied filter:

- Filter type: Top N
- Show items: Top 5
- By value: SalesAmount
- Apply filter button

Red boxes highlight the "Top N" dropdown, the "5" input field, the "SalesAmount" dropdown, and the "Apply filter" button.

Last 5 Days Sales

- Use Relative Date Filtering

Filters on this visual

OrderDate 25-12-2007 - 01-09-2... Filter type ⓘ Relative date Show items when the value is in the last 5 days

Include today Apply filter

Sales Happened today

- Using is in this
 - This Day – Today
 - This month – Current Month
 - This Year – Current Year
 - This Week – Current Week
- Using is in the next (For Future Dates)
 - Next Day
 - Next Month
 - Next Calendar Month

Filters on this visual

OrderDate 01-09-2021 - 01-09-2... Filter type ⓘ Relative date Show items when the value is in this day

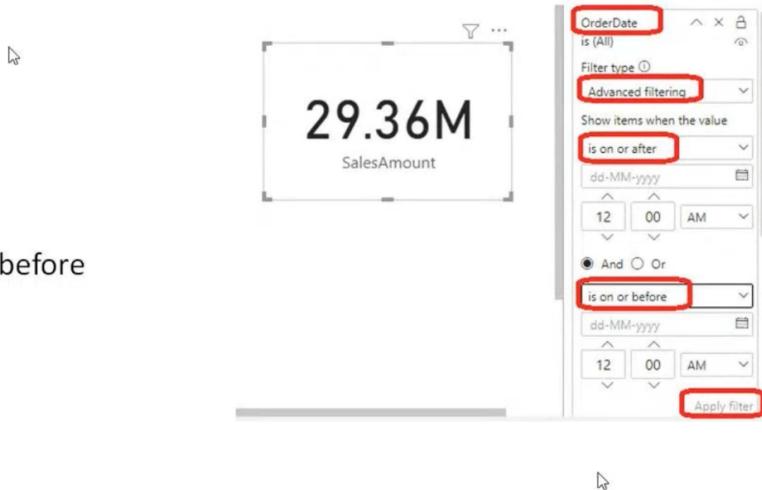
Apply filter

Date Between

- Solution 1:
 - Use Slicer



- Solution 2:
 - Use Visual Filter
 - Is on or after and is on or before



Agenda

- Hierarchies and Drill Down Reports
- Types of Hierarchies
 - System Defined
 - Cannot be modified
 - User Defined
- To create Hierarchies
 - We must have related dimensions
 - Eg: Category, Sub Category, Product
 - Eg: Country, State, City
- Dimension may have zero to more hierarchies

What is Hierarchy

Ans: Arranging the cols in the proper sequential order

DWH

Large DB

Historical Data

Dim and Fact

Dim Table will have e or more hierarchies

**Order
Why
To
Hierarchy
create drill down
reports**

Types of Visualizations

- Basic Data Visualizations
- Visuals of Filtering 
- Visualizing Categorical Data
- Visualizing Trend Data
- Visualizing KPI Data
- Visualizing Tabular Data
- Visualizing Geographical Data
- Leveraging PBI Custom Visuals

Filtering Visualization

- Slicer Visualization
 - Purpose
 - To Filter the Dimension data in the report page by the end users
 - Field Wells
 - Where to place dimensions and facts
 - Formatting Options

Categorical Visualizations

- Pie Visualization
 - Purpose
 - To show categorical data
 - When we have less categorical data
 - Field Wells
 - Where to place dimensions and facts
 - Formatting Options

Region Wise , Category Wise Sales and Profit

- When we add Region and Category in Legend, we will get drill down report
- So add the Category in Details
- It does not allow, when we drag and drop Profit into Value
- Note: When we have two Dimensions and Pie chart allow only ONE fact value

Tooltip

- Visualization look and feel do not change
- I wanted to have 2 dims and 2 or more facts
 - Eg: Region wise , Category wise sales and profit
 - Drag the 2nd fact column to the tooltip
 - Note: No limitation to tooltip (add fact columns)
- Note: Subtotals cannot be shown in the pie chart

note:Pie chart and donut chart is same both are also use in categorical data when less amount of categorical data is there use pie or donut chart if medium amount of categorical data is there then use tree map

Tree Map Visualization

- To show medium level categorical data/values
- Eg: Sub Category wise Sales

Product Wise Sales

- TreeMap is cannot be used
 - When we have more no of categorical data
- Use
- Bar Charts
- Column Charts

Stacked Bar Chart

- When we have more no of categorical values
- We can use Bar and Column Charts
- Scroll down and see the complete data
- Eg: Product Name wise Sales
- Note: One Dim and One Fact → Stacked Bar Chart will work as **Bar Chart**
- Stacked
 - One value on top of another value is called as **stacked**
 - Eg: Product Name wise Sales and Profit

Conditional Formatting

- Data Colors
 - Show negative values in Red and 0 to 10000 in Green and 1000 and above in blue

Default color - *Data colors*

Format by

Rules

Based on field

Summarization

Sum of Profit

Sum

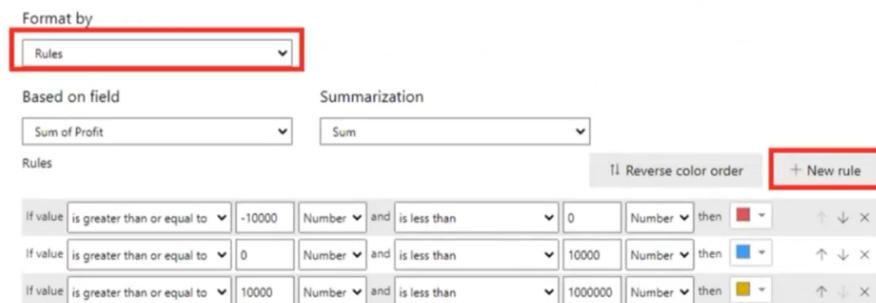
Rules

+ New rule

If value is greater than or equal to -10000 Number and is less than 0 Number then Red

If value is greater than or equal to 0 Number and is less than 10000 Number then Blue

If value is greater than or equal to 100000 Number and is less than 1000000 Number then Yellow



Stacked Vs Clustered

- Stacked
 - One value on top on another value
- Clustered
 - One value to next to another value

Scattered chart

Category Wise Region Wise Sales and Profit



Grouping = grouping data with dimensional table only text data

binning= binning data is also know as grouping the but fact table or numrical data will be taken

Group and Binning

- Customized Groups
- Dimension
 - Text
 - Date and Time
 - Number
- Group
 - Text
- Bin
 - Date
 - Numbers

Line Chart

- Used to visualizing time series data or trend data
- Eg: Year Wise Sales
- We can understand the Trend
 - Increasing Trend
 - Decreasing Trend

Area Chart

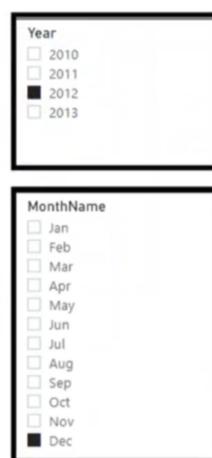
- Used to visualizing time series data or trend data
- Eg: Year Wise Sales
- We can understand the Trend
 - Increasing Trend
 - Decreasing Trend

Line and Stacked Column Chart

- Combining Line and Stacked Column Chart
- It is also called as Combination Chart

Gauge Visualization (Targets and Goals)

- To Understand Sales Vs Targets
- Min Value 0
- Max Value (Sales x 2)

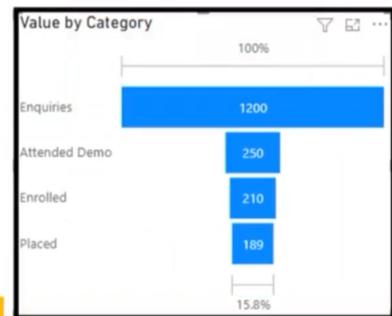
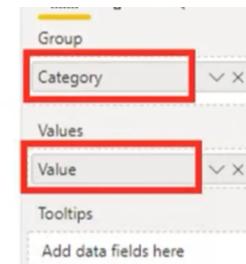


KPI Visualization (Targets and Goals)



Funnel Chart

- When the business contains multiple processes
- Identify bottlenecks in any process
- Similar to Bar Chart
- Rarely, we get this type of data



Map data

- Latitude and Longitude will give you accurate map
- Use Latitude and Longitude, when PBI Map is not able to find out proper place

Filled Map

- Show the sales values in different color
 - Use Data Color
 - Apply Conditional Formatting

matrix

Conditional Formatting

- Show/change the font color based on the condition
- Display Trend (Down Arrow and Up Arrow)
 - Icons

Power BI Service

- Power BI Service
- OLTPVs OLAP
- Create Reports on OLAP
- Datasets/OLAP
- Reporting Requirements
- Dashboard Requirements
- One dataset will have one or more reports and dashboards
- Note: Do not create many datasets
- **Share the Reports with Clients**
- Azure Cloud Based Server

- To Share and Deploy the reports
- Manage the Reports

To create Reports

- Check Relationships
- Any New Columns/New Information to be created or not
- New Column
- New Measure
- New Table

Power BI Project

- Create a Data Set
- Data Source: Adv Works
- Save this project
- AdvWorksDataSet.pbix
- Share this project
- Create a Workspace in Power BI Service
- AmazonReports

Scenario

- 20 Tables
- 10 Reports
- Size is 20GB
- Cannot store in power Pivot
- What can be done:
- Store 10 Tables and create 5 Reports
- Store another 10 Tables and create another 5 Reports
- We must know
- What datasets we must create
- What reports we must have on the given dataset

Report Contains

- Datasets/OLAP Data
- Dashboards
- Note: Share the reports and dashboards to the client

Power BI Service Topics

Create PBI Service Account and Log in to PBI Service

Create Multiple Reports in PBI Service using Datasets using Multiple DEVs

Create Dashboards on Reports

Datasets -i Reports Dashboards

Refresh the Data or Schedule the refresh

Install and Configure Data Gateway to refresh schedule

Understand all the Sub Folders in Workspace

Team Collaboration

Create Workspace

Add a Member/DEVto the workspace

Assign Roles to Members/Devs

Share the Reports and Dashboards to End user

Apply Row Level Security

Power BI Service Licenses

- Pro licenses
- Premium licenses

Power Query (ETL)

Power Pivot

DAX

Data Modeling (Relationship)

Create Dataset and Share/Dep10y PBI Service

Create Report

Create Dashboards

Get the Data From :

- Tables
- Queries
- Stored Procedure
- UFDs

- **To Create power Bi datasets**
 1. Study existing reports
 2. Study existing OLTP/Sources
 3. Study Future Report Req, KPIs, Dashboards, Summary

Create Reports

- Trend or Time Analysis
- Line Charts
- Categorical Data Analytics
- PIE
- . Totals
- . Card
- City Wise Sales
- Map
 - Report gives detailed information
 - Dashboard gives highlights only

Dashboard

- Detail Level Info
- Reports
- High Level Info
- Dashboard
- Dashboards will be created in PBI Service
- Dashboard is a read only view of high level information
- Dashboards can be created on multiple reports and multiple datasets

Cannot add Slicer to Dashboard

- Since dashboard will have multiple datasets
- They do not have relationships
- Pin to a dashboard
- Can add slicer here in this page
- When we share the dashboard with user, they will have access to underlying Reports and Datasets as well
- Dashboard can be created using
- Same dataset
- Or different dataset

Jump from Dashboard to Parent Report

yes

- To see detailed level info

Formatting the dashboard

- Company Logo
- Dashboard Title
- High Important Visuals —Top Left
- Low Important Visuals— Bottom of the page
- Accommodate all visuals in a single page
- How to check size of dataset in PBI Service
- Schedule refresh
- Why Data Gateways
 - Data Gateway
When we refresh the data on premises to Cloud (PBI service)
On Premises (desktop) to get Edited data We required Data gateway software
But on cloud we don't need any software to get edited data.

Where should we install Data GateWay software?

Ans: Source only

Data Gateways

- It is a software
- It acts bridge between on premise data sources to PBI Service datasets
- It moves data from data sources to datasets in PBI Service
- To get the data to PBI Service when we use Direct Query

Where to install the Data Gateway app

- Install in OLTP/Data Sources
- SQL Server
- Oracle
- Shared Folder etc
- Note:
 - No Gateway is required for Azure Data Sources
 - Gateway is required only for On-Prem to Cloud

Types of Gateways

- There are 2 Types
- Personal Gateways (Local)
 - One user can use it
 - Supports Only for Import / Schedule Refresh
- Standard Gateways (Global)
 - Recommended
 - Shared with others
 - Re-usability with many users
 - Supports Import / Live Query / Schedule Refresh
- Difference between Gateways

● Data connectivity Mode

- Files- import - cached in RAM (Data + definition)
- DB - import-cached in RAM (Data + definition)
- DB (400GB)- direct query/ live query(cached with definition) no data
- Cube/PBI datasets(tabular/multi dimensions)-connet live/live - nothing is cached

Data Connectivity Modes

- Import/Cached
 - Less than 10 GB of Data
 - Loads Table Schema and Data

- Direct Query (DBs)
 - When we have more than 10 GB of Data
 - Loads only Table Schema
- Live (Cubes)
 - When we have TB of Data
 - Inherits the Cubes structure (Tabular and Multi Dim)
 - we do not create any data model structure within Power BI
- Files
 - Import (Cached)
- * DB
 - Import! (Cached)
 - Direct Query shows the up to date data
 - No Refresh is required
- Cubes / Datasets for PBI Service
 - Connect Live / Live

Configuring Data Gateways (2 Steps)

Go to app.powerbi.com

1) Path:

- Manage Gateways -- Path of excel file
 ... -- > Settings -

2) Go to work space and click on Datasets + Dataflows

Go to the dataset -

- click on
 settings -
 - Gateway Connection

Scenarios for Data Gateways

- SQL Server with Import
- SQL Server with Direct Query
- Excel with Import
- SQL and Excel Import

Interview Questions

- How many times we can schedule per day
- Pro License —8 Times
- Premium License — 48 Times
- What is interval for one schedule another
- 30 Mins
- Note: No limitation for manual refresh

Workspace and Members

- Create a Workspace
- Add Members /Roles to Workspace
- Admin
- Member
- Contributor
- Viewer

Actions on Workspace

- 1.Update Workspace (Change Name of the Workspace)
 - 2.Add Members to the Workspace
 - 3.Add/Delete/Update Members from the Workspace
 - 4.Add Content (Dataset, Report and Dashboard) to the Workspace
 - 5.Add/Delete/Update Content
- Share the Content with End Users
- 6.View the Content in the Workspace

Members/ Roles

- Admin (All- 1st to 6th)
- Member (2nd Partially and 4th to 6th)

- Contributor (4th and 6th)
- Viewer (Only 6th)
 - We share reports and dashboards to end users not the datasets.
- Share the Content
- Reports
- Dashboards
- Different Ways to Share
- Basic Sharing/ Direct Sharing
- Content Packs (Its removed now)
- Collection of Reports and Dashboards
- Apps

Update The App

- Click On Navigation
- Section
- Link

The screenshot shows the Power BI Apps interface for the 'BhaskarApp'. The left sidebar contains links: Home, Favorites, Recent, Create, Datasets, and Goals. The main area has a blue header 'BhaskarApp' with tabs: Setup, Navigation (which is highlighted with a red box), and Permissions. Below the tabs is a section titled 'Navigation *' containing a 'New' button and a list with 'Section' and 'Link' items, both of which are also highlighted with a red box. At the bottom of this section is the text 'Global Store Performance'.

- Modify the App
- Publish the app, when we add new dashboards and Reports to App
- Delete the App
- Unpublish App

ROW LEVEL SECURITY

- What is Row Level Security
- When to Implement Row Level Security
- Types
- Static
- Dynamic

Row level security means providing specific information according to the requirements.

There are two types Static and Dynamic

Static- in static we allocate user Id on power bi desktop -modeling in row level security

Dynamic- in Dynamic we allocate user Id on Power Bi servicer in work Space.

- Modeling always keeps up the primary key to build a relationship to create visualization.
- Whenever you have two fact table never go with a two way filter relationship.