

Power BI Visualizations



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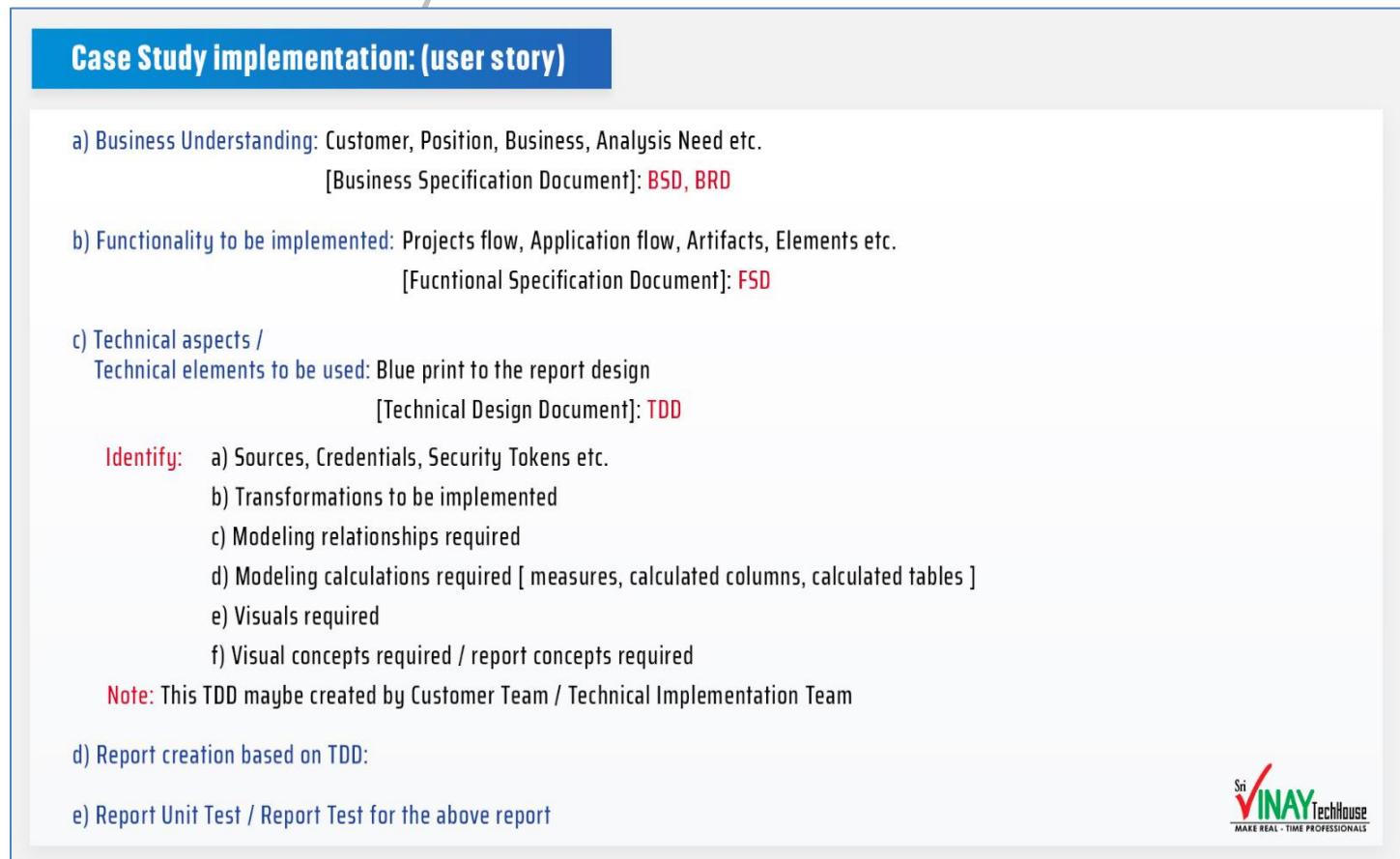
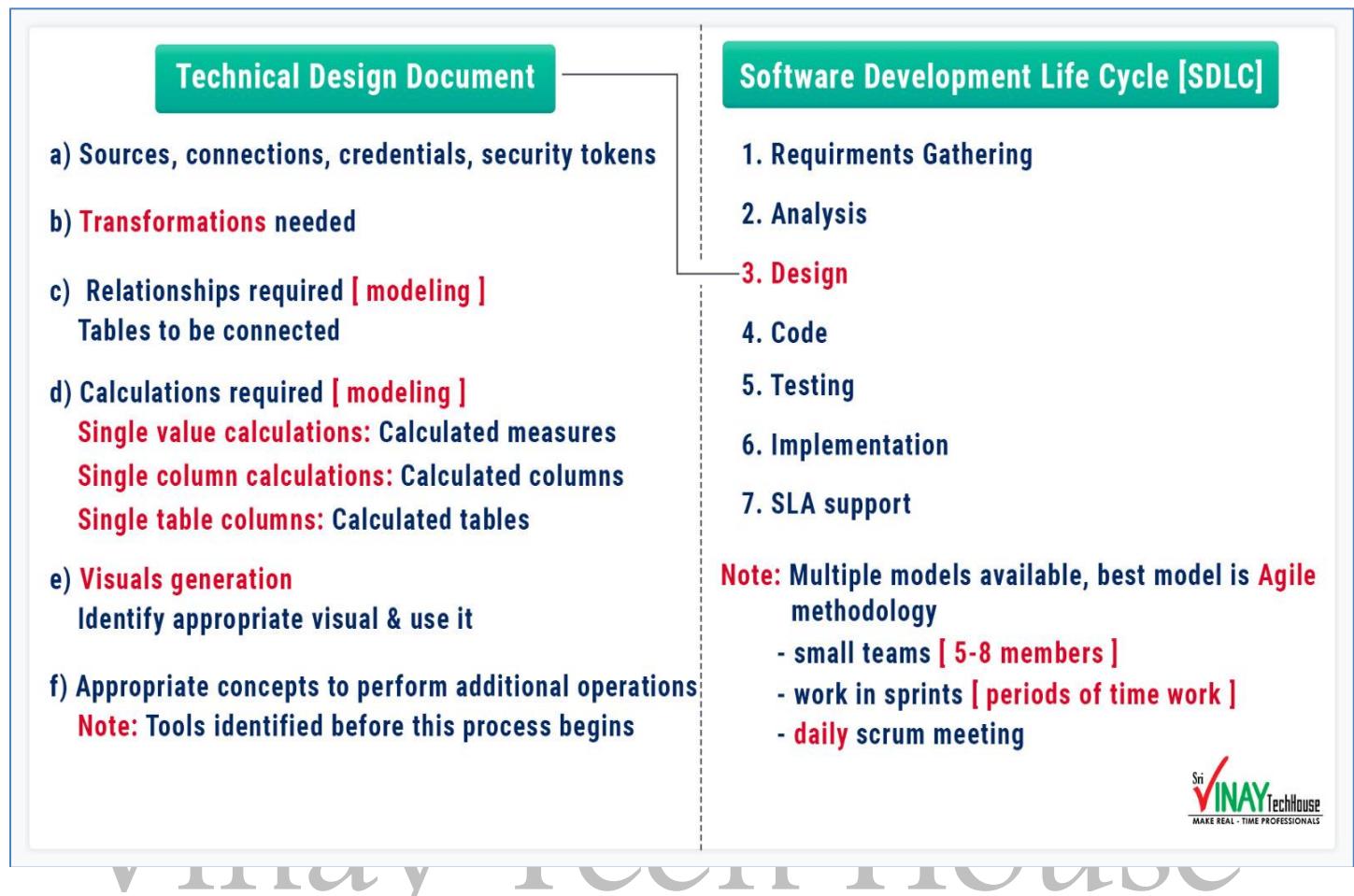
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Demos & New Batches



Deployment: It is the process of moving reports, dashboards, workbooks, datasets & data flows from one environment to another

How do companies maintain multiple environments in real-time?

Development Environment:

- Developers
- Develop reports, Dashboards etc..& test them [unit test/white box test]
- Report code / Layout / Metadata Testing
- Deploy

Test Environment

- Testers / Viewers / Quality Analysts
- Report, Dashboard functionality test [black box / functionality test]
- Report is as per customer requirement or not validation
- Issues raised like **defects** are placed in **defect tracking tools** [HP Quality Center, BugZilla, JIRA etc..]
- Defects Operated by **developers** & then move to test environment, this process continues till there are no defects
- Deploy

Production Environment

- Support Team / Production Team participate
- After development & testing, we move reports for live operations & customer sharing
- Report Scheduling and monitoring take place
- Issues raised like **Incidents or Problem tickets** in support portals [JIRA, Service now etc..]
- Multiple levels [L1, L2, L3, L4] of support and multiple types of problem tickets [P1, P2, P3, P4]



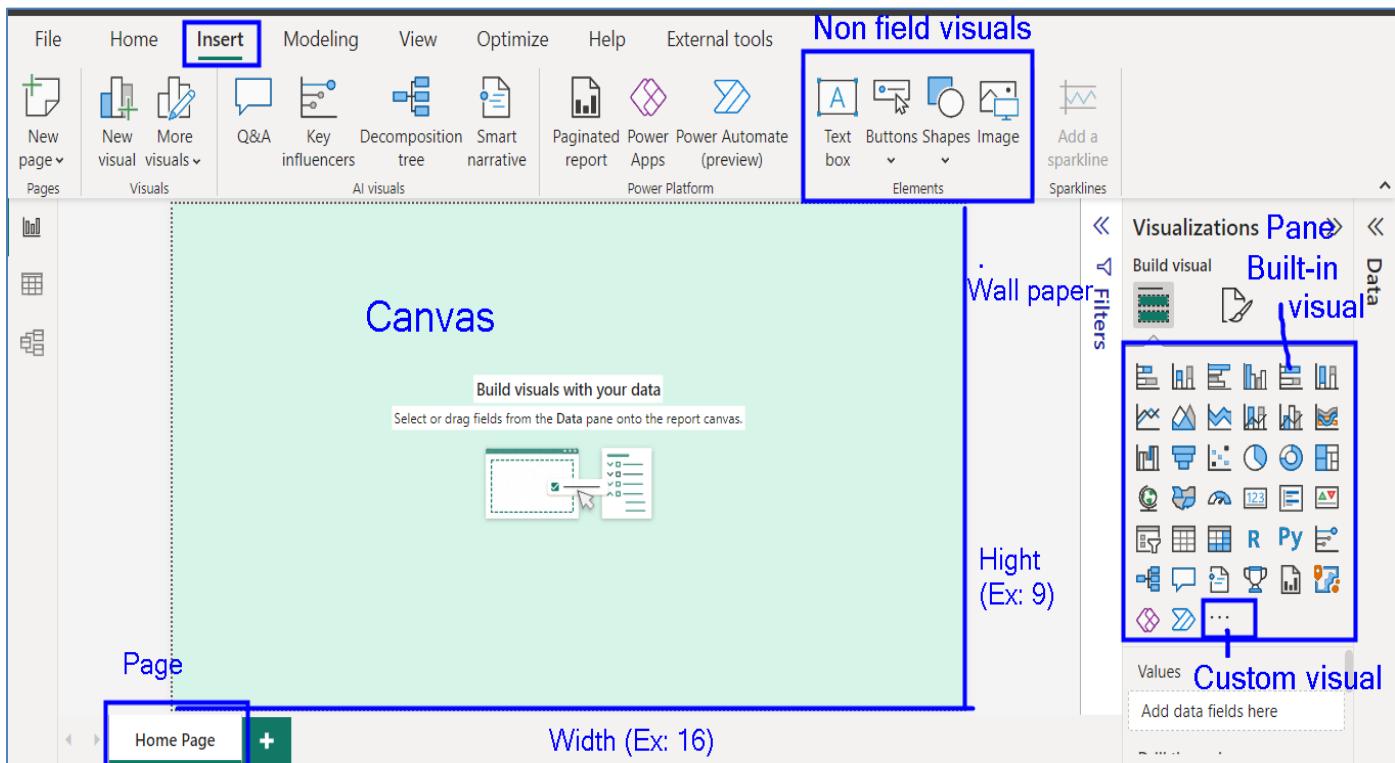
Customer Provides?	a) Business Specification Document [BSD] b) Technical Design Document [TDD] c) Change Request Documents [CR] d) Data [files / tables / views / procedures etc.] e) Images, logos, videos f) Theme [uniform colors, fonts, alignments etc.] g) Report height and width, report view [landscape or mobile view])
Customer special approvals?	a) Your suggestions (regarding visuals, format, layout etc.) b) Custom visuals usage
Practical Report Creation Steps?	a) Page Settings [Size, Background, Tooltip, Filter Pane Settings etc.] b) Page View Settings [Actual Size, Fit to Width, Normal Size] c) Themes d) Visuals and Formatting e) Various concepts on the visuals f) Performance improvement g) Unit Testing of report etc.

Power BI Desktop Document

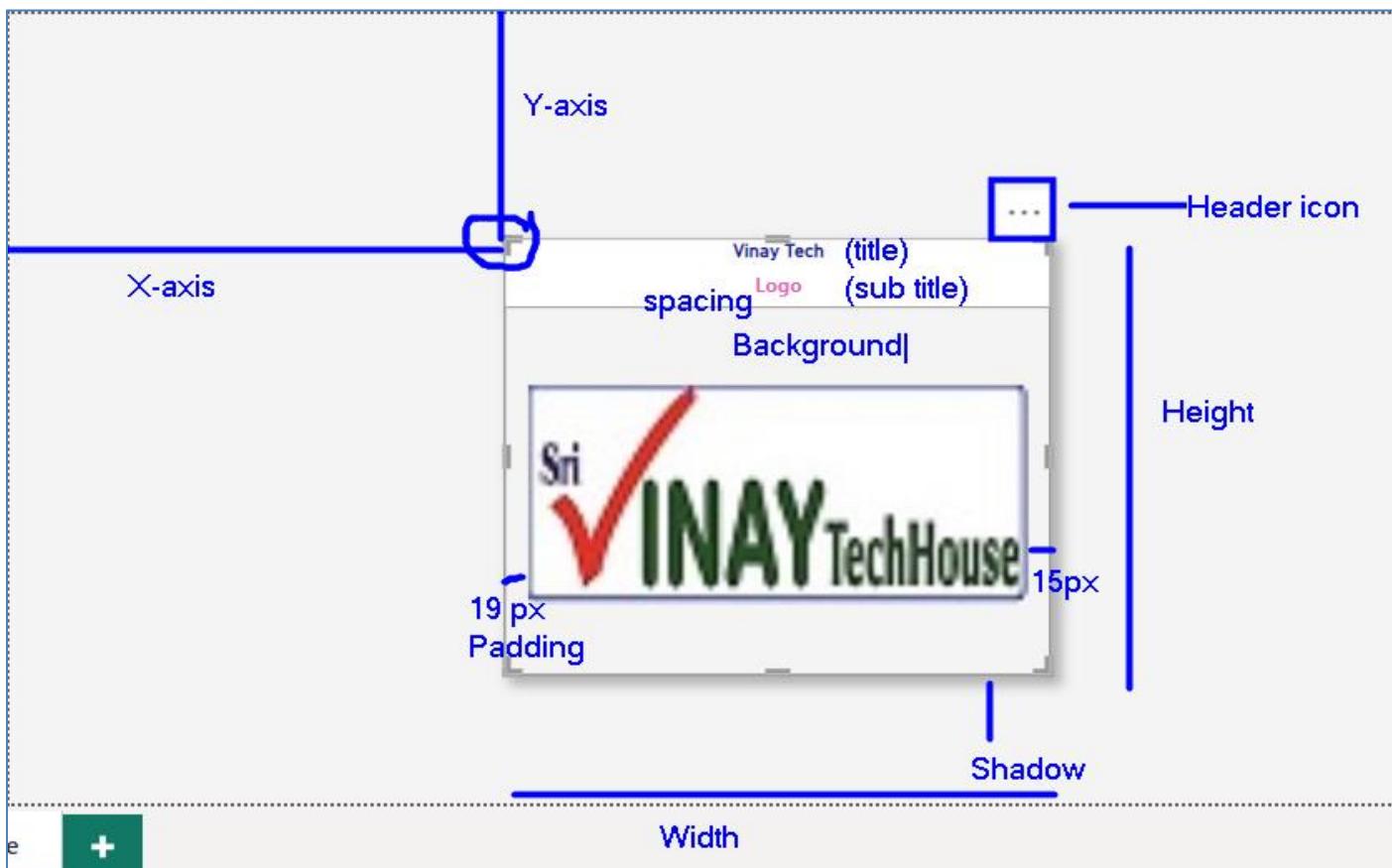
1. It contains multiple pages, each page support multiple visuals.
2. We have Page Settings and Visual Settings.

What is visual?	Which displays data or data in graphical presentation
	<p>Two Types</p> <p>a) Non-Field Visual No data is required Ex : Image, Textbox, Shapes, Buttons, etc.</p> <p>b) Field Visual. Data is required. Again, Two types</p> <ol style="list-style-type: none"> 1) Data Display. Only data display. Again, Two ways. <ol style="list-style-type: none"> A) Single value display [Card] B) Multi value display [multi-row card, matrix, Table etc.] 2) Data + Graphical Data presented in graphical format. <ol style="list-style-type: none"> A) Simple Graphical Status Display Visuals KPI, Gauge, Bullet Chart etc. B) More graphical with multiple categories <ol style="list-style-type: none"> A) Charts B) Maps C) AI Visuals D) Power BI Service Visuals E) Power Platform Visuals F) Custom Coding Visuals [R, Python etc.]
Visual Types?	<p>Two types</p> <p>a) Microsoft Given [Built-In visuals] Two navigations: 1. Visualization Pane 2. Insert Menu Tab</p> <p>b) Custom Visuals [Microsoft and Other organizations] or Visuals Generated by using Power BI Developer Environment Two navigations: 1. Visualization Pane 2. File Menu-> Import There are three ways to bring custom visual <ol style="list-style-type: none"> a) Using R and Python b) Import a visual from a file c) Import a visual from Microsoft Store </p>
Visuals used in Power BI?	<p>Note: Few are Free and Few need License</p>

Report View and Canvas Settings:



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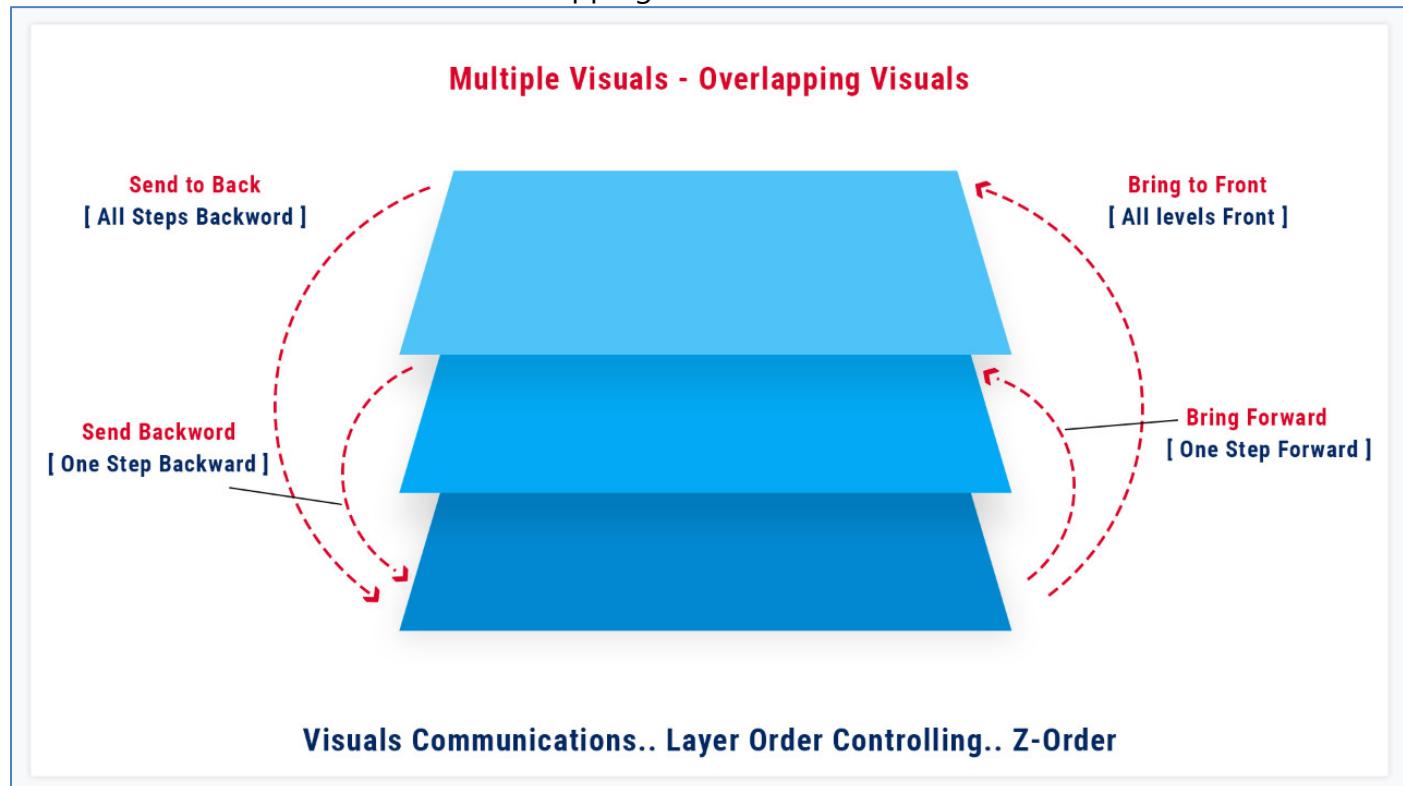
GENERAL FORMAT OPTIONS

Responsive Visualizations:

Responsive Visualizations automatically adapt their size to offer a data-optimized view across different screen sizes. Thus, you can create one visualization & add it to Power BI reports & dashboards displayed on larger screens & on the smallest devices.

Z-order:

This order will control visuals and overlapping



All visuals common Format properties:

- a) Properties b) Alt text c) Header icons d) background e) Title etc.

General Formatting options: Common to all visuals

Lock aspect ratio – ON: Resizing the visual horizontal & vertical proportional

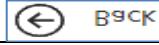
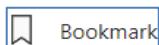
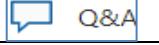
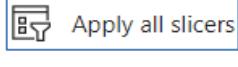
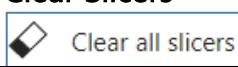
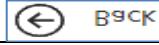
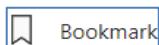
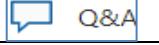
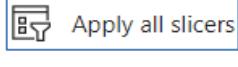
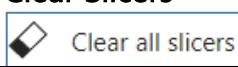
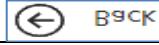
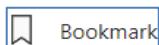
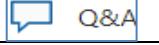
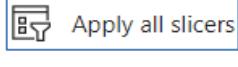
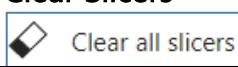
Lock aspect ratio – OFF: Resizing no restriction

Text wrap: If the length of the text is more automatically divided into multiple lines

Alt text: Narrator (screen reader) will read the content mentioned in the text box area

Edit Interaction: Visuals support cross filtering, cross highlighting & None interactive options

NON-FIELD VISUALS

Non field visual	Usage																
Image  Image	Takes single image.																
Textbox  Text box	<ul style="list-style-type: none"> a) Takes text into the box b) Supports QA and takes the value c) Can create a hyperlink for the required text 																
Shape  Shapes	There are different shapes and used for multiple purposes Ex: Line, Oval, Rectangle, Rounded Rectangle etc.																
Buttons  Buttons	<p>Perform actions based on events</p> <table border="1"> <tbody> <tr> <td>Back  BACK</td><td>Takes to the previous page</td></tr> <tr> <td>URL</td><td>Opens the specified URL</td></tr> <tr> <td>Bookmark  Bookmark</td><td>Opens the specified bookmark [snapshot / user interested areas]</td></tr> <tr> <td>Page Navigation</td><td>Opens the specified page [navigating to the specified page]</td></tr> <tr> <td>Drill Through</td><td>Navigating to the drill through page</td></tr> <tr> <td>Q&A </td><td>Opens Q & A form</td></tr> <tr> <td>Apply Slicers </td><td>Unlike the single 'Apply' button on slicers, the 'Apply all slicers' button will allow you to make selections across multiple slicers and then apply them in one click.</td></tr> <tr> <td>Clear Slicers </td><td>Clear all slicers</td></tr> </tbody> </table>	Back  BACK	Takes to the previous page	URL	Opens the specified URL	Bookmark  Bookmark	Opens the specified bookmark [snapshot / user interested areas]	Page Navigation	Opens the specified page [navigating to the specified page]	Drill Through	Navigating to the drill through page	Q&A 	Opens Q & A form	Apply Slicers 	Unlike the single 'Apply' button on slicers, the 'Apply all slicers' button will allow you to make selections across multiple slicers and then apply them in one click.	Clear Slicers 	Clear all slicers
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Clear Slicers 	Clear all slicers																

QA VISUALS

QA Visual  <div style="border: 1px solid #ccc; padding: 10px; background-color: #f9f9f9;"> <div style="border-bottom: 1px solid #ccc; padding-bottom: 5px;"> <input style="width: 100%; height: 30px; border: 1px solid #ccc; margin-bottom: 5px; font-size: 10px; padding: 5px; outline: none;" type="text"/> ⚙️ </div> <p>Try one of these to get started</p> <div style="display: flex; justify-content: space-around; gap: 10px;"> <div style="background-color: #ffcc00; padding: 5px; border-radius: 5px; text-align: center;"> top geo states by total units </div> <div style="background-color: #ffcc00; padding: 5px; border-radius: 5px; text-align: center;"> top geo states by total OTHER units </div> <div style="background-color: #ffcc00; padding: 5px; border-radius: 5px; text-align: center;"> top geo states by total compete volume </div> </div> <p style="text-align: center;">Show all suggestions</p> </div>	<p>An AI visual for questions and getting answers, it supports two additional settings than QA button.</p> <ul style="list-style-type: none"> a) Custom formatting b) Saving the results
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DATA DISPLAY VISUALS

Card Visual



- a) **Single value** display visual
- b) Takes either **Measure or Column** with aggregation [Sum, Avg, Count etc.] or **Calculation**

Note:

In case of single line split into multiple lines, use "Word Wrap" option, In case of values display in different format, use Display Units [required format]

Multi-row card

(Blank)	20852000	₹ 21,81,000.00
Year	Total DF	Sum of Actual_Fee
2017	1475100	₹ 16,90,000.00
Year	Total DF	Sum of Actual_Fee
2018	379800	₹ 4,22,000.00
Year	Total DF	Sum of Actual_Fee
2019	534600	₹ 5,34,000.00
Year	Total DF	Sum of Actual_Fee

- a) **Multiple cards in a single row and multiple rows in multi-row card** **[Row Wise Operation]**

- b) No Total Section and No Header Section, so we can't show aggregated information of rows again

- c) One row can be separated with another row [using card formation]

Real-time usage:

Categories aggregated data row wise display with row separations.

Table Visual

Year	Total DF	Last year df	Growth	Growth per
20052000				
2017	1475100		1475100	
2018	379800	1475100	-1095300	-74.25
2019	534600	379800	154800	40.76
Total	23252400		23252400	

- a) It is **columnar visual** [column by column data displayed], contains column headings and footings. **[Column wise operation]**

- b) For a **greater number of records**, this visual only suitable

- c) **Aggregated data** in the bottom rows, **Titles in the top row**.

- d) Supports **row formatting** [rows colors, fonts controlling]

- e) Supports **column / field formatting** [colors, fonts, icons etc. Controlling]

- f) Supports **column conditional formatting**

[based on condition formatting]

- g) **No drill down/ up** operation

Matrix Visual

State AP Krishna Vishakhapatnam Total			
9234000	9234000	10733200	19969200
9234000	9234000	10735200	19969200
2017	1070100	101700	1171800
1	1070100	101700	1171800
2018	54900	63000	117900
1	54900	63000	117900
2019	58500	76500	135000
1	58500	76500	135000
Total	10417500	10976400	21393900

- a) It is for "**Cross tab Reporting**" **[Rows Vs. Columns aggregate data analysis]** **[Row and Column Operation]**

- b) **For a table visual row wise analysis required with drill down and drill up**

- c) It is for a **smaller number of categories analysis**

- d) Aggregated data in the **bottom or right-hand side**

[Column total and Row total]

- e) Supports **row formatting** [rows colors, fonts controlling]

- f) Supports column / **field formatting** [colors, fonts, icons etc... controlling]

- g) Supports column **conditional formatting** [based on condition formatting]

- h) Supports **drill down/ up operation** [row wise and column wise]

- i) **Subtotal and Grand Total presentation** possible

A table supports two dimensions, but 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 drilling down into the data.

Sparkline	a) Sparklines are tiny charts shown within cells of a table or matrix that make it easy to see and compare trends quickly. b) You may want to use them to show trends in a series of values, such as seasonal increases or decreases, economic cycles, or to highlight max and min values.
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Table	Matrix	Multi-row card
Columnar visual	Cross tab visual	Multiple individual rows card
Column by column show	Rows Vs. Columns show	Row by row show
More rows recommended	Less categories comparison	Limited rows
No drill-down and drill-up	Supports Drill Down / Up	Drill down and drill up Not supported
Column totals only	Support row and column totals	Header and Total not available
Conditional formatting supported	Conditional formatting supported	No support to conditional format
Suitable for Paginated Report	Not suitable	Not suitable

FAQs:**a) I want to show 200 records, which visual is required?**

Table or Multi-row card [because of more records]

b) I want to show country and state wise discount fee value?Country and state come under **same table**, so **create hierarchy** and use it at **table**.**c) I want to show country and mode wise discount fee value?**Country and Mode are **two different entities**, so prefer **matrix****d) I want to show growth percentage value?**

Card (as it is a single value)

e) I want to show for each location current DF, last DF, Growth and Growth Percentage?

1. Multirow is good if you don't need totals and don't require column values conditional format
2. Table visual is also good [it supports **totals and** column values conditional format]

f) Which visuals support conditional formatting? How many options available?

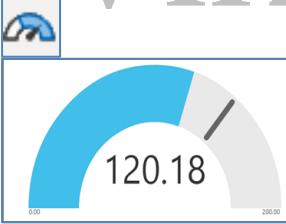
Table and Matrix visuals support conditional formatting, there are three options

- a) Gradient
- b) Rules
- c) Field Value

Which visuals support sparklines (a tiny chart)?

- a) Table
- b) Matrix

SIMPLE STATUS DISPLAY GRAPHICAL VISUALS

SIMPLE GRAPHICAL VISUALS	The visuals which show status by comparing Current Vs. Target
KPI [Current Vs. Target, 2 measures required] 	<p>KPI: Key Performance Indicator.</p> <p>A) Important business values show and to analyze them quickly by seeing status B) Always compare current value Vs. target value C) Two Measures required, displays progress toward a measurable goal.</p> <p>Real-world Examples: Traffic Signal is a KPI, Sensex up and down is a KPI, Out/Not Out is a KPI</p> <p>Class room example:</p> <ul style="list-style-type: none"> A) All locations discount fee vs. actual fee B) All course modes discount fee vs. actual fee <p>Note: Individual location or course not possible [unless you use a filter / slice]</p>
Gauge [KPI+ Min + Max, 4 measures required] 	<p>Similar to KPI, but it will take additional two measures [minimum and maximum]</p> <p>a) It talks about a value in a range B) Whether reached the target or crossed the target C) Is there any scope to reach maximum value after crossing target</p> <p>Real-world examples: Bike or Car speedo meter (radial 180-degree gauge), Water Level Identification (Linear Gauge), BP Machines etc...</p> <p>Classroom examples:</p> <ul style="list-style-type: none"> a) All locations discount fee vs. actual fee with min and max values b) All course modes discount fee vs. actual fee with min and max <p>Note: Individual location or course not possible [unless you use a filter / slicer]</p>
Bullet Chart [KPI+max+min+Needs improvement, satisfactory+Good+Very Good+ target1+target2+max] 	<p>Multiple categories available, each category status you want among multiple statuses.</p> <p>A bar chart with extra visual elements to provide additional context. Useful for tracking goals. Instead of multiple KPIs visuals for multiple business units / categories, this bullet is helpful.</p> <p>a) KPI chart with more measures (Gauge+ few more measures) b) If your business categories fall under any one of the measure range, to present with a status, this visual is helpful. C) It has Needs improvement, Satisfactory, Good, Very Good, Target2, Max etc... along with Current and Target</p> <p>Example: Want to give a status for each manager for current Vs. target among multiple statuses.</p> <p>Note: Individual location or course is possible [multiple values possible]</p>

MULTIPLE CATEGORIES GRAPHICAL VISUALS PRESENTATION [CHARTS & MAPS]

Charts

[Comparing, Composition, Relationship, Distribution, Trend, Positive and Negative values Trend etc.]



Design Reason: When Multiple Categories to be operated.

Basically, a visual with graphical presentation for "textual Vs numerical" evaluation

Charts majorly for

a) Composition b) Comparison c) Distribution d) Relationship e) Trend Analysis f) Positive and Negative values analysis etc. operations

Composition: Considering all parts composition as 100% [all parts]

Comparing: One comparing to other

Distribution: Within the main category, sub category distribution

Relationship: Multiple measures against category analysis, one category related to another category to present business value

Trend Analysis: Over period of time business values [up and down]

Positive and Negative: High times and low times with red and green bars

Other important terms:

Bar: Comparing

Stacked: Distributed [sub category required]

Clustered: Individual items grouped [sub category required]

Row and Column Chart:

- a) Bars for different types of viewing only, recommended based on the space and number of categories to be presented.
- b) Based on the textual column (categories) presentation, if it is **column wise then 'column chart'**, if it is **row wise 'row chart'**

Chart Types:

Different types of charts for different purposes and presentations

Ex: Bar, Rounded, Trend Analysis, Ribbon, Stage charts

Charts Requirement

Requirement:

Minimum one textual column (can have sub textual or categories columns) and one measurable column is required.

Always "first data field is parent" and "second data field is child [sub category field]"

BAR CHARTS

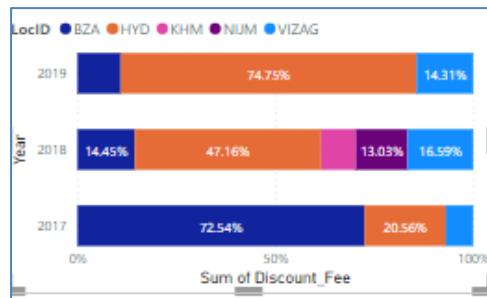
Bar Charts



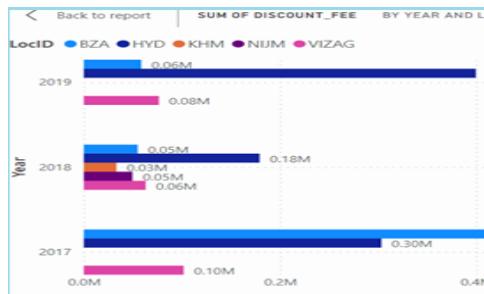
Stacked bar charts



100% Stacked Bar charts



Clustered bar charts



Bar is for comparing. It is of 3 types

1) Stacked Bar:

Stacked+ Bar = Distribution + Comparison

Note: Bar lengths are different

Usage:

- Parent category comparison
- Child Category Distribution inside parent and Comparison
- Childs distributed in the alphabet order [sort order]

2) 100% Stacked Bar

100% composition + distribution + comparison

Note: Bar lengths are same

Usage:

- Child Category Composition, Distribution, and Comparison
- Childs distributed in the alphabet order [sort order]

3) Clustered Bar

Clustered + Bar = Childs grouped + Childs' comparison

Usage:

- Across Parent Categories Child values Comparison
- With in the parent child values comparison

Note:

Row bar / Column bar:

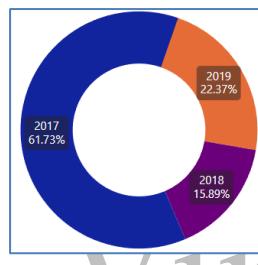
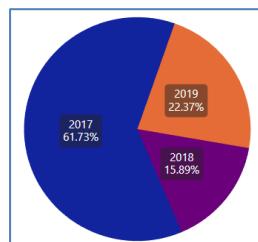
Depending on the space, type of view [portrait view / landscape view], category required access.

Ex: Row-wise years required (Y-Axis Year), Column-wise years required (X-Axis Year)

Stacked Bar Chart [distribution+comparing]	Clustered Bar Chart [Individual values grouped+comparing]	100% Stacked Bar Chart [Composition+Distribution+Comparing]
Parents comparison	With in parent child's grouped and compared	Parent Categories bar length same
With in the parent child's distribution and comparison	Across parents' child's comparison	Individual category analysis. Each category child's distribution, comparing and composition (because of 100%)
PARENTS COMPARISON, CHILD DISTRIBUTION AND COMPARISON	FULL COMPARISON OF CHILD INSIDE PARENT AND ACROSS	CHILD DISTRIBUTION, COMPARING, and COMPOSITION

ROUNDED CHARTS

ROUNDED CHARTS [PIE AND DONUT]



a) Rounded charts: [Shape in rounded format]

Above bar charts do not support **parent category composition**.

1. **100% consideration of all slices / ARCs**
 2. Easy understanding for less categories [**5 to 6 categories appear good**]
 3. Also help us for **comparing the slice values**
[More size more value, Less size less value]
 4. These **occupy less space [image area]**
 5. Slices /ARCs in the order **of high to low**
- Example: **Pie, Donut (hole with size / has inner radius)** etc.
- Purpose: **a) Composition b) Comparison**

Composition: Percentage Comparing: Size of Slice

Requirement: One Textual (can have sub textual) and one measurable

Pie	Donut
Rounded Shape	Rounded ring shape
Composition and comparing	Composition and comparing
Slices based comparing	ARC based comparisons
We can't place a visual in Pie	Donut allows visual
Pie can't be converted to Donut with feature	Donut can be converted to pie. 0% radius is Pie [more than zero is donut]

RECTANGLE CHARTS

Rectangle Charts [Tree Map]



Rectangle charts: [Shape in rectangle format]

1. **Rectangle portion of areas** [for **comparing and distribution**]
[More value big rectangle, less value small rectangle portion]
2. **Less categories, categories displayed based on values order.**
Means Bigger rectangles to small rectangles.
3. A few people interested to geographical presentation
4. Are charts of coloured rectangles, with size representing value. They can be hierarchical, with rectangles nested within the main rectangles.
5. These occupy **more space**

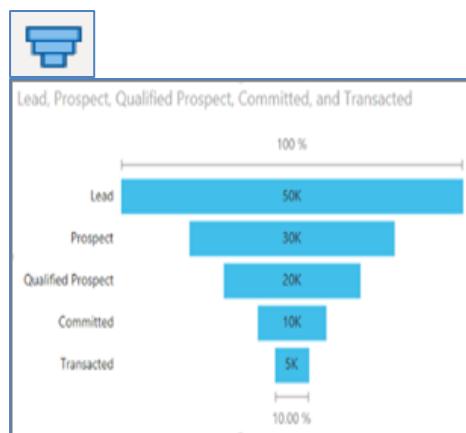
Ex: TreeMap

Purpose: a) Comparison b) Distribution

Requirement: One Textual (can have sub textual) and One measurable

STAGE WISE IMPLEMENTATION CHARTS

Funnel Chart [Horizontal stacked bar chart]



Funnel / Pyramid Chart/Cylinder chart / Horizontal stacks descending order chart:

[Want to show in rectangle stacks in descending order]

Useful for two purposes

a) Top-down and bottom-up analysis [using stacks]

b) Stage wise status analysis [by considering first stack as 100%]

1. Stack format and displaying highest values to lowest in different sizes

2. Displays current value, Current value percentage in the previous value and first value

Purpose: a) Composition of each stack b) Comparison

Requirement Reason: One Textual (recommended) and One measurable

Field Sections: Category, Values

Few Companies:

Stage wise implementation analysis [stage1, stage2, stage3 etc...]

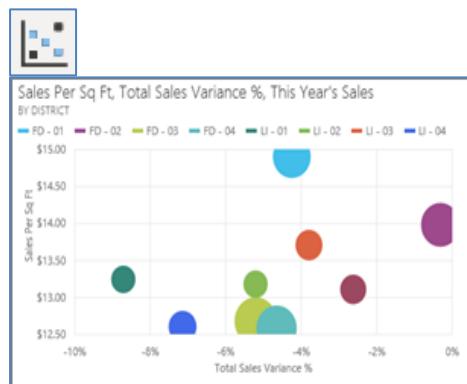
Ex: A bridge construction planned for multiple stages in a span of 5 years. Each year completion you want to see by comparing with full bridge plan and previous stage

A funnel chart helps you visualize a linear process that has sequential, connected stages. For example, a sales funnel that tracks customers through stages: Lead > Qualified Lead > Prospect > Contract > Close. At a glance, the shape of the funnel conveys the health of the process you're tracking.

Each funnel stage represents a percentage of the total. So, in most cases, a funnel chart is shaped like a funnel -- with the first stage being the largest, and each subsequent stage smaller than its predecessor. A pear-shaped funnel is also useful -- it can identify a problem in the process. But typically, the first stage, the "intake" stage, is the largest.

RELATIONSHIP CHARTS

Scatter Chart [Relationship Chart]



Scatter means distribution [in this chart bubbles distribution]

1. Provides **relationship** between **two independent sections** [categories or measures] by placing in **X-Axis and Y-Axis**
2. Displays the relationship using bubbles, **bubble size controlled using another measure**
3. There is a **Play axis** to see the relationships in another category

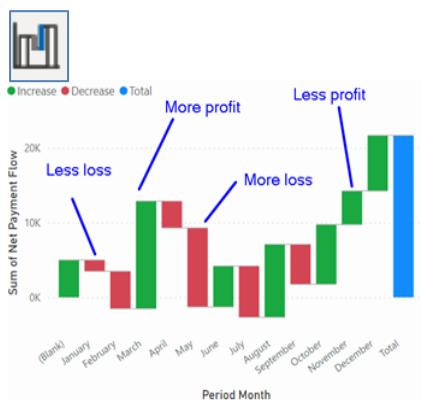
Note: Multi measure and multi axis visual

Field Sections: Values, X-Axis, Y-Axis, Bubble Size, Detailed

Examples:

- a) Demand Vs. Supply for each product show
- b) Actual Fee Vs. Discount Fee for each course show

Water Fall Chart



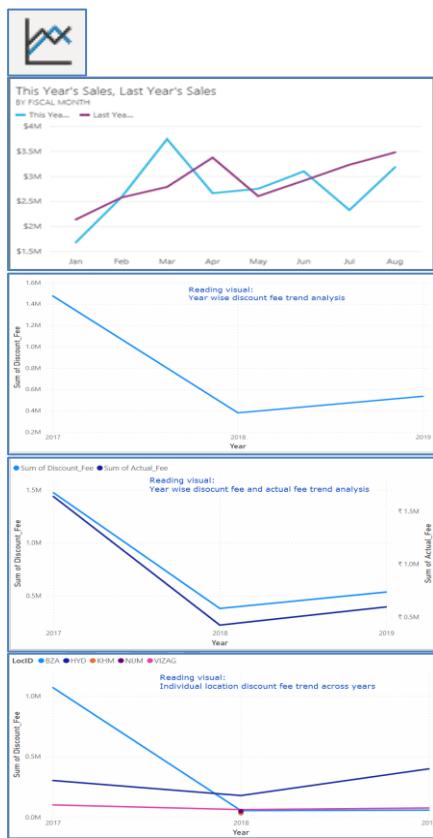
Two purposes

- a) **Positive and Negative** values comparison
- b) **Up and Down** values comparison for categories
- c) Negative values in "Red Bars", Positive values in "Green bars"
- d) Highest value **bigger bar** and lowest value **small bar**

Field Sections: Category, Breakdown, Y-Axis

TREND ANALYSIS

Line Chart



- 1) **Trend Analysis** Chart. [Set of points connected with line]
 - 2) Up and down values in a line shape [May be positive or negative]
 - 3) Helps us to see the **growth and fall for a category over period of time.**
- [It will take **multiple categories and connect using Line**]

Emphasize the overall shape of an entire series of values, usually over time.

Real world Examples:

Dhoni batting in the last 10 overs, Reliance Petroleum in todays' Sensex, male increase in the city wise periodically

Classroom Example:

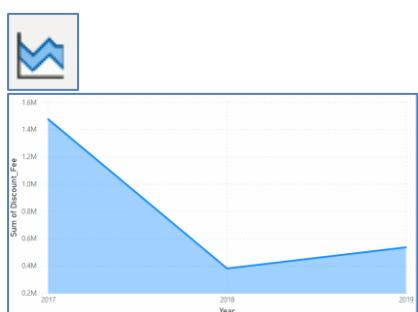
- Tech House**
1. Year wise discount fee Trend
 2. Across years locations trend
 3. Year wise discount fee and actual fee trend
- Etc.**

Area Chart

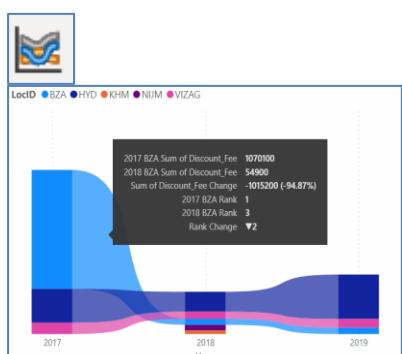


- a) Lines area will be filled with colours [**Trend analysis points covering Area**].
The Basic Area chart is based on the line chart with the area between the axis and line filled in.
- b) **Colour overlapping** happens
- c) Y-Axis / X-Axis values point to the categories accurately
- d) We need to go to a point to see the respective value

Stacked Area Chart



Ribbon Chart



MIXED CHARTS

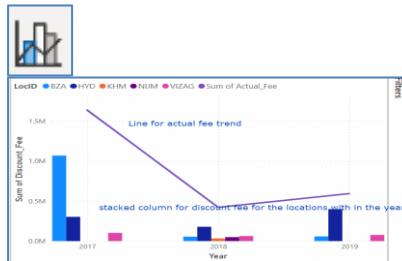
Mixed Chart

[Line and Stacked Bar Chart]



Mixed Chart

[Line and Clustered Bar Chart]



- a) Lines area will be filled with colours [**Trend analysis points covering Area**]
- b) **Colour NO overlapping**
- c) Y-Axis / X-Axis values point to the **categories inaccurately**
- d) As it is stacked **low to high / high to low** sub categories presented [**mostly alphabetical order from bottom to top**]
- e) The complete line points **values at a time we can see in the same alphabetical order**

- a) Within the **parent child stacks in the order of descending, child categories covering with ribbon across parent categories**
- b) **Ranking** provided on ribbon values across categories.
- c) It talks about position, increase and decrease of position for a category
- d) Ribbon charts show which data category has the highest rank (largest value). Ribbon charts are effective at showing rank change, with the highest range (value) always displayed on top for each time period.

Mixed Chart

[Line and Stacked Bar Chart]

- a) **Trend Analysis on One Measure**

- b) **Distribution, Comparison on another measure**

- a) **Trend Analysis on One Measure**

- b) **Grouping, Comparison on another measure**

Conclusion:

a) Stacked+Bar+Trend Analysis=Line and Stacked Bar Chart

b) Grouped+Bar+Trend Analysis=Line and Clustered Bar chart

Note: Two measures required

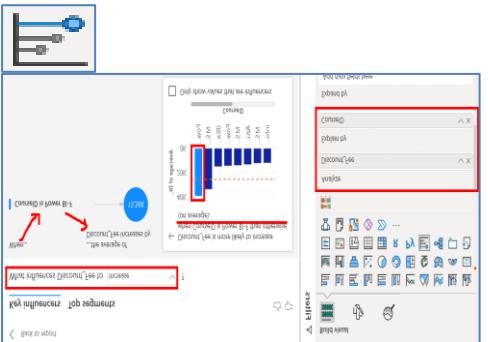
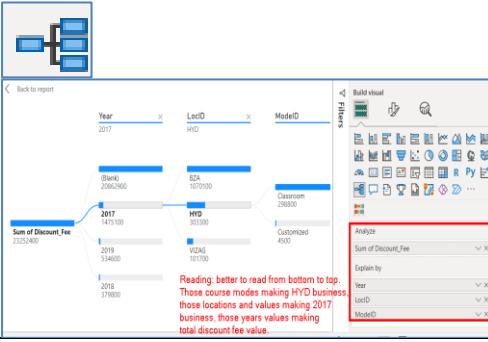
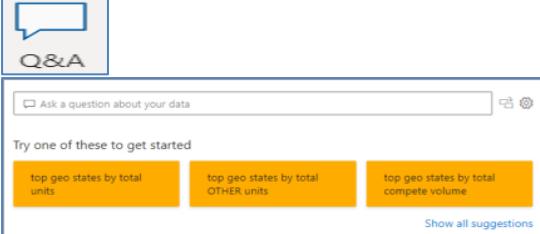
1) For stacked or clustered bar -One measure

2) Trend analysis-One more measure

AI VISUALS



AI algorithms applied in the backend to perform operations. There are four visuals

<h3>Key Influencer</h3> 	<p>The key influencers visual is a great choice if you want to:</p> <ul style="list-style-type: none"> • See which factors affect the metric being analyzed. • Contrast the relative importance of these factors. • Increase and decrease of business values <p>For example, do short-term contracts affect churn more than long-term contracts?</p> <p>A key influencer chart displays the major contributors to a selected result or value.</p>
<h3>Decomposition-Tree</h3> 	<p>The decomposition tree visual in Power BI lets you visualize data across multiple dimensions. It automatically aggregates data and enables drilling down into your dimensions in any order.</p>
<h3>Smart Narrative</h3> 	<p>The smart narrative visualization helps you provide a quick text summary of visuals and reports. It provides relevant innovative insights that you can customize. Use smart narrative summaries in your reports to address key takeaways, to point out trends, and to edit the language and format for a specific audience. When you add a live Power BI report page to PowerPoint, instead of pasting a screenshot of your report's key takeaways, you can add narratives that update with every refresh. Your audience can use the summaries to understand the data, get to key points faster, and explain the data to others.</p>
<h3>QA Visual</h3> 	<p>The Q&A visual allows users to ask natural language questions and get answers in the form of a visual. <i>Consumers</i> can use it to quickly get answers to their data. <i>Designers</i> can also use it to create visuals quickly.</p>

POWER BI SERVICE DATA USAGE VISUALS

Metrics	Power BI Cloud Service metrics you want to use in Power BI Desktop , this visual is helpful
Paginated Report	a) If you want to show Power BI Service cloud paginated report in Power BI Desktop , this visual is helpful. b) It helps to show paginated and non-paginated reports in the same page.

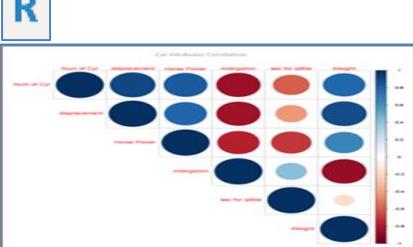
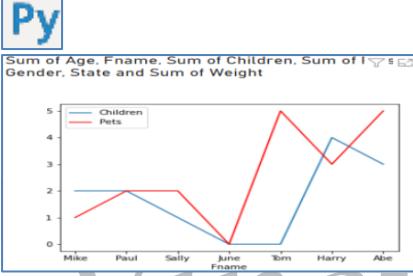
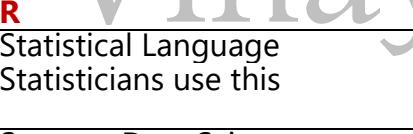
POWER PLATFORM VISUALS

Power Apps Visual	Report designers can create a Power App and embed it into a Power BI report as a visual . Consumers can interact with that visual within the Power BI report.
Power Automate Visual	Power Automate visual in a Power BI report help end-users can run an automated flow , just by clicking a button in your report. Furthermore, the flow can be data contextual, meaning that the flow inputs can be dynamic, based on the filters the end-users set.

Tech House

R & PYTHON VISUALS

If customer is using R and Python code for Data Science kind of operations, or customer likes the visuals in R and Python, the R and Python visuals in Power BI helps to support that.

R 	Visuals created with R scripts, commonly called R visuals, can present advanced data shaping and analytics such as forecasting, using the rich analytics and visualization power of R. R visuals can be created in Power BI Desktop and published to the Power BI service.
Python 	Creates a python visual using a few of the many available options and capabilities for creating visual reports by using Python, pandas, and the Matplotlib library.
R 	PYTHON General purpose programming languages Normal programming, statistics, Web Development, Data Science Operations and many more operations Support Programming, Data Science, AI, Analytics etc.

R and Python in Power BI

We have these languages in two places

a) Power Query:

- a) Here to extract, transform with custom rules and protocols
- b) If the given transforms not sufficient, you want to perform more statistical and data science related calculations, then R (statistical lang) and Python (general purpose very powerful lang) are used.

b) Power View level:

If the existing visuals not sufficient and you want to generate custom visuals using R and Python, then use R, Python options.

Real-time usage:

You are working in a Data Science project, mostly they use R or Python, If the customer sync of code between all applications. They may suggest to use R or Python Wherever applicable.

Pre-Requisite

- a) **Install R / Python** (or Anaconda) software [mandatory], add the path in the environment variables [optional]
1st way: File menu→ Options and Settings→ R / Python Scripting and Click Install
2nd Way: Google it and Install
- b) Download required **Libraries or Packages, Classes and Methods** [which you want to use]
- c) Ensure those **environmental paths** specified in the Power BI Desktop, File Menu->Options
- d) Take **R or Python** visual on the report view, write the code in code editor, click run to generate the visual with data.

R Visual in Power BI

- a) Open Power BI Desktop, File Menu→ Options and Settings→ Options—>R Scripting→Click Install
Or
Download from google, **Microsoft R 3.5.0.0**. Install It.
- b) Power BI Desktop, File Menu→ Options and Settings→Options→Check it is detecting R-Installed path in the machine.
- c) Implement the below

Practical 1:

1. Drag and drop R visual, take Date and Discount_Fee data in the fields of R visual
2. Write the below R command and click run icon

```
plot(dataset$Discount_Fee)
x<-rnorm(100)
plot(x)
```

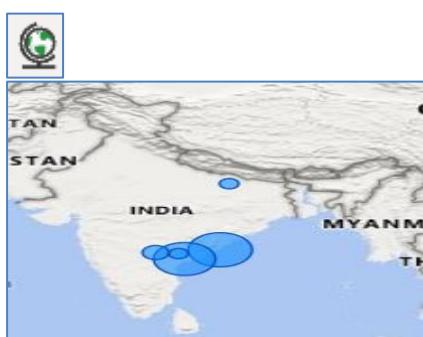
It now will show you 100 values statistical plot

MAPS, REQUIREMENT, TYPES OF MAPS



Maps	<p>1) They generate "geo spatial maps". 2) They help us to see the locations and their business values in graphical format [bubbles, region filling or any] 3) They support cross filtering, cross highlighting and slicing.</p>
Maps Input	<p>Maps require either of the inputs</p> <p>a) Location names [if you know the names] Ex: State name, City name etc. you know</p> <p>b) Longitude and Latitude</p> <p>a) Specific longitude and latitude</p> <p>b) If you don't know the location names Ex: You are under sea [on top of sky], no locations under sea, in this situation longitude and latitude are helpful etc.</p>
Map Types	<p>a) Map [Bubble map, Bing Map]: Mapping locations with bubbles, based on size we identify business [bigger bubble more size, normal bubble less size]</p> <p>b) Filled Map [Area filling map, Bing Map]: Locations area only displayed. Values in the tooltip.</p> <p>c) Shape Map [Own Shape Map, Color saturations]:2019 added. Filled Map+ Area Color Controlling+Ownshape</p> <p>d) ArcGis Map [Complex map with many features...from ESRI org]: 2020 added Bubble Map+ Shape Map+ many layers+ many options etc.</p>

Bubble Map



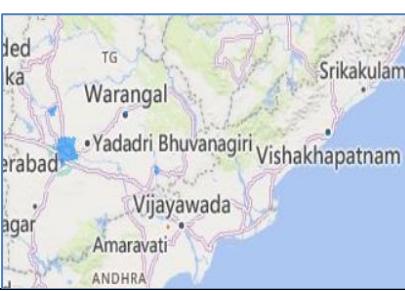
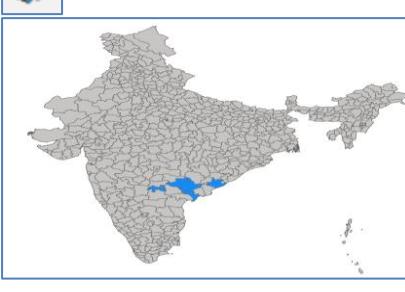
- 1) Displays map locations by showing bubbles
- 2) The sizes of bubble can be controlled by a measure / field [big bubbles for more value, small bubble for less value]
- 3) Also, ToolTip to show the business and other key values
- 4) You can browse map and locations, respectively shows the values in other visuals

Note: It shows Microsoft Bing map [world-wide map]

- 5) Default is bubbles, when we turn on Heat Map, that bubble option will disappear.

Note:

Heat map custom visual is used by many organizations, so Microsoft added another control to the existing map, i.e heat map

<h3>Heat Map</h3>  	<p>Heat maps are a type of visualization to show data density on a map.</p> <p>It is a custom map.</p> <p>They are particularly helpful when you have a lot of (e.g., tens of thousands of) data points on the map and are mainly interested in their overall distribution. Technically, in a heatmap, data points are aggregated locally and mapped to colors (either gradient or quantile), so that we can make better sense of the density of the data from the colors while still being able to see and use the map.</p>
<h3>Filled Map</h3>  	<ol style="list-style-type: none"> 1) Displays map locations by filling the region with the specified colour. Locations region colour control based on values. 2) Also, you can take ToolTip to show the business and other important values 3) You can browse map and locations, respectively shows the values in other visuals [cross filter, highlight, and none supported] <p>Note: It shows Microsoft Bing map</p>
<h3>Shape Map</h3>  	<ol style="list-style-type: none"> 1) This was under preview till 2018 end. It added in 2019. 2) It will help us to have our own shape map (rather than Bing) and own color formatting. 3) By default, few countries shape it provides support, if your country is not in the list, then go for your own shape file creation (which is in Json format) and added to shape map 4) It is not a Bing Map <p>Note:</p> <p>You can download shape files from internet (verify at lab backup for India shape files)</p> <p>If you don't find shape map visual: File menu→Options and Settings, Preview Features→Tick Mark Shape Map</p>

ArcGis Map



Aeronautical Reconnaissance Coverage Geographic Information System

[It has many visual formatting, colors, shapes etc. features than above all]

- 1) Microsoft joined with **ESRI [Environmental System Research Institute] organization to get ArcGis maps** [SSRS supporting this map]. Many companies asked Microsoft a Powerful mapping,
i.e ArcGis ArcGis added recently.
- 2) It has **many layers, many options, many controls, many ways of display etc.**
- 3) One of the complex maps and more detailed map in the mapping visuals.
- 4) **It was added in 2020**
- 5) It has the functionality of **Bubble Map + Shape Map+ Filled Map + Other Features**

Differences between Filled Map and Shape Map?

Shape map for customized map locations, whereas Filled map for worldwide map presentation.
Rest of the options are similar