



MICROSOFT POWER BI LEVEL 2 TRAINING MANUAL

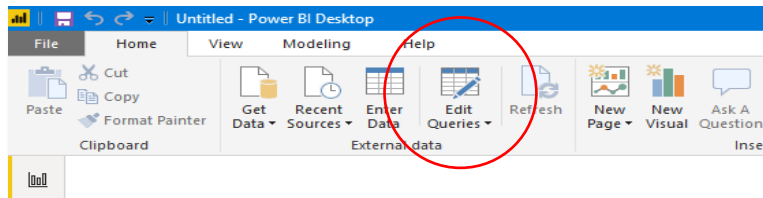


Magic Rabbit Hat Software Training

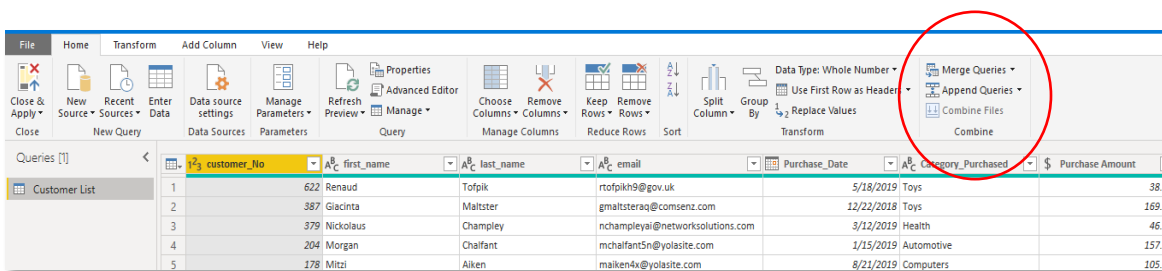
Power BI 2

The Query Editor

The Query Editor allows users to connect to data sources, manage data sources, transform data and even add custom columns enhance your queries.

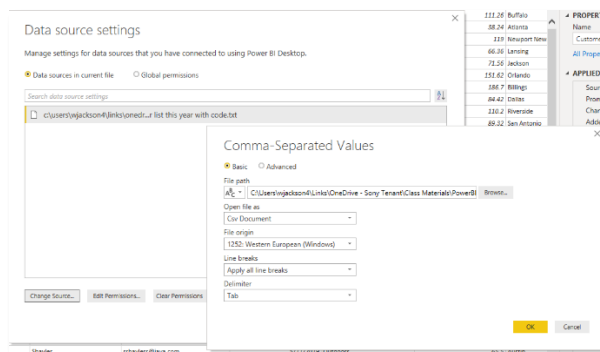
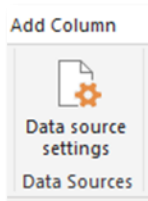


To access the Query Editor, select the Edit Queries command from the Home Ribbon.

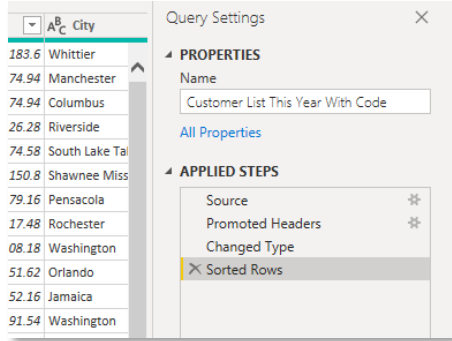


Data Source Settings

- To view or change the data source for your report, select Data source settings from the Editors Home tab.
- To change the data source, select change source.
- The name, file path and delimiter type are available. Select the browse button to search for the new data source.



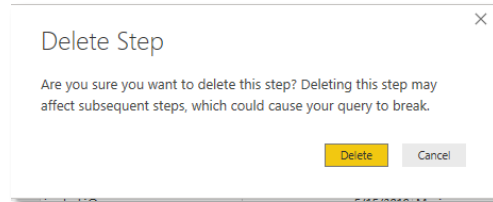
Applied Steps / Undo Actions



Each action that is applied to the query is represented in the Query Settings pane. To undo any action in the editor select the “X” next to that action.

Click the name of the action to view the data as it was prior to applying that action.

Skipping backwards to delete a step may result in query errors.



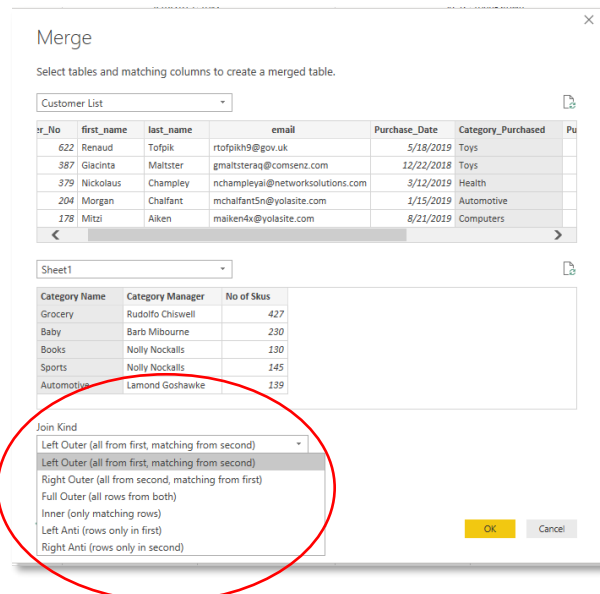
Merging Queries

In addition to the Editors many tools, you can also merge separate data sources into one query result.

Joined Queries

Using a common field, tables can be joined to create one table with additional column of information.

- To create the joined/ merged query first select the initial table for the merge.
- Next, select Merge Queries from the Home tab and choose Merge as New Query
- The merge query dialog box will appear, and you will need to add the second table to be joined.
- Click or select the common field from each table to be joined
- Select the Join type (See the options to the right)
- Click OK and the new merged table will appear in the queries pane on the left.

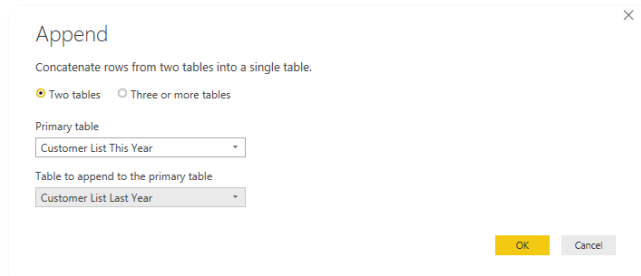


Append Query

Tables with matching fields can be appended to create larger datasets.

(i.e. separate datasets from multiple years with a similar layout)

- From the home tab select Append Queries and then Append queries as new
- From the dialog box select the number of tables to be joined (2 for this example)
- Next, select the Primary table to be appended to
- Select the table to be appended
- Click Ok and the new combined dataset will be available in the query Pane on the left of the editor.

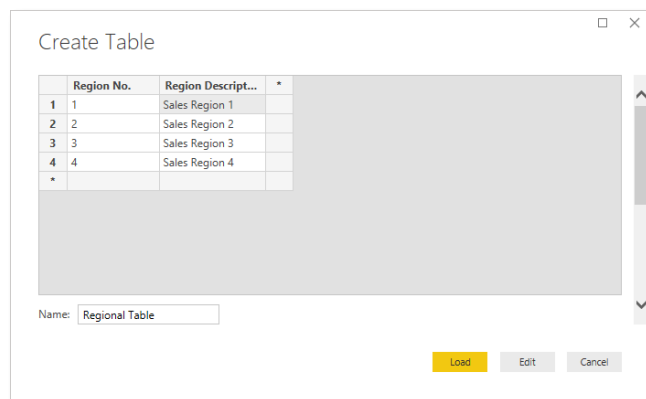


Creating Tables By entering data

Additional information that is not already in the data source can be added to your queries by creating a table and entering the data manually.

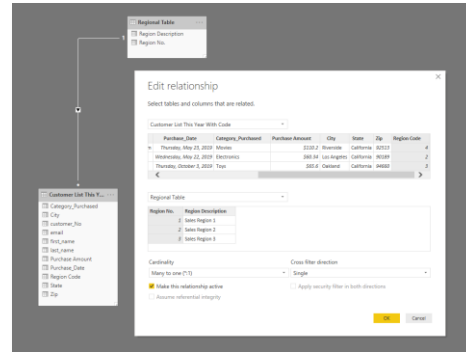
These tables can then be joined to existing data to enhance results

- From the Home tab, select Enter Data
- Enter your first value into Column 1
The column names can be changed by double clicking
- Additional records are added by clicking the Asterisk (*) in the next row. Additional columns may be added by clicking the Asterisk (*) to the right

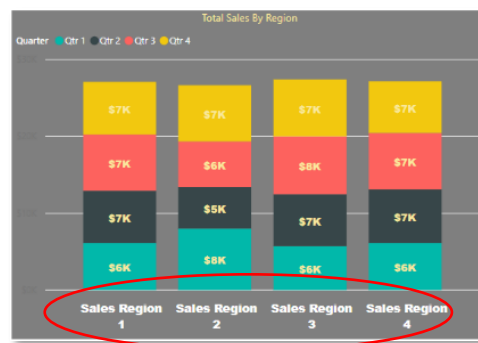


Using Data Entry Tables

The new table can be used to create relatable fields between tables



The table may also be used to enhance visualizations



Transforming Data

The BI Query Editor provides the users with several tools to convert or “Wrangle” data. This allows users to transform difficult datasets into data formats that work easily in reports.

Transpose

If data is positioned horizontally, it can be rotated using the Transpose tool in the editor

To convert data from horizontal to vertical layout

- Select any one cell of your data in the query editor
- From the Transform ribbon choose Transpose.
- The data is converted to a vertical format

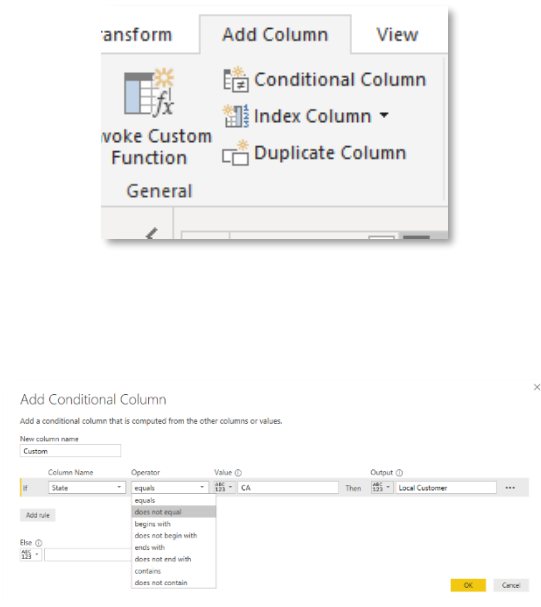
*At the end of the process, select Use first row as header (from the Transform tab) to promote the first row of the “flipped” data to headers.

	Any Column	Text Column		
	ABC 123 Column1	ABC 123 Column2	ABC 123 Column3	ABC 123 Column4
1		1	2	3
2	Marybelle	Xymenes	Loretalorna	Aurie
3	Geddes	Faragher	Sancho	Gilkes
4	mgeddes0@state.gov	xfaragher1@desdev.cn	lsancho2@dligo.com	agilkes3@ftc.gov
5	10/14/2019	9/28/2019	11/6/2019	10/14/2019
6	Grocery	Baby	Books	Sports
7	\$111.26	\$38.24	\$119.00	\$66.36
8	Buffalo	Atlanta	Newport News	Lansing
9	New York	Georgia	Virginia	Michigan
10	14210	31165	23605	48919
11	1	4	1	4

Conditional Columns

Power BI allows users to create custom columns that are populated conditionally as a result of values in other columns. These conditional columns provide the flexibility of a custom result and may also be used in reports to add a different perspective to the visualizations.

To create a Conditional Column

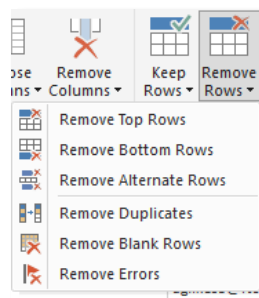


- From the Add Column ribbon of the Query Editor select Conditional Column
- Add a name for the new column
- Add the criteria for your column
 - Column Name
 - Operator (see diagram for options)
 - Value to examine
- Add the output entry for the conditional column
- You may add an else to the condition or leave it blank. Records that do not meet the criteria requirements will have a blank in that column.
- Click OK and the column is created and placed at the far right of the table

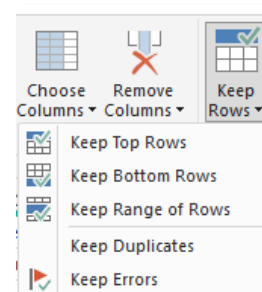
Keep and Remove Rows

Specific data rows can be isolated without the need for a query and criteria by using the keep or remove rows feature.

This feature can be used to:



- keep or remove duplicate records
- keep or remove rows from the top or bottom of the dataset
- keep or remove a range of records (ie. 15 thru 50).
- You can even remove blanks or rows with errors

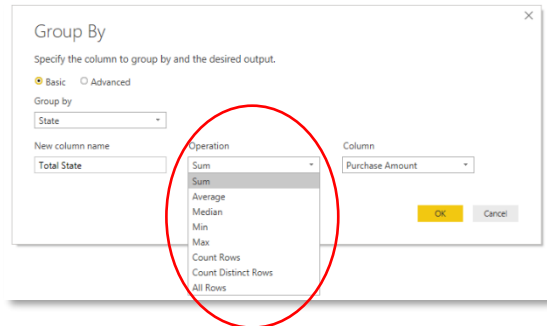


Grouping Records

Records may be grouped and summarized using the Group By command on the Transformed tab.

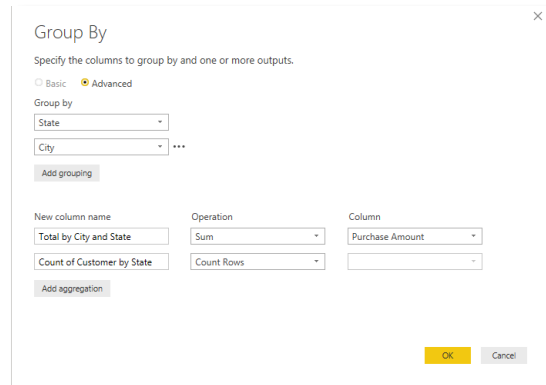
To group and summarize records

- Select the Group By command from the Transform ribbon
- Choose the field to group by
- Add the calculation to be applied (the list of options is on the right)
- Choose the field that the calculation is to be applied to



Select the Advanced option to:

- Add additional grouping levels
- Add additional Aggregations



Single level grouping of records

State	Total Amount by State
1 New York	5142.5
2 Georgia	3315.9
3 Virginia	4631.82
4 Michigan	2360.58
5 Mississippi	304.36
6 Florida	9603.24
7 Montana	354.48
8 Texas	12535.96
9 California	12062.42
10 New Mexico	1248.58
11 Indiana	2060.44
12 Alabama	2436.42
13 Alaska	502.62
14 Arizona	1370.2
15 Ohio	3388.22
16 Illinois	2165.64

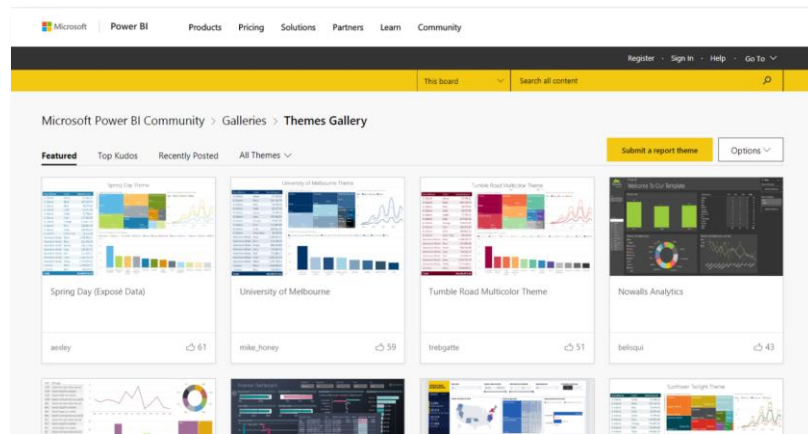
Multi-level grouping

State	City	Total by City and State	Count of Customer by State
1 New York	Buffalo	316.1	4
2 Georgia	Atlanta	1320.52	13
3 Virginia	Newport News	175.88	2
4 Michigan	Lansing	405.7	4
5 Mississippi	Jackson	270.6	3
6 Florida	Orlando	1399.44	10
7 Montana	Billings	354.48	3
8 Texas	Dallas	1097.22	11
9 California	Riverside	236.48	2
10 Texas	San Antonio	1227.54	10
11 New Mexico	Albuquerque	768.48	7
12 Indiana	Indianapolis	600.74	8
13 New York	White Plains	216.36	2
14 New York	Rochester	671.94	5
15 Texas	El Paso	2347.38	20
16 Florida	Tallahassee	426.36	3
17 Alabama	Montgomery	370.18	4
18 Indiana	Muncie	106.76	1
19 Texas	Houston	2825.66	20
20 Alaska	Anchorage	502.62	3
21 Arizona	Phoenix	815.36	7
22 California	Los Angeles	663.24	10
23 Ohio	Cincinnati	1071.66	11
24 Illinois	Peoria	337.22	3

Editing Visualizations

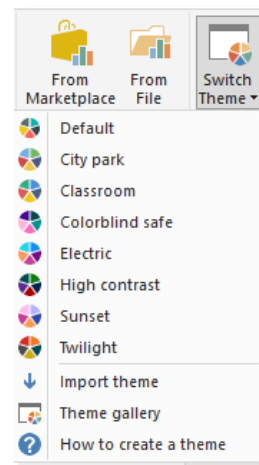
Working with Themes

Themes in Power BI are a great way to standardize formatting of reports without manually formatting each visualization separately. There are a variety of themes to choose from and users can even create new themes. To view a selection of idea generating themes, visit the theme gallery near the bottom of the themes list.



Selecting a theme

To apply a theme to your report just select Switch theme from the right side of the home tab. All visualization backgrounds, data points, borders, etc. will change to the selected theme colors.



Create and Import a theme

Themes can be imported into Power BI as JSON files (.json)

```
{  
  "name": "St Patrick's Day",  
  "dataColors": ["#568410", "#3A6108", "#70A322", "#915203", "#D79A12", "#bb7711", "#114400",  
  "#aacc66"],  
  "background": "#FFFFFF",  
  "foreground": "#3A6108",  
  "tableAccent": "#568410"  
}
```

The sample above demonstrates important elements that determine the structure of the theme

- "name" of the theme
- "dataColor"
- "background"
- "foreground"
- "tableAccent"

Color choices are entered in a hexadecimal format

To apply the theme:

- Select Switch Theme from the Home tab
- Select Import theme
- Find and select the ".json" theme file
- All visualizations in the report will adopt the new theme.

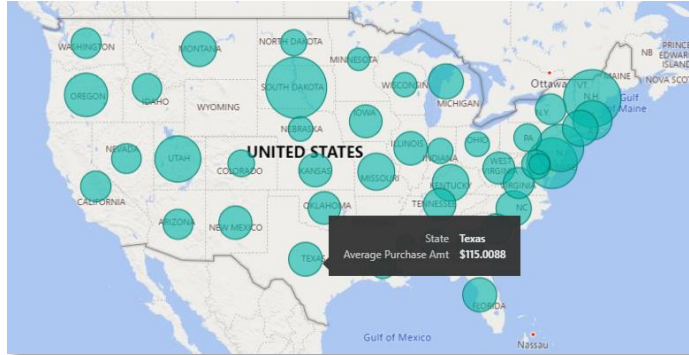
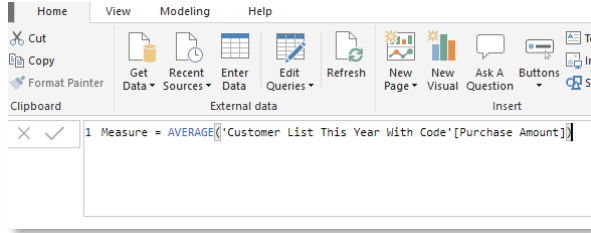
For more information on themes select "How to create a theme"
or visit the Microsoft Power BI Theme gallery at the bottom of the Themes list.

Creating New Measures

Although most measures are created naturally in Power BI, you may want to add additional measures to provide specific summarization to your reports. Power BI provide 2 types, Measures and Quick Measures. Let's look at methods for creating both.

To create a new Measure:

- Select New Measure from the Home tab
- A small calculator will appear in the fields pane
- The formula bar will open at the top of the screen
- Create your measure using the DAX formula language
- You can rename the new measure by right clicking the measure in the Fields pane
- Add your new measure to your report as needed

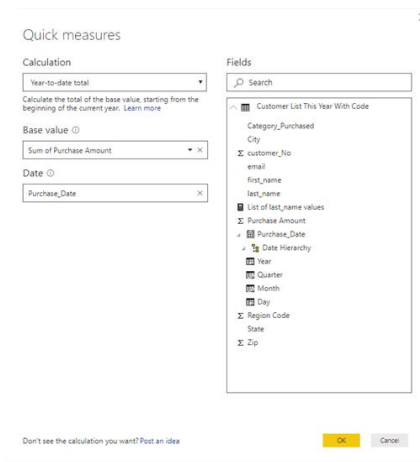


Create Quick Measures

Quick Measures can create calculable fields for use in reports without the need to write DAX expressions.

To create a new Quick Measure

- Select New Quick Measure from the Home tab.
- Select the type of calculation for your measure



The measure can now be used in the report to provide a “running total” calculation providing a view of the data that did not previously exist.

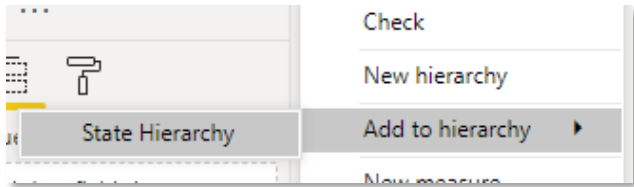
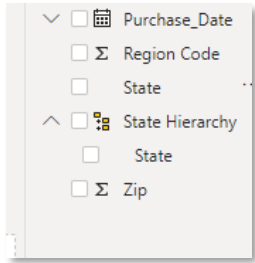


Create Hierarchies

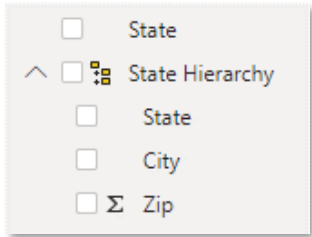
While hierarchies are naturally created in Power Bi for date fields (one example), users can create hierarchies for other fields as needed. In this example, we will create our own hierarchy for the state field.

To create a hierarchy:

- In the Fields pane, right click the State field that you would like to add the hierarchy to and choose New hierarchy
- Select the field to add to the State hierarchy (City) and choose Add to hierarchy



- Repeat the process and add the Zip field to the hierarchy
- You may now use the hierarchy in your report allowing users to drill down from the state level



Filters

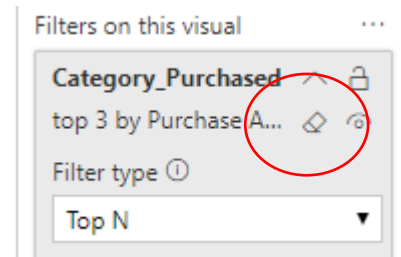
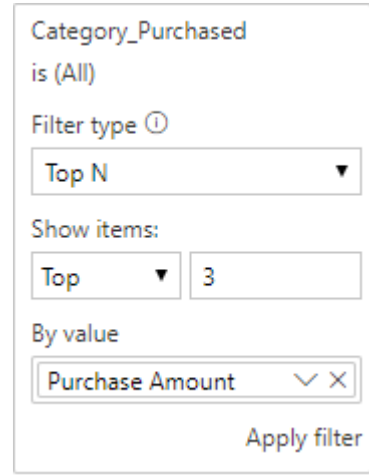
Power BI users have a variety of tools to focus the analysis of values in the dataset. These filters include: Top N Filters, Parameters and Drillthrough.

Top N Filters

Top or bottom values can be identified in visualizations by selecting the visualization and then using the Filter Pane on the right side of the program. The filter is applied by selecting the filter for the category / dimension.

The default filter is Basic filtering.

- Select the drop down and choose Top N filter
- Select a top or bottom target (i.e. Top or bottom 3)
- Add the value field to use as a filter
- Click Apply filter to activate.
- The filter pane will change color (grey) when the filter is applied.
- To clear the filter, click the small eraser at the top of the filter.



Parameters

Parameters may be added to most visualizations. These prebuilt criteria packages allow users to get a head start on query criteria instead of, or in addition to adding filters on the fly.

To create a Parameter

- Select New Parameter from the Home tab of the Query editor
- Add a name for your criteria in the first field and a description if necessary
- Change Parameter type
 - Types include numerical, text, date, etc. or leave the default ANY type to provide the most flexibility to your users
- In the suggested values field, you may use query results, a typed list of values or you may leave ANY
- Select a default value to start the parameter with
- Add a current value to use as an initial filter.

1	California
2	Texas
3	New York
4	Colorado
*	

To use the parameter

In the below example, we will use a Parameter to change the results of a conditional column.

Create the conditional column

- In the query editor select Conditional column from the Add column tab
- When the dialog box opens, type a name for your new

Column Name	Operator	Value	Output
if State	equals	[Value]	Then [Output] Target State

column into the New column name field

- Next, select the column on which to add the condition
- In the value field select parameter from the provided list
- Then choose your newly created parameter
- Add an output to show when the item is found in the column and click OK.
- Your output phrase will show in the column next to each record that meets your filter criteria
- To change the criteria, select the parameter in the panel on the left of the screen and change the current selection field.
- Return to your query and view your results

Texas		null	78230
New Mexico		null	87201
Indiana		null	46226
New York	Target State		10606
New Mexico		null	87105
Texas		null	75358
New York	Target State		14646
Texas		null	88525
Florida		null	32314
Alabama		null	36195
Indiana		null	47306

User Interaction Buttons

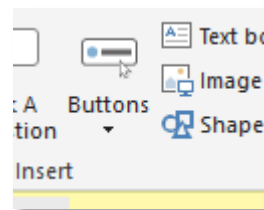
User interaction buttons allow anyone viewing the visualization to navigate the visualization with a button click. Some options for the buttons include:

- Reset
- Move left or right
- Request information
- Ask a question of the data in the report

In the example below, we will add the “Ask a question button”.

To add user interaction buttons to a report

- Select Buttons from middle the Home tab
- Choose the Q&A button.
The button will appear



in the top left corner of the report

- Drag the button to a location of your choosing and make sure that the button selected
- Click the Button text in the in the Visualizations tab and then Button Text
- Type any text that you would like to see on your button.

To use the button, control click, and the Q&A window will appear with sample questions and you will can use the natural language query feature to find insight into your data.

