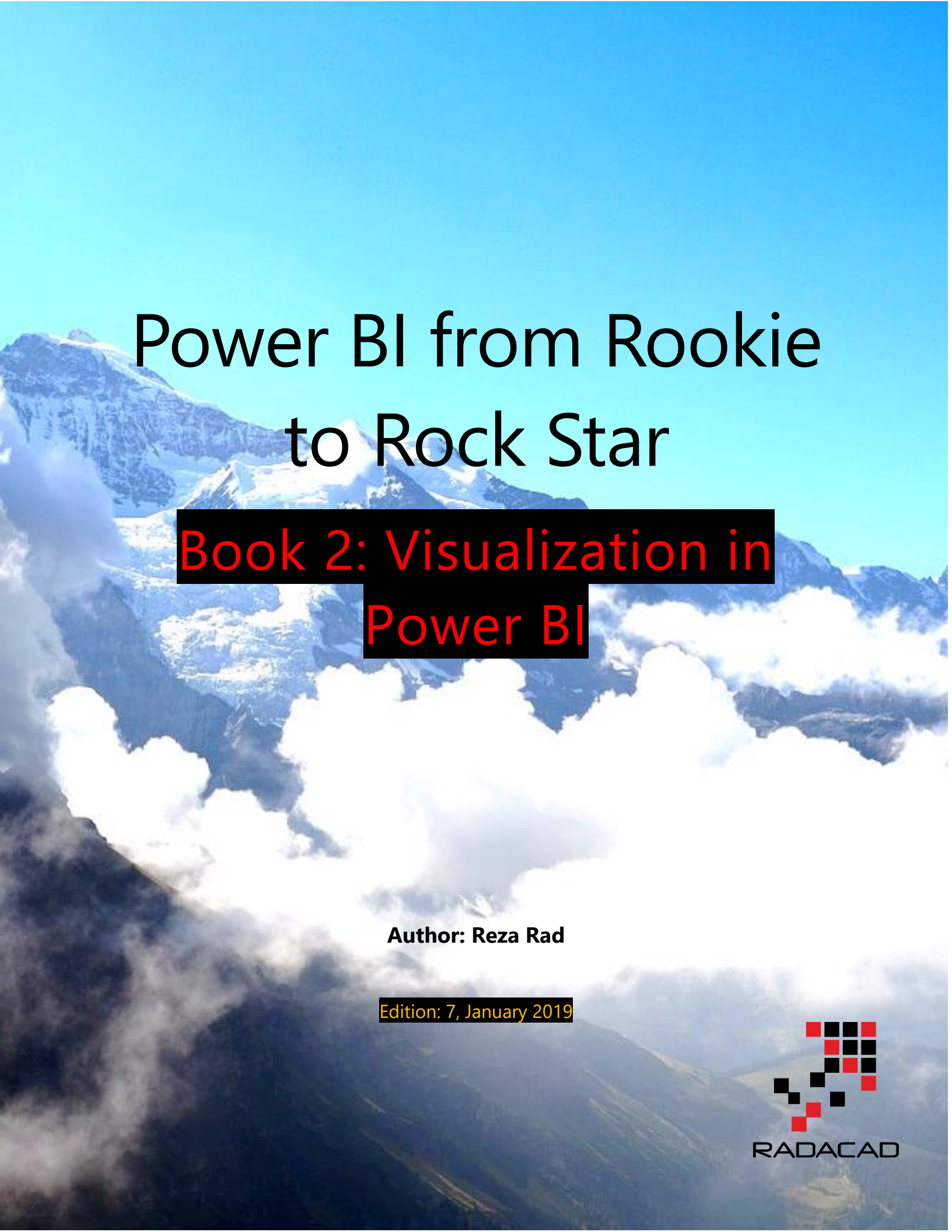

Power BI from Rookie to Rock Star

Book 2: Visualization in Power BI

Author: Reza Rad

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About the New Edition and New Structure

The Power BI from Rookie to Rock Star been such a popular book from the time that it published, and I added content to it every single week. After edition 3 which released July 2017, there have been many contents added. The edition 3 itself was more than 1100 pages, and If I wanted to continue the book as an all-in-one, it would have been more than 2000 pages now. So I decided to break the book into a book series. Each book in this series is a complete book and can be read individually. However, each book covers a specific area of the Power BI, and if you want to learn Power BI from ground zero to sky hero, you would need to read them all. Here is the new structure:

- Book 1: Power BI Essentials
- Book 2: Visualization with Power BI
- Book 3: Power Query and Data Transformation in Power BI
- Book 4: Power BI Data Modelling and DAX
- Book 5: Pro Power BI Architecture

This book is the book two of the series. In this book, you will learn only about visualizations. You will learn visualization basics such as choosing between clustered column chart or stacked column chart, as well as extending visualizations using some features such as drill-through master details design. You will learn through examples, everything about Power BI visualizations in this page. If you want to learn the basics of Power BI Desktop or service, or learn basics of Power BI in general, start with book one of this series “Power BI Essentials” If you want to learn more about advanced features in Power Query, Modeling or Architecture, your answer is within books 3 to 5.

About the book; Quick Intro from Author

In July 2015, after the first release of Power BI Desktop, I had been encouraged to publish a Power BI online book through a set of blog posts. The main reason to publish this book online was that with the fast pace of updates for Power BI Desktop, it is impossible to publish a paperback book because it will be outdated in a few months. From that time till now, I've been writing blog posts (or sections) of this book almost weekly in RADACAD blog. So far, I have more than 60 sections wrote for this book. The book covers all aspects of Power BI; from data preparation to modeling, and visualization. From novice to the professional level, that's why I called it Power BI from Rookie to Rock Star.

You can start reading this book with no prerequisite. Each section can be read by itself; normally you don't need to follow a specific order. However, there are some sections, that need an example previously built in another section. These sections have a prerequisite section mentioning this requirement.

After a year and half of writing online, I decided to release this book as a PDF version as well, for two reasons; First to help community members who are more comfortable with PDF books, or printed version of materials. Second; as a giveaway in my Power BI training courses. Feel free to print this book and keep it in your library, and enjoy. This book is FREE!

This book will be updated with newer editions (hopefully every month), so you can download the latest version of it anytime from my blog post here: http://www.radacad.com/online-book-power-bi-from-rookie-to-rockstar

Because I've been writing these chapters and sections from mid-2015, there are some topics or images or sections outdated with new changes in Power BI. I will do my best to update any changes in the next few editions. However, to keep you informed; There is a date at the beginning of each section under the header that mentioned the publish date of that section.

About Author

Reza Rad is a Microsoft Regional Director, an Author, Trainer, Speaker and Consultant. He has a BSc in Computer engineering; he has more than 15 years' experience in data analysis, BI, databases, programming, and development mostly on Microsoft technologies. He is a Microsoft Data Platform MVP for eight continuous years (from 2011 till now) for his dedication in Microsoft BI. Reza is an active blogger and co-founder of RADACAD. Reza is also co-founder and co-organizer of Difinity conference in New Zealand.
His articles on different aspects of technologies, especially on MS BI, can be found on his blog: http://www.radacad.com/blog.
He wrote some books on MS SQL BI and also is writing some others, He was also an active member on online technical forums such as MSDN and Experts-Exchange, and was a moderator of MSDN SQL Server forums, and is an MCP, MCSE, and MCITP of BI.
He is the leader of the New Zealand Business Intelligence users group. He is also the author of very popular book Power BI from Rookie to Rock Star, which is free with more than 1100 pages of content.
He is an International Speaker in Microsoft Ignite, Microsoft Business Applications Summit, Data Insight Summit, PASS Summit, SQL Saturday and SQL user groups. And He is a Microsoft Certified Trainer.
Reza's passion is to help you find the best data solution; he is Data enthusiast.

Who should read this book?

BI Developers and Consultants who want to know how to develop solutions with this technology. BI Architects and Decision Makers who want to make their decision about using or not using Power BI in their BI applications. Business Analysts who want to have a better tool for playing with the data and learn tricks of producing insights easier. The book titled "Power BI from Rookie to Rockstar" and that means it will cover a wide range of readers. I'll start by writing 100 level, and we will go deep into 400 level at some stage. So, if you don't know what Power BI is, or If you are familiar with Power BI but want to learn some deep technical topics about Power Query M language, then this book is for you.

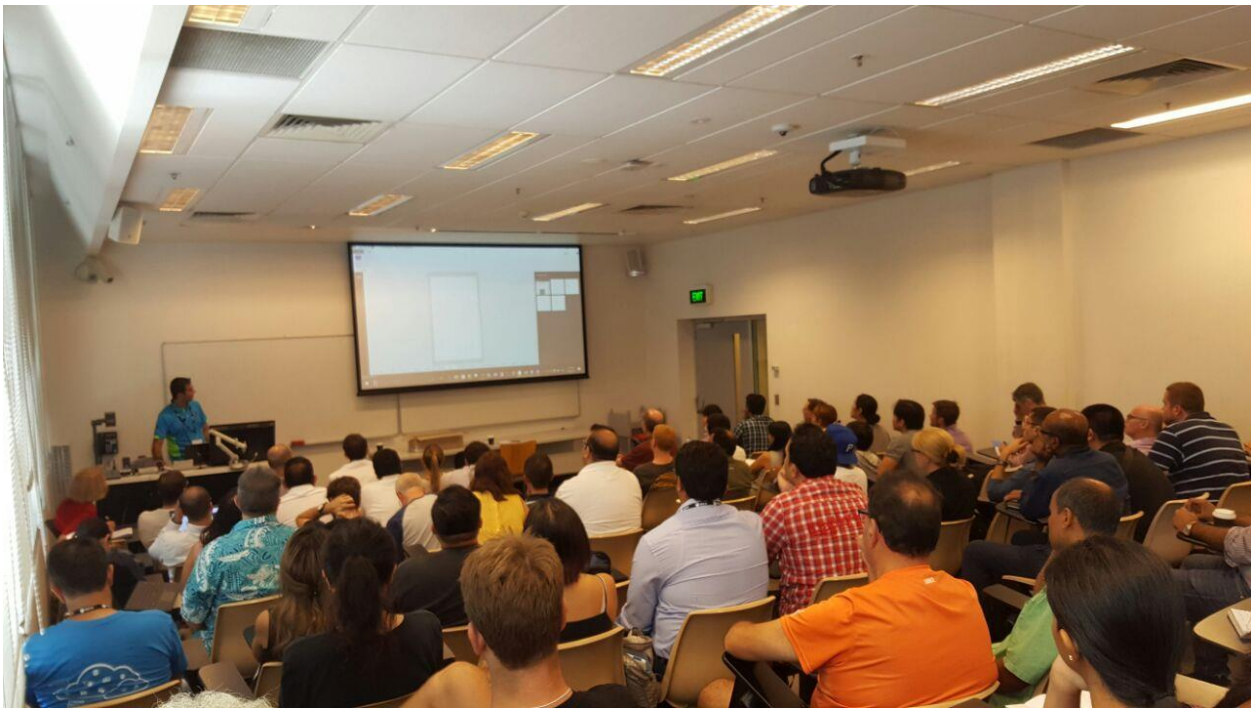
Upcoming Training Courses

Reza runs Power BI training courses both online and in-person. RADACAD also runs Advanced Analytics with R, Power BI, Azure Machine Learning and SQL Server courses ran by Dr. Leila Etaati. Our courses run both online and in-person in major cities and countries around the world.

Check the schedule of upcoming courses here:

http://radacad.com/events

http://radacad.com/power-bi-training



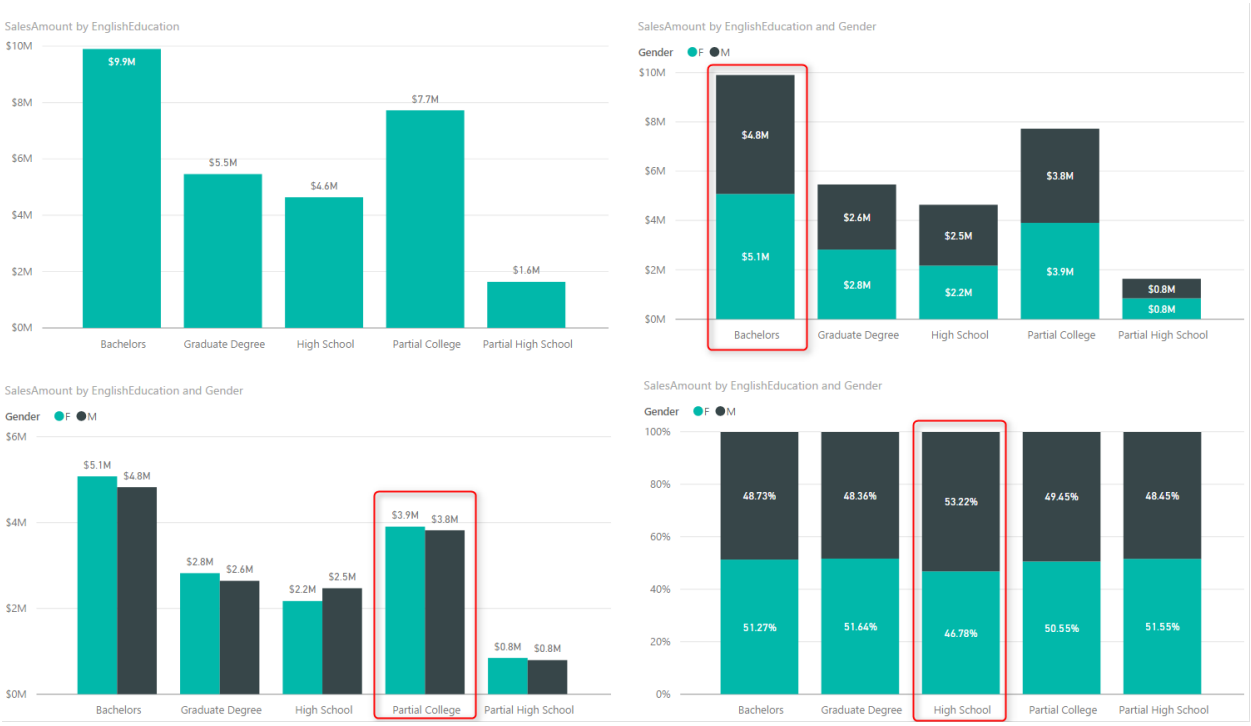
Heading Table of Content

Detailed Table of Content

Part I: Visuals in Power BI

Stacked Chart or Clustered? Which One is the Best?

Published Date: January 11, 2017



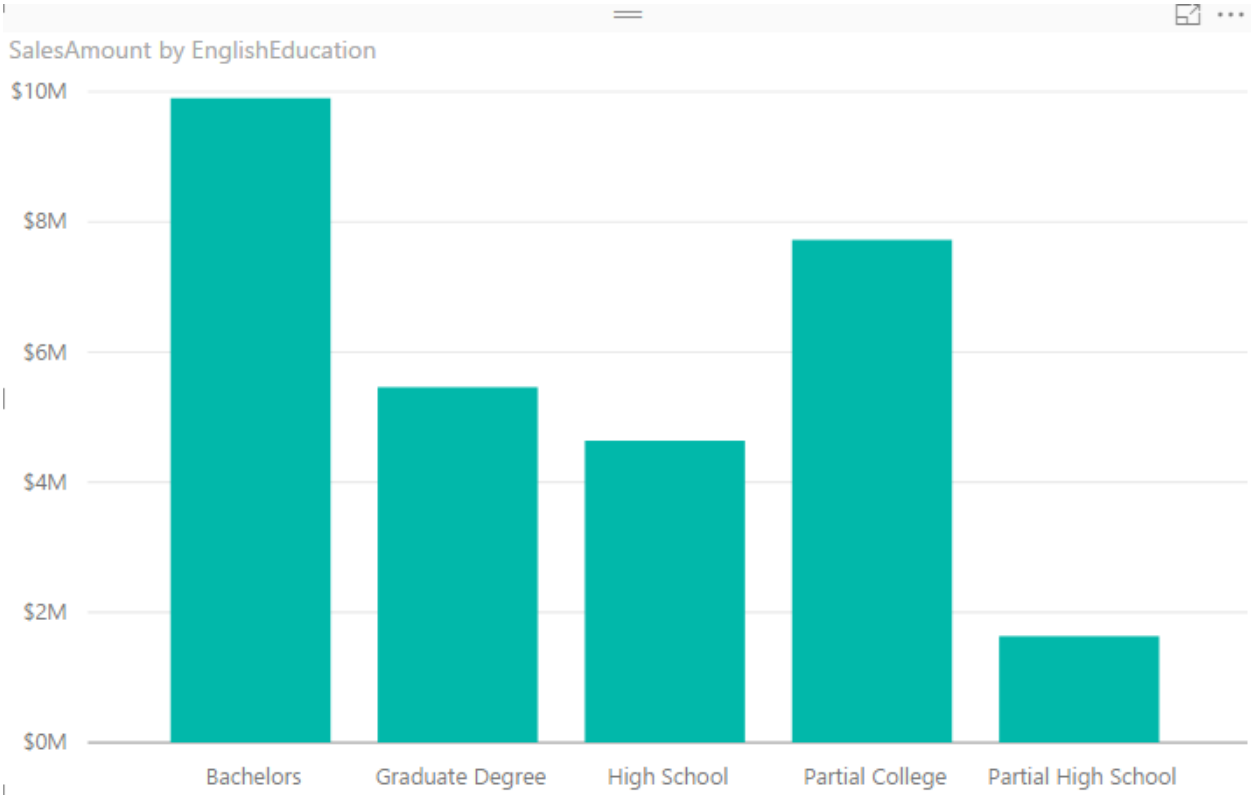
Column chart and Bar chart are two of the most basic charts used in every report and dashboard. There are normally two types of these charts: Stacked, and Clustered. At first glance, they seem to do the same action; showing values by categories and subcategories. However, they are different. Your storytelling of data would be totally different when you use one of these charts. The difference is simple, but knowing it and considering it in your visualization will take your visualization simply one level up. In this post I'll show you the difference and when to use which. I will use Power BI for this example, but this is a conceptual post and works with any other BI tool. If you like to learn more about Power BI; read Power BI online book, from Rookie to Rock Star.

Prerequisite

For running example of this post, you will need the AdventureWorksDW sample database, or you can download an **Excel version** of it.

Simple Column Chart

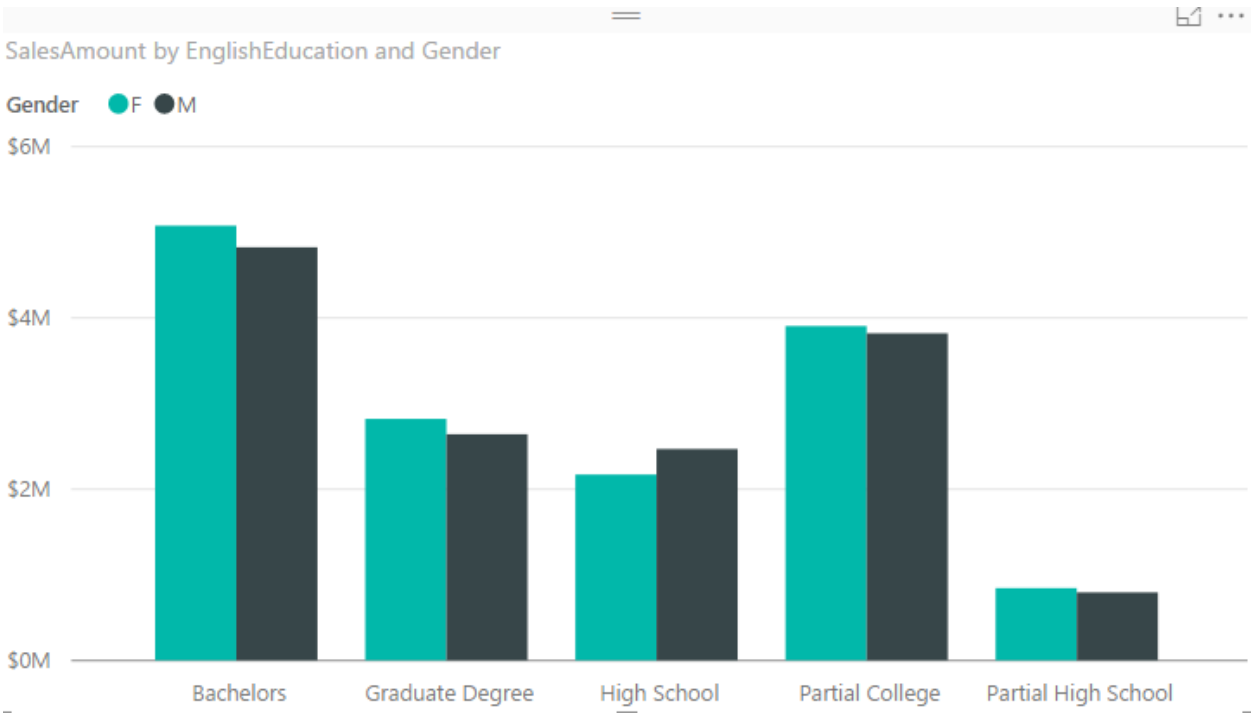
One of the best options to visualize the difference between quantitative values across multiple items is the column chart or bar chart. I have created a Power BI Desktop file connected to AdventureWorksDW and loaded DimCustomer and FactInternetSales into the model. The chart below is a Column chart with EnglishEducation from DimCustomer as Axis, and SalesAmount from FactInternetSales as Value;



You can see with a single glance that Bachelors are producing the most revenue in this data set, and then Partial College after that. You can also simply understand Partial High School type of customers are the lowest revenue generating customers. Column Chart and Bar chart are best for comparing a quantitative value (SalesAmount) based on categories/items (EnglishEducation). Now let's bring another dimension here.

Clustered Chart

Clustered charts are best for comparing all categories and their subcategories as part of a whole. If you add Gender from DimCustomer as Legend and choose the Clustered Column Chart type for your visual, this is what you will see;



Similar to normal column chart you can easily figure out which subcategory producing the most revenue: Bachelors Female. And Partial High School Male is the least revenue generation subcategory. You can also very easily realize that in each category which subcategory has a higher value than the other one;

You can simply say that Males are producing less revenue than females in the Partial College category. Even though in Partial College values of Male and Female subcategories are very close to each other. These are questions that you can answer with this chart easily:

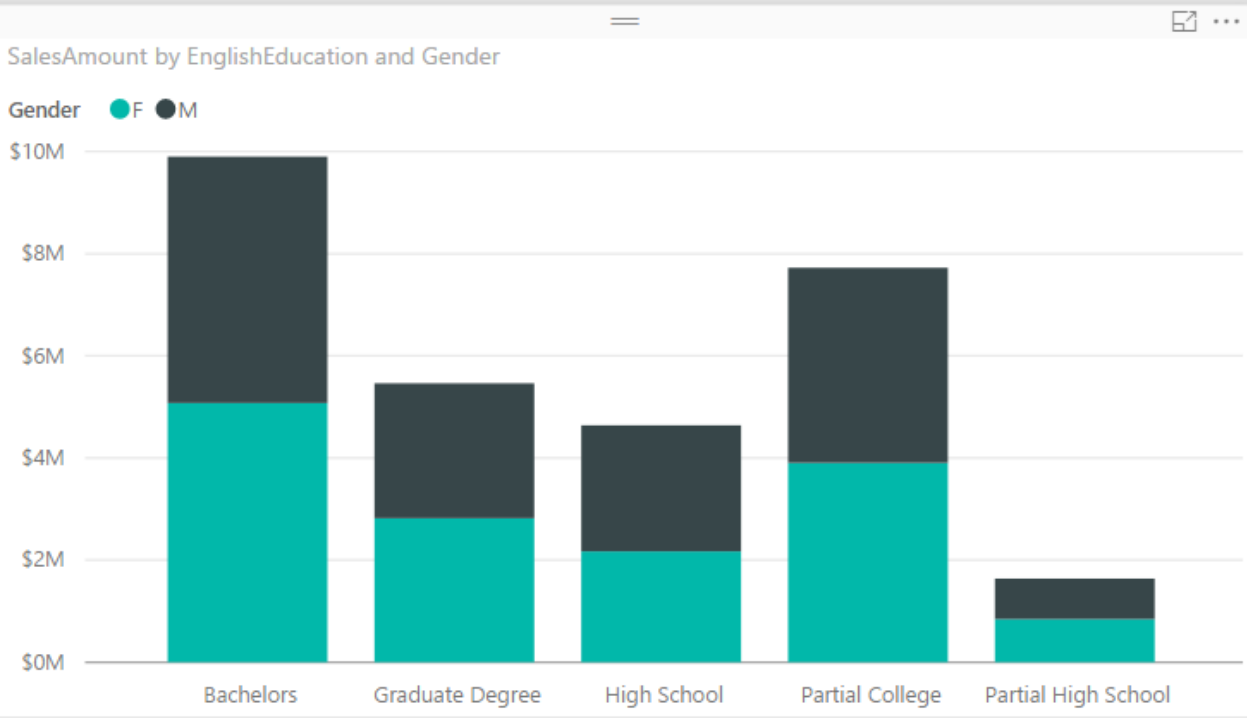
- Q: Which subcategory is generating the most revenue?
- A: Bachelors Female.
- Q: Which subcategory in Partial College is generating least revenue?
- A: Male.

How about this question: Which category produces most total revenue? You would say Bachelors probably fairly quickly because both Female and Males have the highest values of females and males across all categories. However, if I ask you between High School and Graduate Degree, which one has the total revenue based on only Clustered Chart above, that might be challenging to answer. The point is:

> Clustered Chart is not good for comparing the totals of categories

Stacked Chart

The point above leads us to Stacked Chart which is good for comparing totals and also values of subcategories. Change visual to Stacked Column Chart;

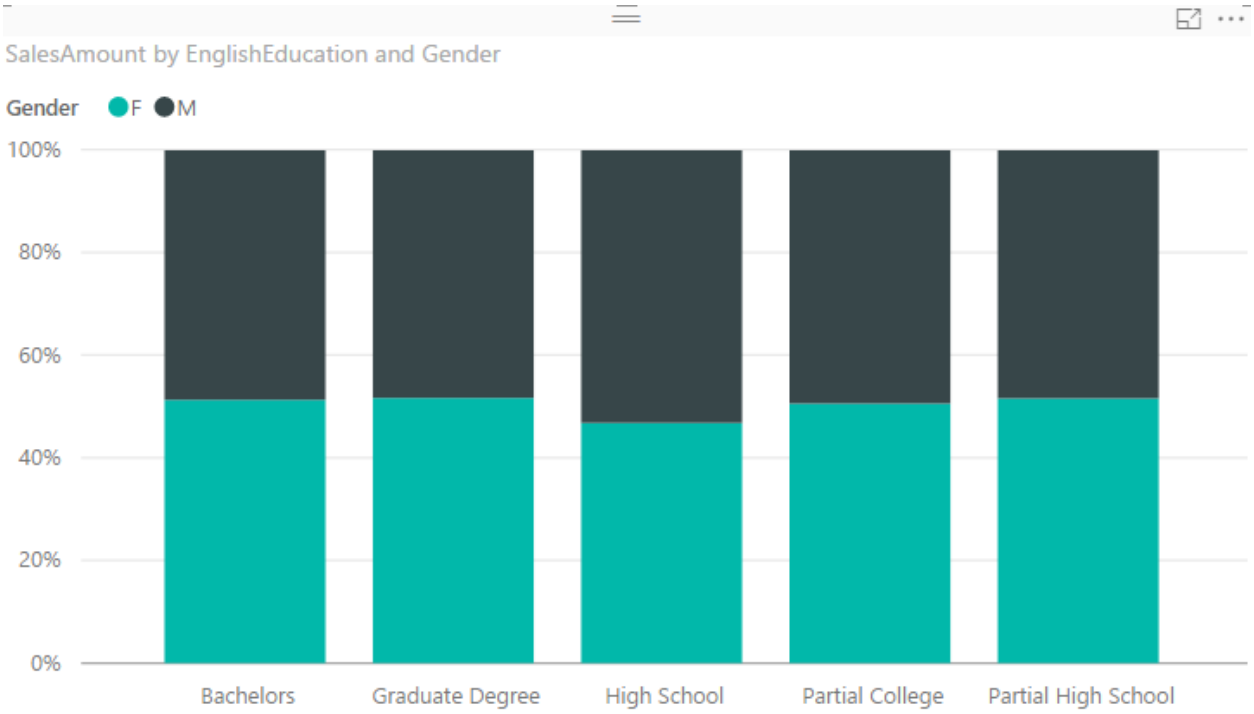


With this chart, you can simply say which Education category provide the most revenue because the total is showed. Between Graduate Degree and High School, it is Graduate Degree. In Stacked chart however isn't easy to compare values of a category. For example, finding out is Male or Female producing more revenue in the High School category is almost impossible through this. Stacked Chart is good when the value difference is high between subcategories in each category.

> Stacked Chart is not good for comparing values in each category

100% Stacked Chart

There is another type of stacked chart, named as 100% Stacked Chart. This chart is good for comparing percentages normally. To find out how subcategories of each category are doing compared with other subcategories. If you change the type of chart to 100% Stacked Column Chart, here is what you will see:

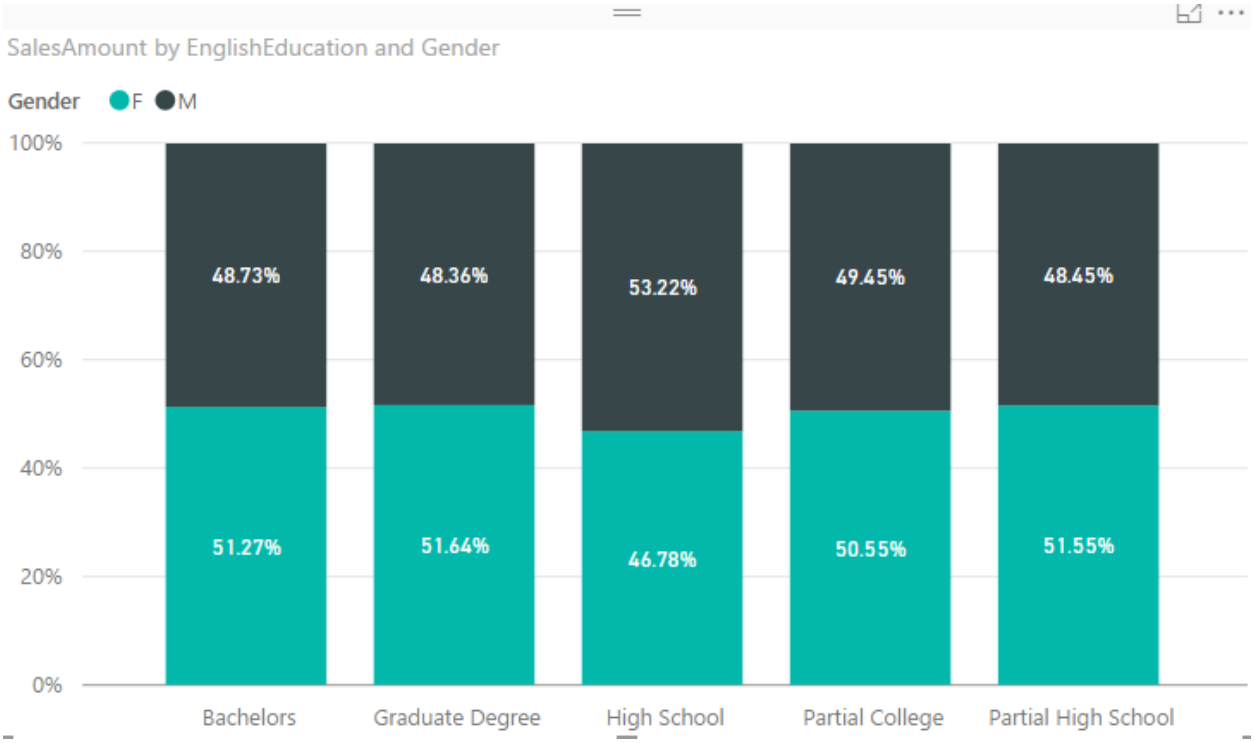


You can realize very quickly that portion of Males in all Education categories are less than High School's Males. However, You can never use 100% stacked chart for comparing actual values. This chart is only good for percentages. When you use this chart in Power BI, it will automatically use percentages calculation for it.

> 100% Stacked Charts are not good for comparing actual values.

Data Label is Your Asset

Regardless of what type of chart (Stacked, 100% Stacked, or Clustered) you are using, Data Labels are always helpful. Here is how charts can be powered with labels;

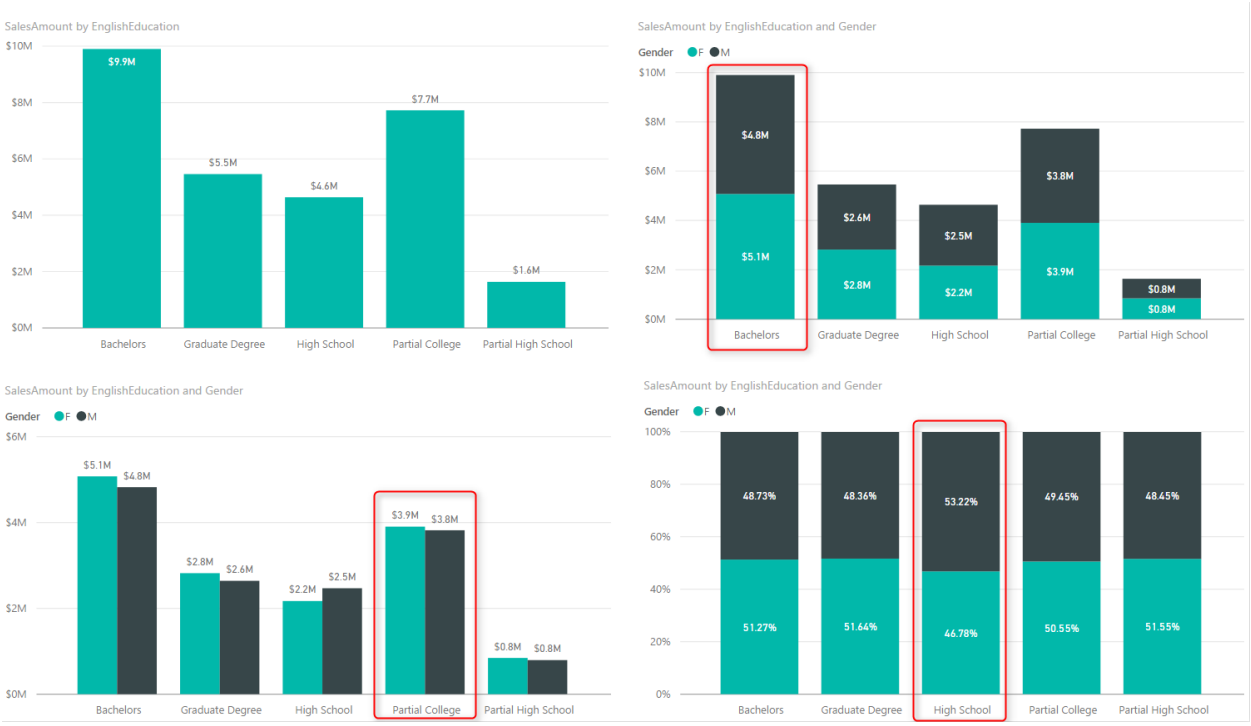


Your Story of Data

Deciding which chart is the best is all depends on what you want to tell as the story of the data;

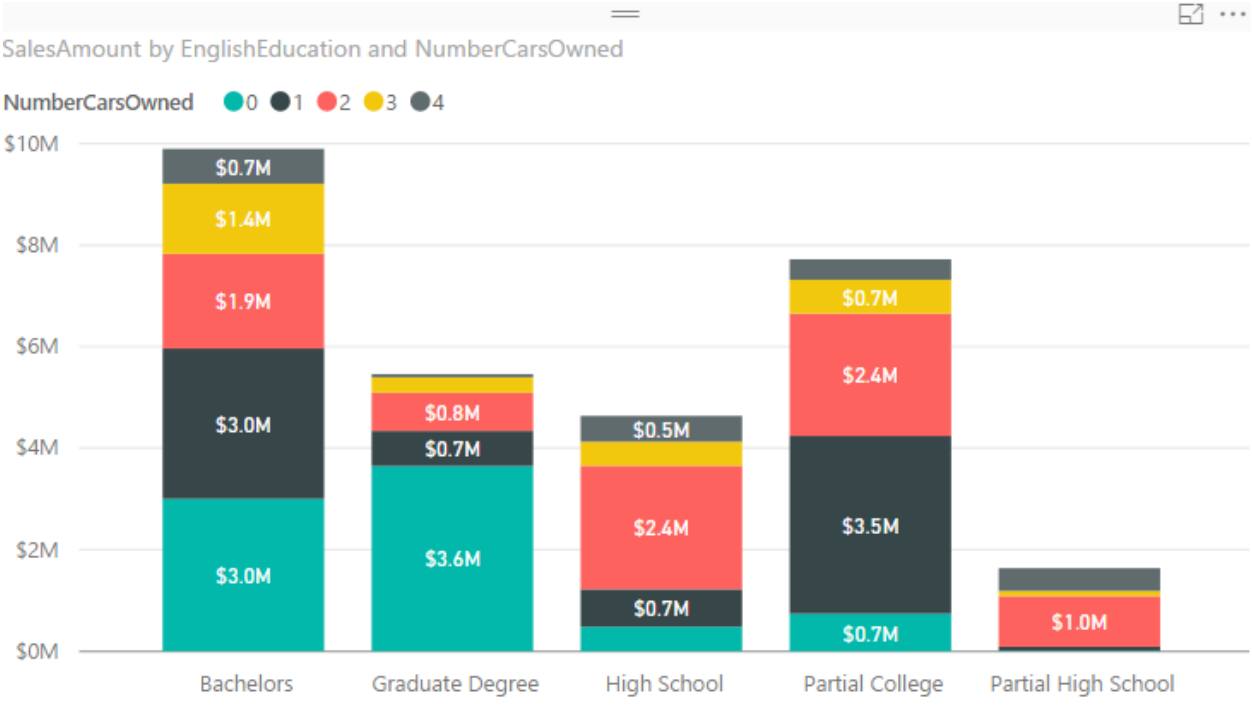
1. If you want to visualize totals of each category with separation of subcategories; Stacked Chart is your option.
2. If you want to visualize differences in the percentage of subcategories value with other subcategories in other categories; 100% Stacked is the best.
3. If you want to compare values for all subcategories, and understand which one is the best or worst, inside a category or overall; Clustered Chart is your asset.

There is no one single chart telling the whole story. You need to use a combination of these but use them wisely. For example, don't use Stacked Chart if you want to understand which subcategory of a single category performs better or worst, or don't use the Clustered chart if you want to compare totals of categories together.



Be Careful of Too Many Items

All of these charts works perfectly when you have a few numbers of items. If you want to spread these across many subcategories these charts would be hard to understand. Best would be splitting that variety in multiple charts.



Power Behind the Line Chart in Power BI; Analytics

Published Date: August 28, 2016

The line chart is one of the most basic charts that you can see in every visualization tool. Power BI like other visualization tools has the line chart visualization which is good for showing one or two measure's value across an axis which can be a category, period, etc. Recently Power BI line chart added the feature to create dynamic reference lines and the Analytics pane which brings more power into this useful chart. In this post, I'll show you an example of using these features in Power BI line chart. If you are new to Power BI or you want to learn more make sure to read Power BI; from Rookie to Rock Star.

Prerequisite

For running the sample in this post, you will need to download and install AdventureWorksDW sample Microsoft SQL Server database.

Introduction to line types in the line chart

Value Line

A line chart can show one or more measures as measures, such as Sales Amount, Total Costs, Quantity of the goods sold, etc.

Trend Line

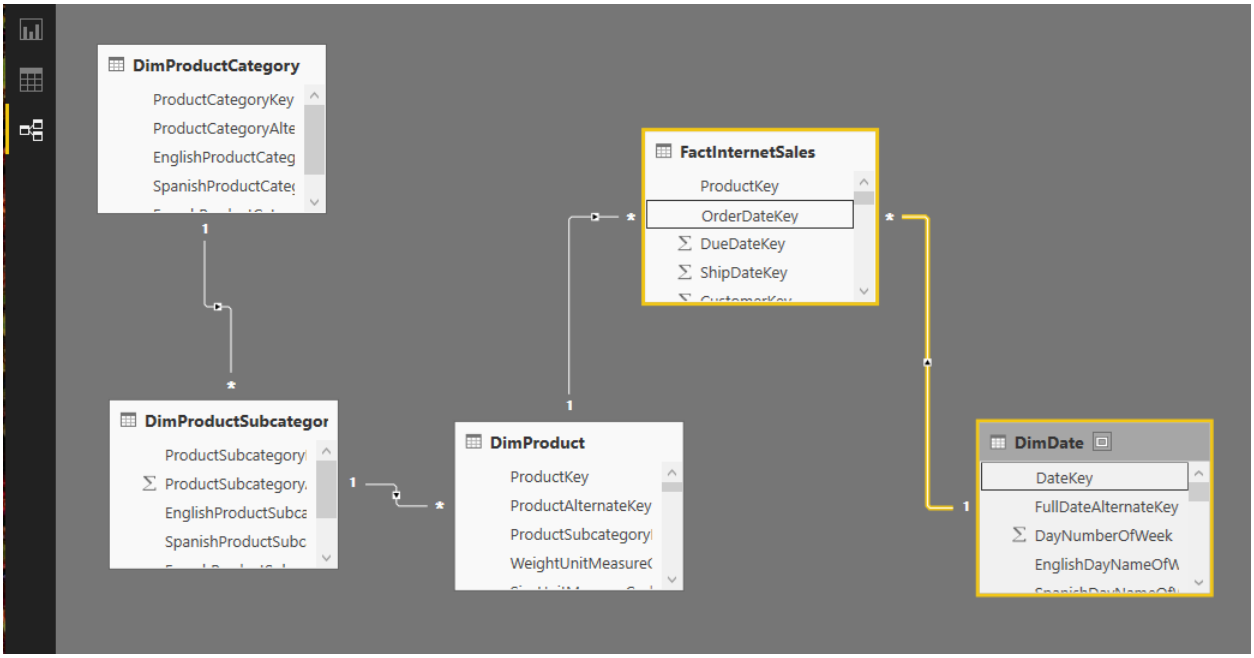
Depends on the variety of values across a period, Line chart can illustrate a straight line as a trend. This trend is good to understand how overall products are selling, is revenue going up or down for example.

Reference Line

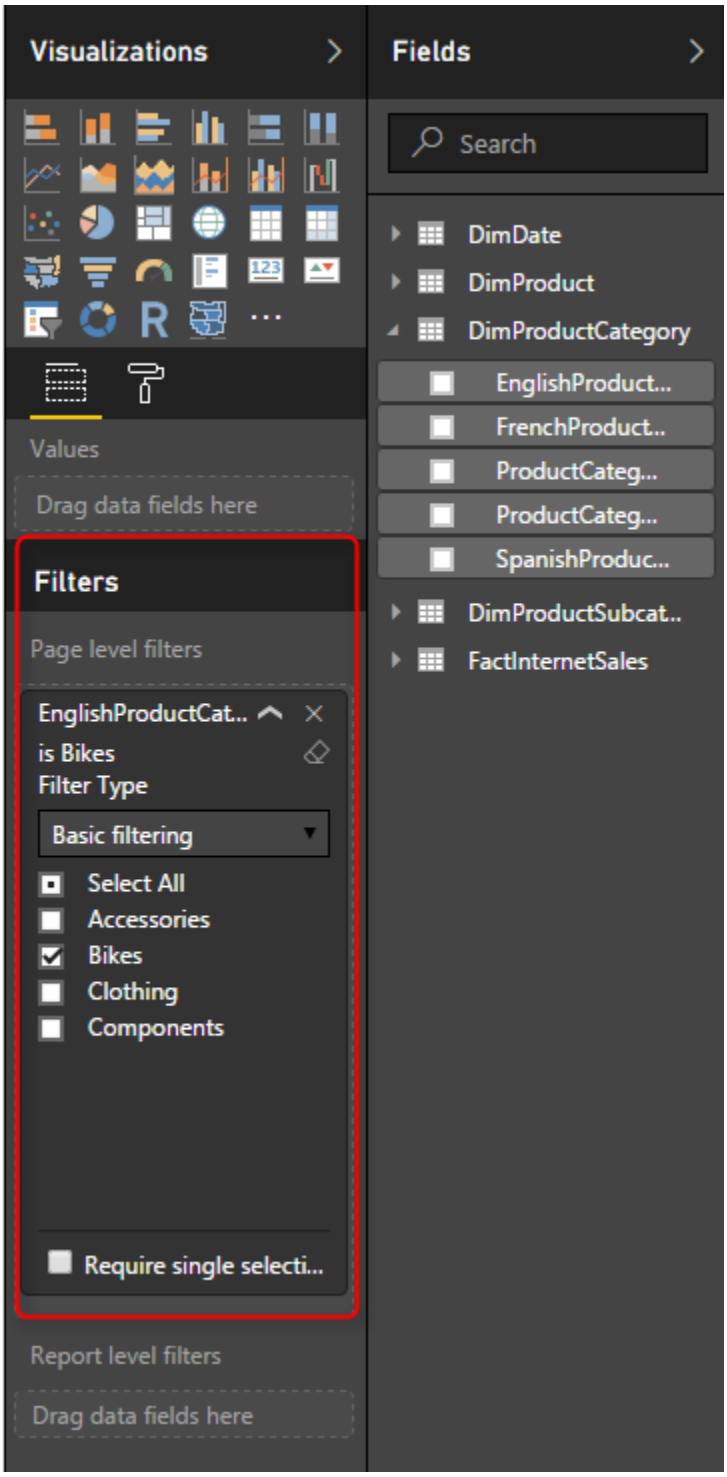
You might want to define minimum, maximum, average, or median values for your line chart as separate lines, and compare values lines with these lines. These are reference lines which can be dynamically created based on the value of measures in the chart.

Building a Line Chart

Create a new Power BI solution with getting Data from the AdventureWorksDW SQL Server database, and choose tables as DimDate, DimProductCategory, DimProductSubCategory, DimProduct, and FactInternetSales. Click on Load, and in the relationship tab. Remove extra relationships between FactInternetSales and DimDate to be only one active relationship based on OrderDateKey.

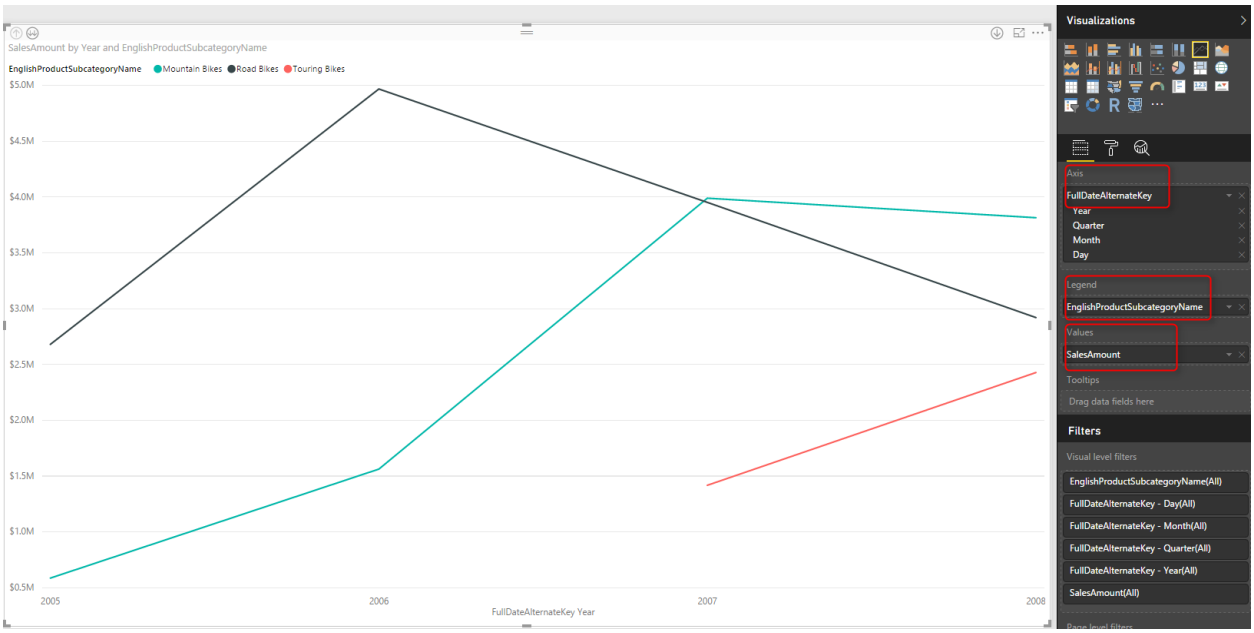


Go to the Report tab, and add EnglishProductCategory to the Page Level Filters. Filter data to be only Bikes.



Page level filter will filter all visualizations in this page to only show Bikes information. Now add a Line Chart from visualization pane. Set the value to be SalesAmount (from

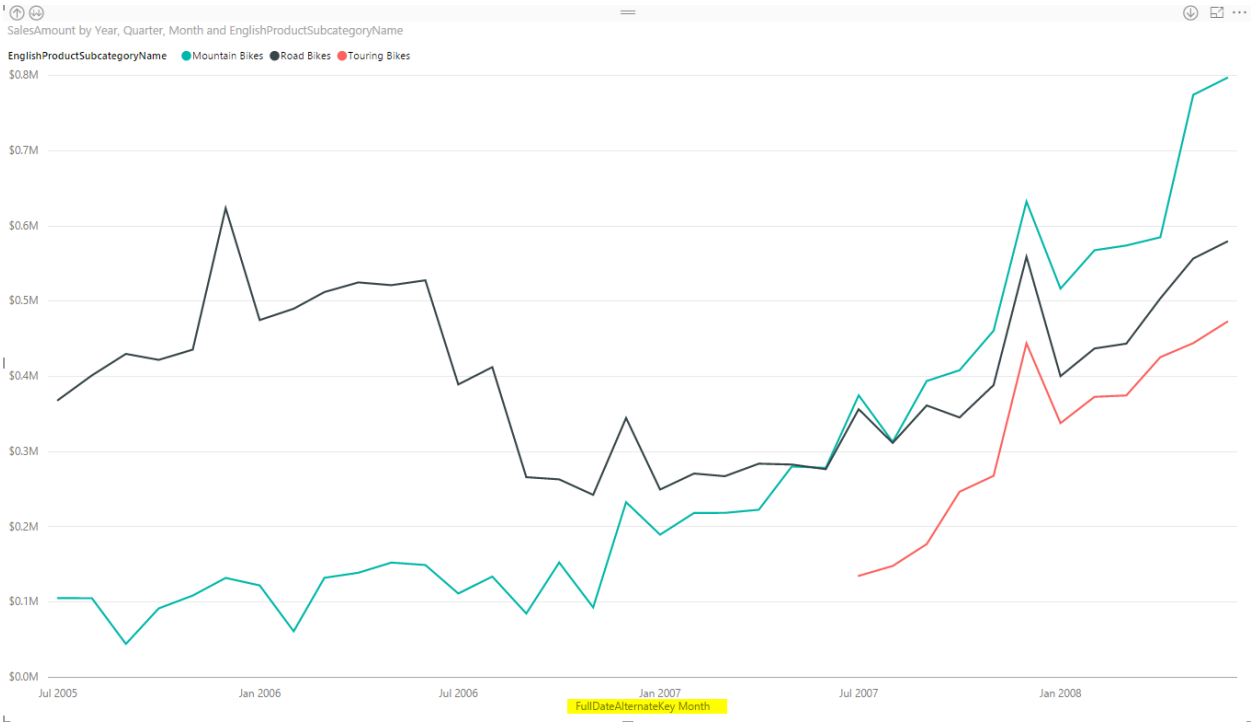
FactInternetSales), Axis to be FullDateAlternateKey (from DimDate), and EnglishProductSubCategory (from DimProductSubCategory).



This line chart now shows three product subcategories of Bike; Mountain Bikes, Touring Bikes, and Road Bikes. FullDateAlternateKey is a full date column which in this view showed as a Year level. This behavior is because Power BI automatically add Date Hierarchy to date fields. If you want to change this behavior, you can go to options and do so.

Let's now drill down into Quarter by clicking on the Drill Down button on the top left-hand side corner of the line chart. You can see after drill down in the button center of the chart it shows the level of drill down is in Quarter now.

Drill down into Month Level afterward.



Month level view shows better visualization as a detailed view, and not as messy as Day view (you can drill down today to see what I mean by messy).

Trend Line

As I explained earlier, Line chart can simply show a trend line to investigate the overall behavior of the value over the period. For adding this trend line, simply go to Analytics Tab (when you have line chart selected), and under Trend Lines click on Add.

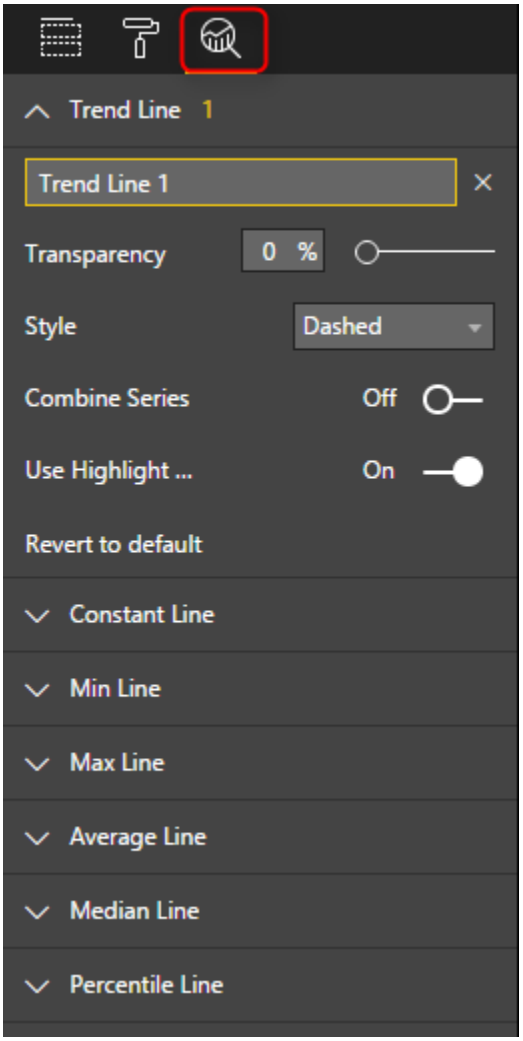
As you see in the screenshot above, this trend line shows the trend of Total Sales Amount over the period, which is increasing. You can have this trend as total as is, or have a separate trend line per each product subcategory.

Trend Line by Category

Change the Combine Series option in the Trend Line setting to Off. You will see now a trend line per each subcategory. This is a very useful visualization to see how each subcategory works. For example, you can now simply see the sales amount for the solid black line (road bikes) increased in the last few months of the data. However, it is still trending down (black dashed line). And the trend for the other two subcategories is going upwards.

Analytics Tab

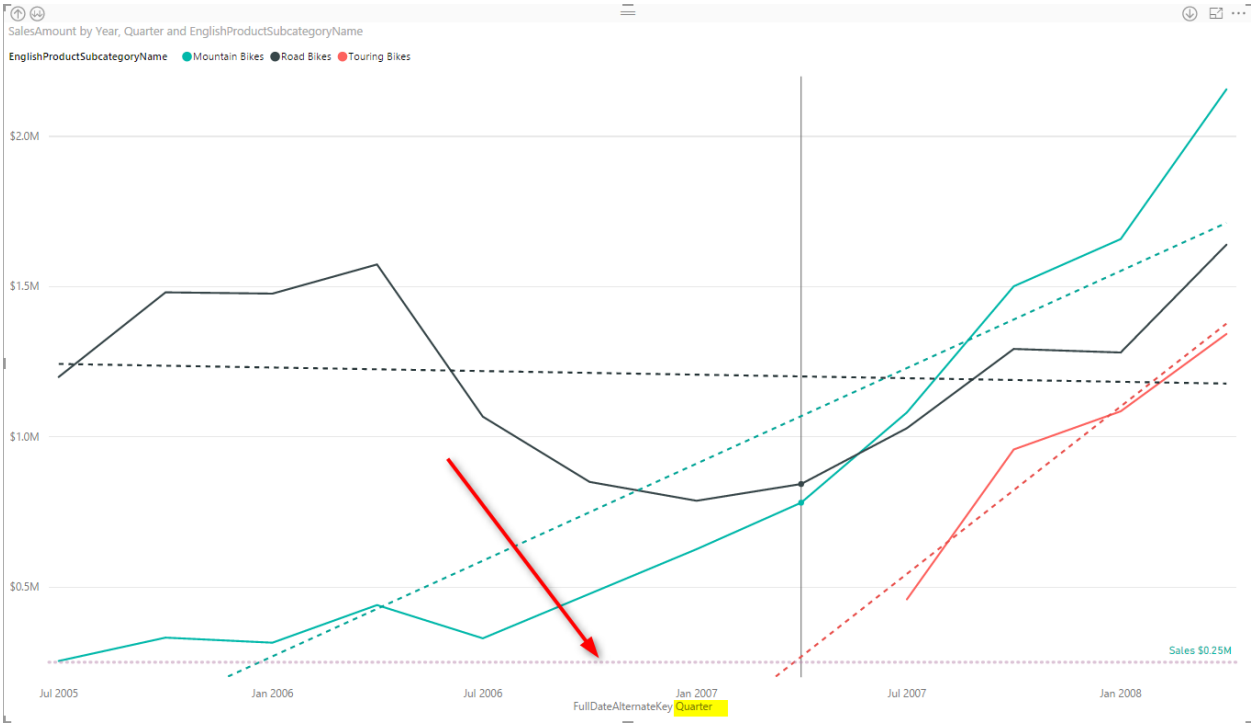
In the Line chart (and few other charts) there is an Analytics tab that brings the power of adding extra insight, named Analytics Tab. In a line chart, we can have the extra insight as Trend Line, Constant Line(s), and Dynamic Reference Line(s). You have seen already how helpful a trend line is. next other lines are reference lines which can be useful to measure values in line chart and compare them to a reference value. Let's dig more into it now.



Constant Line

A constant line is a constant value showed as a line. It is good for comparing the value line to a constant line. Here I have created a constant line for value $250000. And did some formatting for that and made it dotted.

This is good to compare values with especially when we DO NOT want to drill down or up. The reason for that is that If I drill up one level, then because I am in quarter level most of the values goes above this constant value. So normally constant line used when you have the main value as the Average, rather than sum or count.

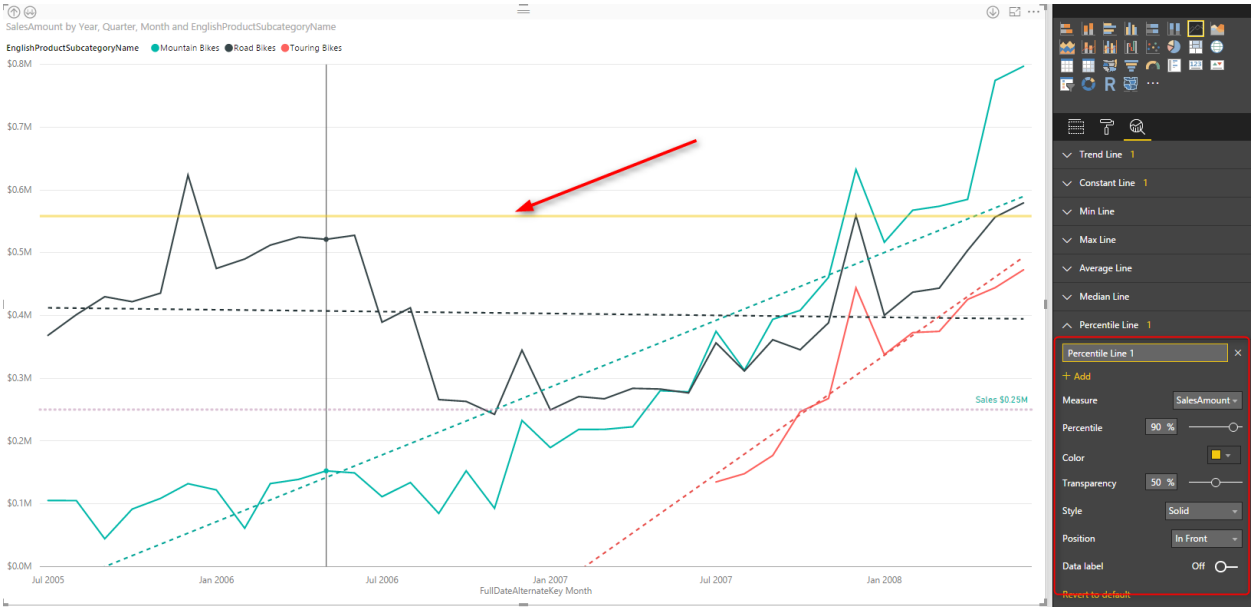


Dynamic Reference Lines

Constant line as you see above is not good when we drill down or up, because their value might not be close to comparing with the value lines in that level. So dynamic reference lines are the substitute for such case. For example, you can create An average reference line, minimum, or maximum which works based on the level you are in or filter applied, or what other slicers selected. This would be based on what data is showed in the value line. There is some dynamic reference lines that you can create; Min, Max, Average, Median, and Percentile.

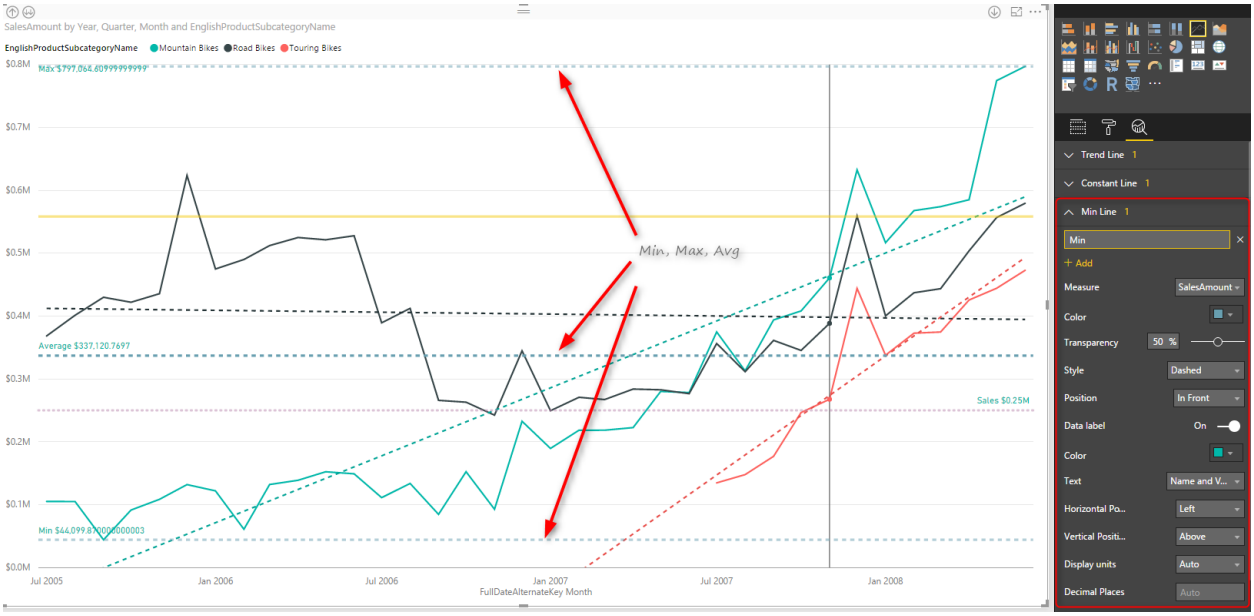
Percentile Line

You can simply add a percentage line, based on the percentage number you want. This can be a percentage of one of the measures viewed in the line chart.



Min, Max, Average, Median Lines

For adding any of these lines, click add, set the formatting, name the line as something and then choose to show data labels with name and values or without it.

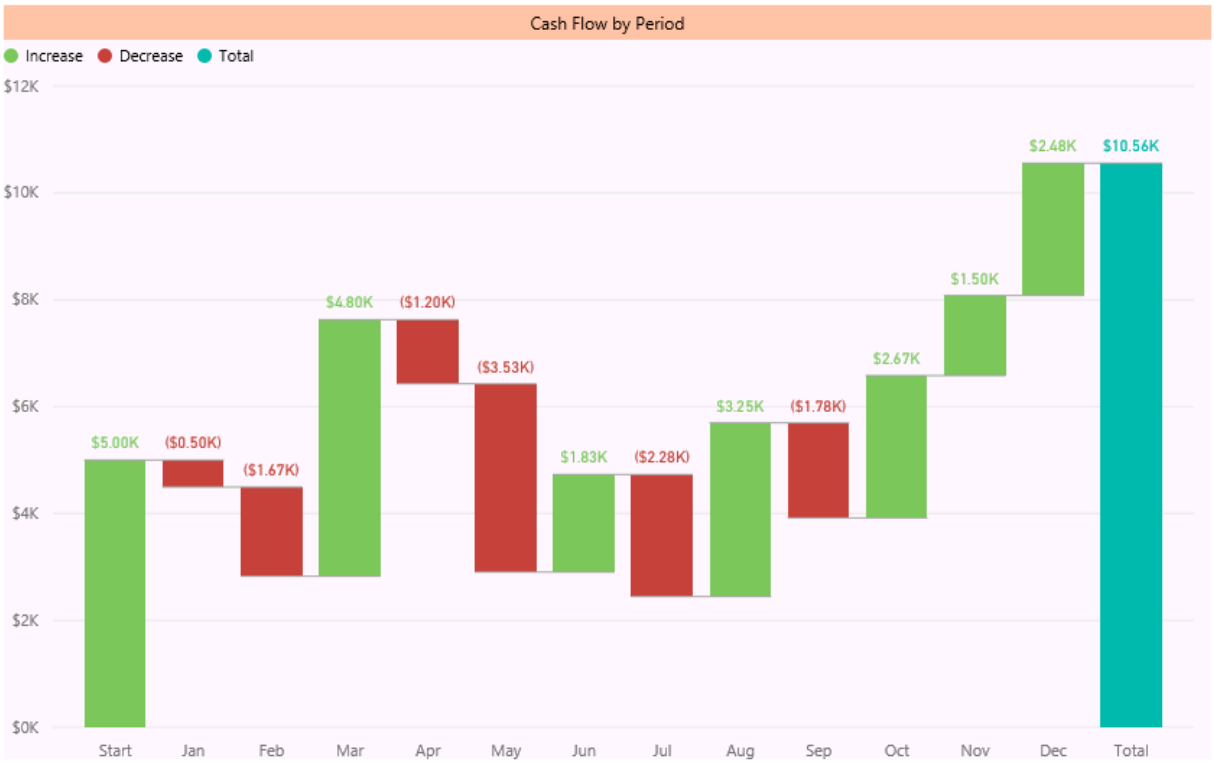


Do Not Overuse

Line Chart is a simple chart, and there is a reason for this simplicity, to figure out values, trends, and analyze it with a glance. Adding more lines to it will add more insight obviously, but overusing it with adding all possible reference lines, trend lines, and multiple constant lines will make it a very busy line chart which then doesn't convey the message as it should. Consider using this visualization in the best way, get the benefit of reference and trend lines, but only when it adds value.

Power BI Waterfall Chart: What's That All About?

Published Date: July 29, 2015



You've heard the news about Power BI Desktop release with a bunch of new features. If you don't, read the blog post here to understand new features of Power BI. The waterfall chart is one of the new visualization elements in this product. For finance people this chart makes sense, but not everyone knows the usage of that. In this post, I want to explain what is a Waterfall chart when to use it? And how to use it? So you would learn what's Waterfall chart all about?

Many charts are self-explanatory, such as Bar chart, line chart…. Some charts might need a little bit working with to understand what is the best situation to use them, such as scatter chart (especially with play dimension). Some charts look easy but you might not get their reason to exists, and the type of problem that they solve. From the feedback that I've heard, I think the waterfall chart is in the latest category. But don't be afraid, it is an easy chart. You only need to know when and how to use it.

What is the Waterfall Chart?

Waterfall Chart is a type of chart that usually used for

> "understanding the cumulative effect of sequentially introduced positive or negative values."

Don't blame me! I've got that definition from Wikipedia 😉 My simple definition however is: Waterfall chart is for analysis of up and downs for an additive measure. as an example ,y ou can analysis cashflow based on up and downs of it through all months of a financial year.

When to use Waterfall Chart?

You can also use waterfall chart for analysis of inventory, credit, performance, and everything else that falling or raising of its value matters. Sequential of an attribute that describes the value is also another helpful dimension of the waterfall chart. For example, you want to know up and downs of performance through the last year with the sequence of quarters that you've done performance reviews.

So Don't limit yourself, this chart visualizes and tells many stories, think big and find situations that you can use this chart to respond to the existing requirement.

How to use this Chart?

Easy! When you know the usage of the chart, and you have the data set to work with, then use Waterfall chart in Power BI Desktop. I'll show it through an example to you.

Sample Data

I used the data set provided by Debra Dalgleish in this post. The data set is a cashflow dataset as below:

	A	B	C	D	E
1	Period	Base	Down	Up	Cash Flow
2	Start		$0	$5,000	$5,000
3	Jan	$5,000	$503	$0	-$503
4	Feb	$4,497	$1,670	$0	-$1,670
5	Mar	$2,827	$0	$4,802	$4,802
6	Apr	$7,629	$1,198	$0	-$1,198
7	May	$6,431	$3,526	$0	-$3,526
8	Jun	$2,905	$0	$1,826	$1,826
9	Jul	$4,731	$2,284	$0	-$2,284
10	Aug	$2,447	$0	$3,250	$3,250
11	Sep	$5,697	$1,780	$0	-$1,780
12	Oct	$3,917	$0	$2,667	$2,667
13	Nov	$6,584	$0	$1,500	$1,500
14	Dec	$8,084	$0	$2,475	$2,475
15	End	$10,559			

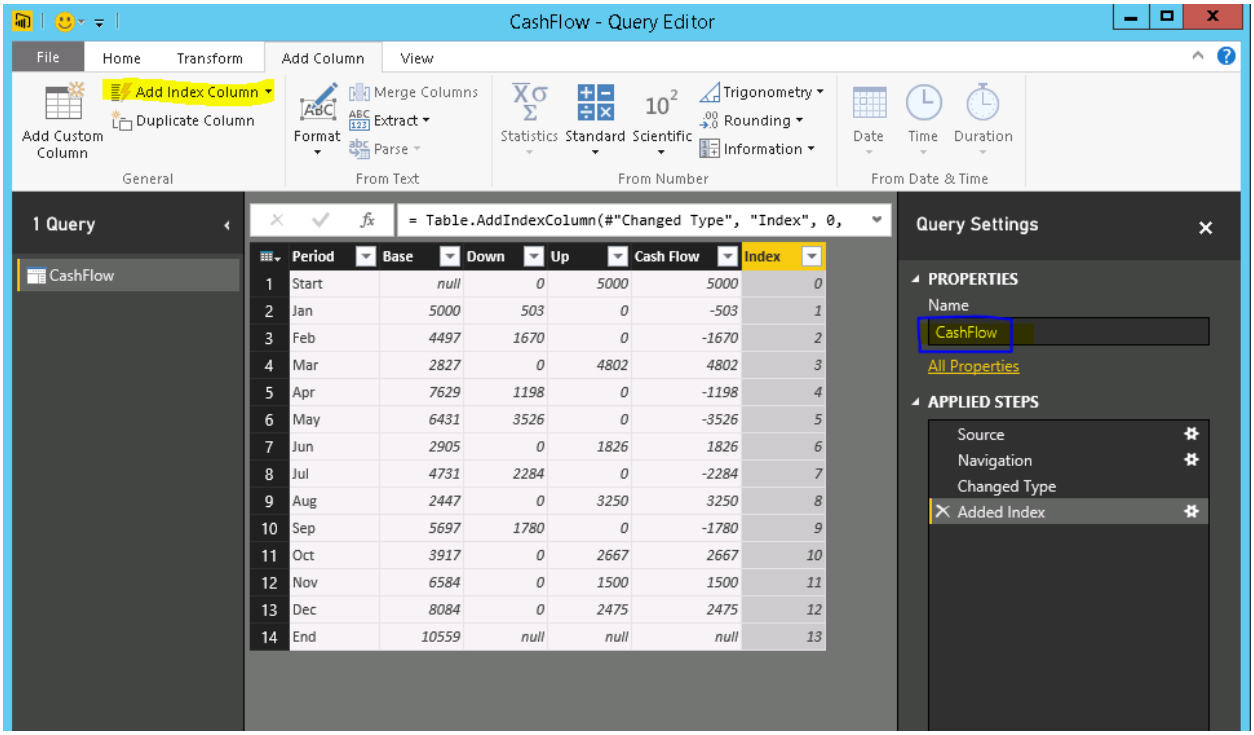
As you see in the above data set, we have periods (months), base, up, down, and the cash flow. If you want to understand how the calculation of cash flow works. It is as below:

- Base of the start period is coming from the previous period (year) balance.
- The base of each period is the Base from previous period + Up of previous period – Down of the previous period
- CashFlow is equal to Up minus Down
- value of End of Period calculated in the same way of the base for each period
- As an example B3=B2+D2-C2 (this formula continues to down with numbers changed based on rows)

So Let's use this dataset in the Power BI.

Extract the Data

I fetch the data from the excel file as is. With no changes. The only change I make is to add an Index Column to it (this index column will be used for sorting later on);



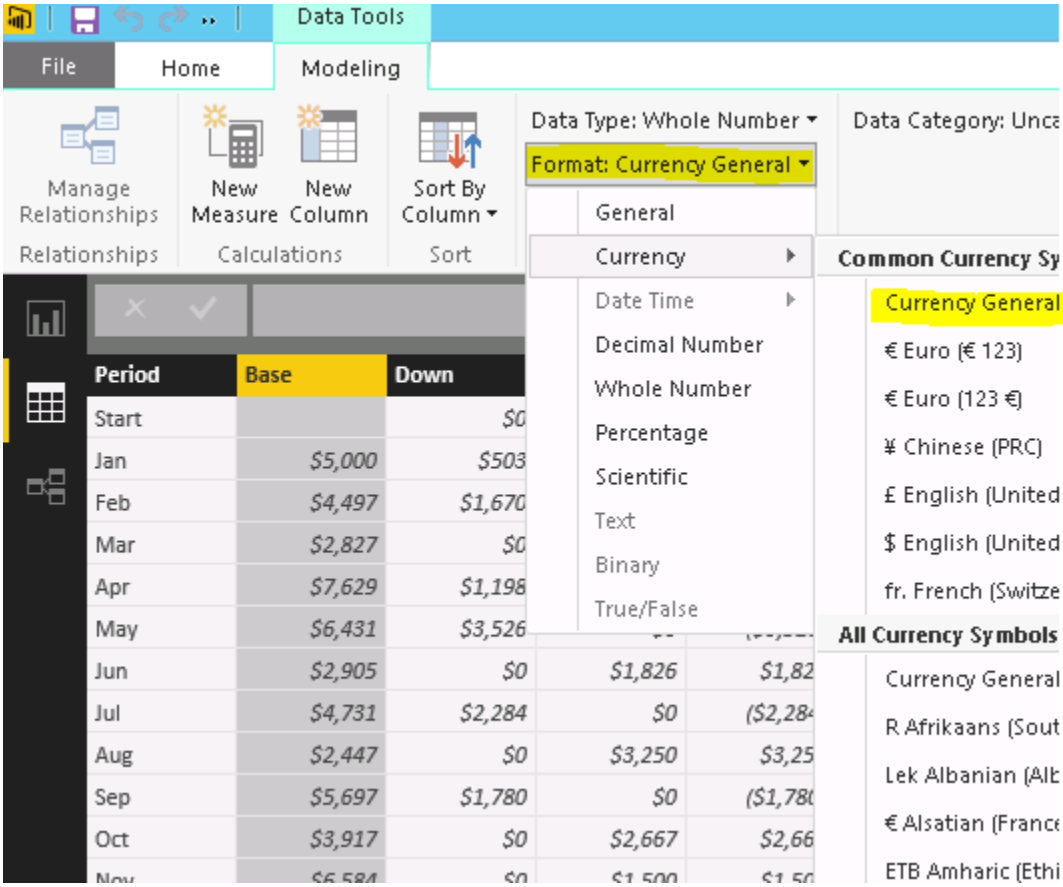
	Period	Base	Down	Up	Cash Flow	Index
1	Start	null	0	5000	5000	0
2	Jan	5000	503	0	-503	1
3	Feb	4497	1670	0	-1670	2
4	Mar	2827	0	4802	4802	3
5	Apr	7629	1198	0	-1198	4
6	May	6431	3526	0	-3526	5
7	Jun	2905	0	1826	1826	6
8	Jul	4731	2284	0	-2284	7
9	Aug	2447	0	3250	3250	8
10	Sep	5697	1780	0	-1780	9
11	Oct	3917	0	2667	2667	10
12	Nov	6584	0	1500	1500	11
13	Dec	8084	0	2475	2475	12
14	End	10559	null	null	null	13

After adding the index column and changing the name of the query to CashFlow. I'll start preparing the model.

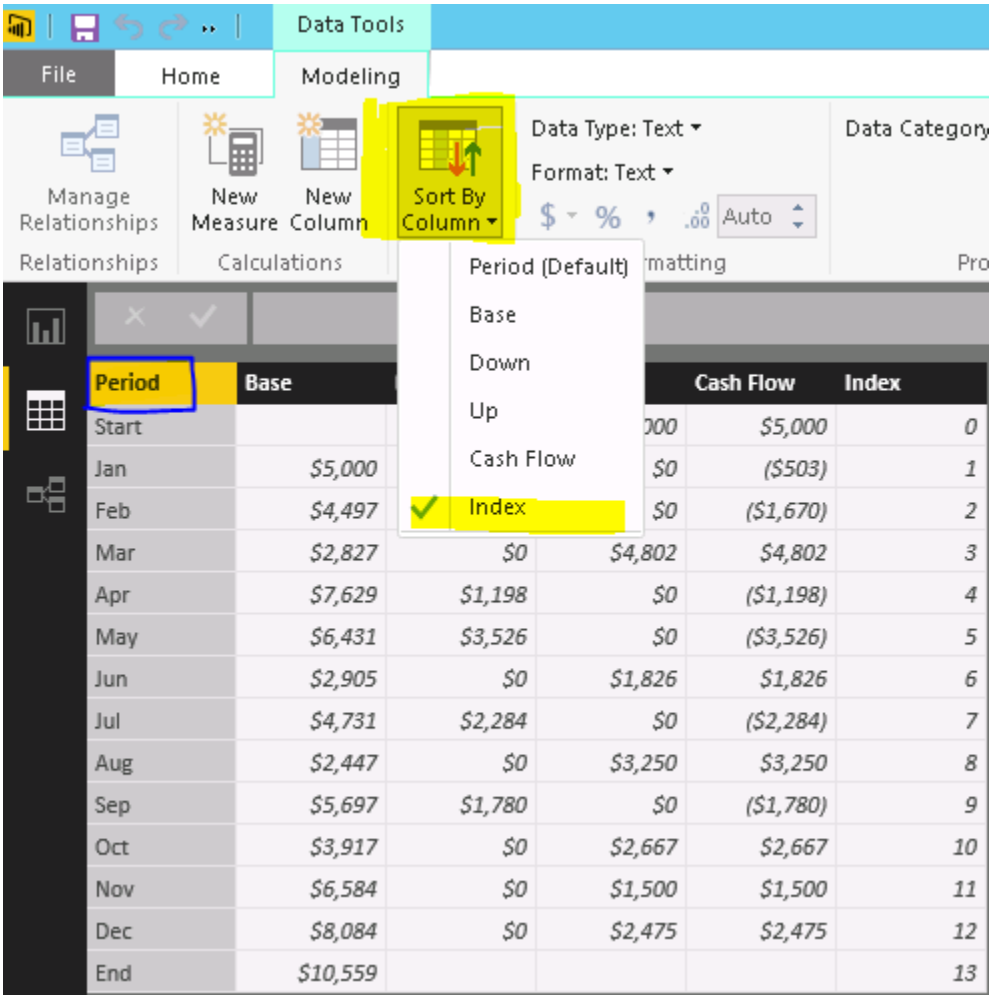
Modeling

There is only one data table in our model, so modeling shouldn't be a problem. However, there are some changes that I like to make as below:

4. Changing Format of columns (Base, Down, Up, and Cash Flow) as Currency



1. Change Sorting of Period Column to be based on the Index column



Period	Base			Cash Flow	Index
Start			000	$5,000	0
Jan	$5,000		$0	($503)	1
Feb	$4,497		$0	($1,670)	2
Mar	$2,827	$0	$4,802	$4,802	3
Apr	$7,629	$1,198	$0	($1,198)	4
May	$6,431	$3,526	$0	($3,526)	5
Jun	$2,905	$0	$1,826	$1,826	6
Jul	$4,731	$2,284	$0	($2,284)	7
Aug	$2,447	$0	$3,250	$3,250	8
Sep	$5,697	$1,780	$0	($1,780)	9
Oct	$3,917	$0	$2,667	$2,667	10
Nov	$6,584	$0	$1,500	$1,500	11
Dec	$8,084	$0	$2,475	$2,475	12
End	$10,559				13

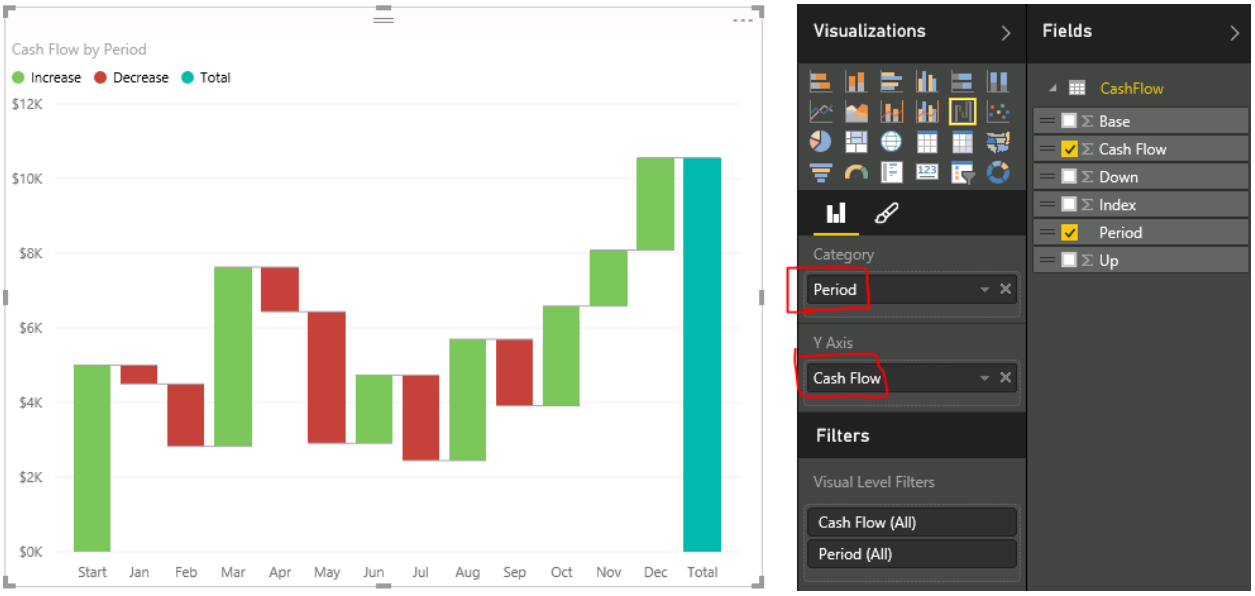
For doing above change; select Period column first, then from Modeling tab, click on Sort By Column, and then choose Index. If you don't apply this change waterfall chart will sort periods based on their alphabetical order.

Visualization

Go to the Report tab. Double click on Waterfall chart from Visualizations pane in the right-hand side.

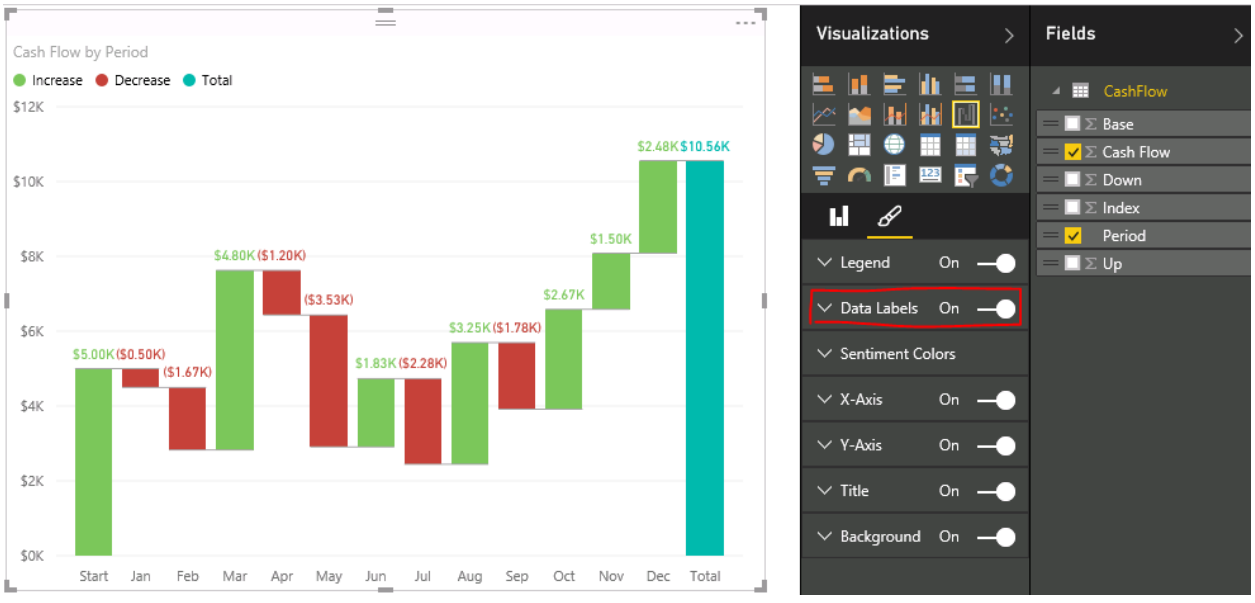
You have to set only two parameters:

- Category: Set it to Period
- Y-Axis: Set it to Cash Flow



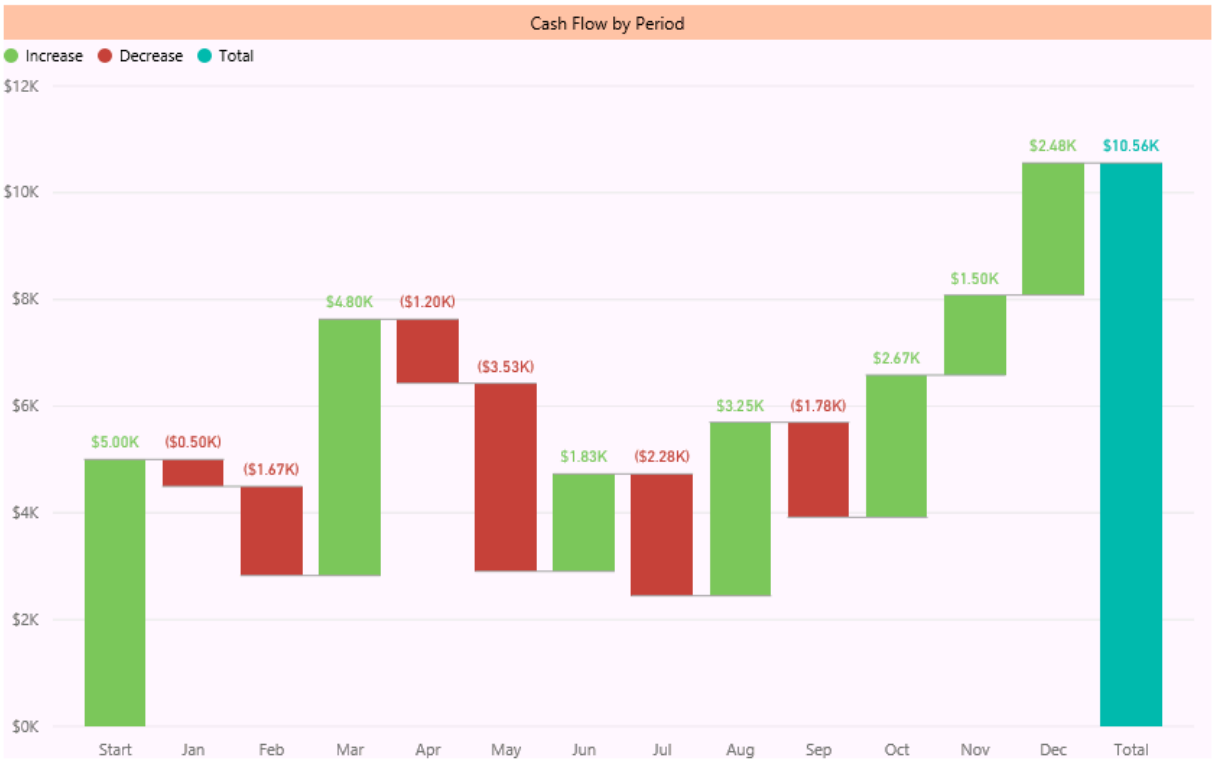
As you see in the above chart, the cash flow and its up and down showed beautifully in the chart. Order of period category is also right, and that is because of the Sort By Column setting we've done in the previous section.

You can apply the formatting as you want to this chart, like changing colors, backgrounds, title and so on. I like to set data labels for now.



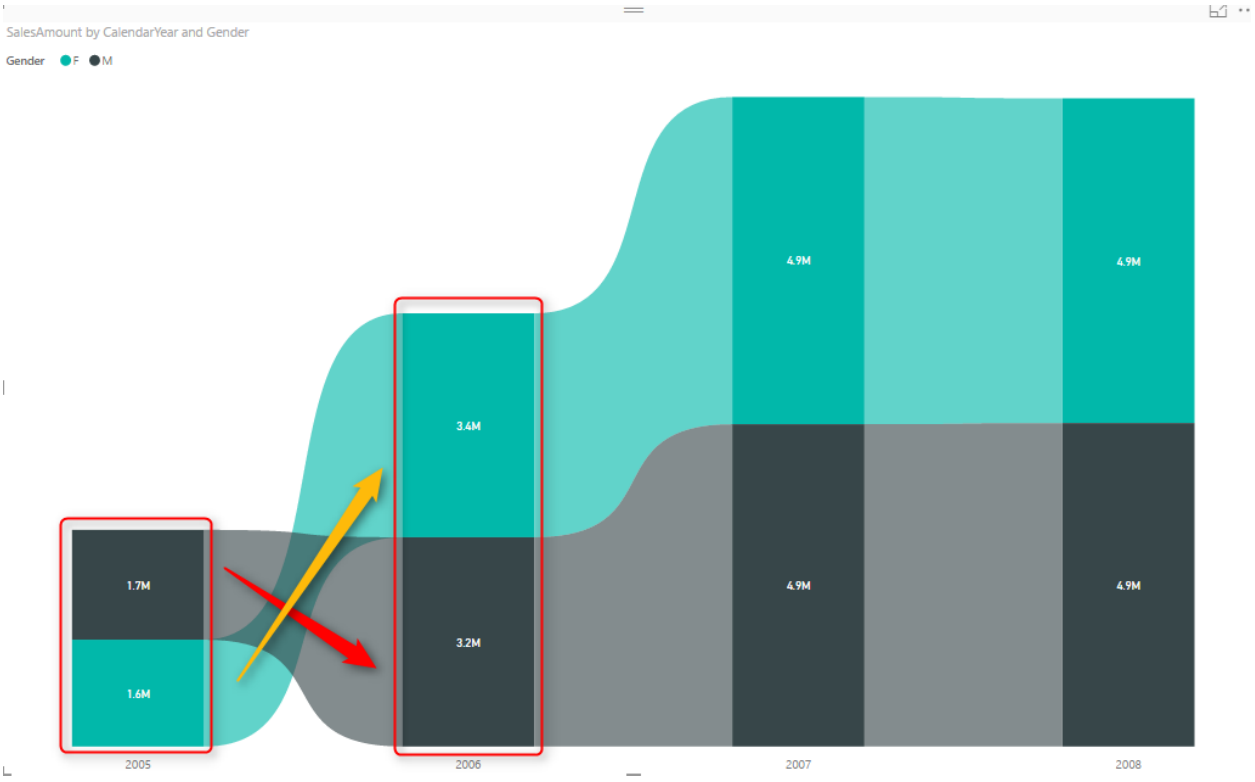
Result

And this is the final chart (with few formatting):



Ribbon Chart is the Next Generation of Stacked Column Chart

Published Date: September 27, 2017



Earlier this month (September 2017), in the new version of Power BI Desktop, a new type of chart announced; Ribbon Chart. The very first look and feel of this chart are similar to Stacked Column Chart. The question that might come into your mind is that; why another way of showing the same thing? The fact is that this chart is more powerful than the stacked column chart. In other words, I have to say this chart gives you much more interesting insight than the stacked column chart. Let's look at this chart through an example and see what this new chart is capable of. To learn more about Power BI, read Power BI book from Rookie to Rock Star.

Prerequisite

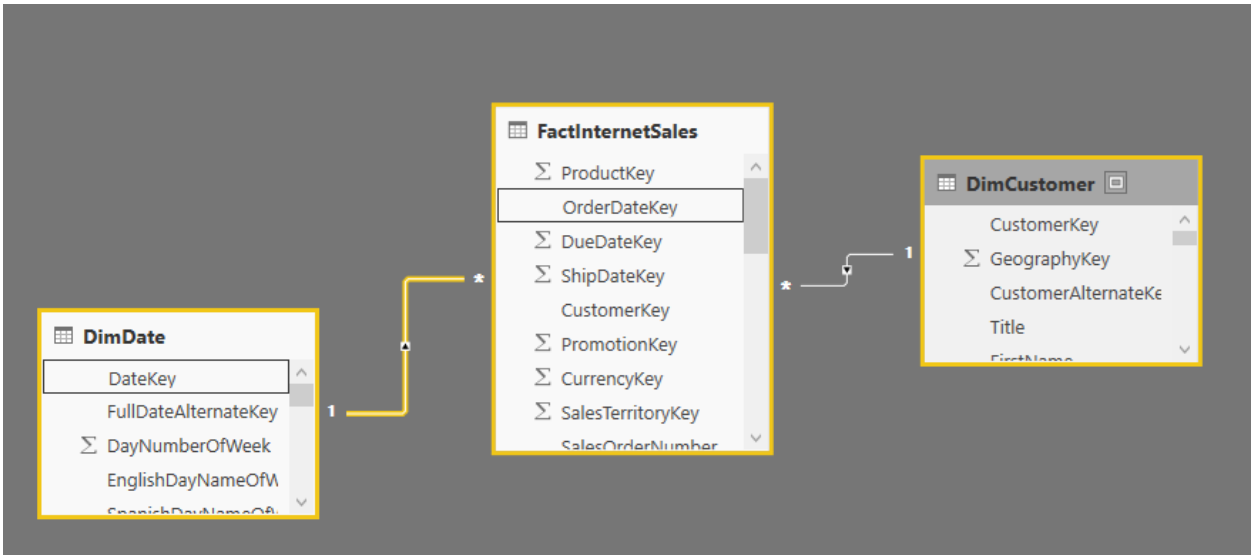
To run the example for this part, you need to download the AdventureWorksDW Excel sample file.

Ribbon Chart

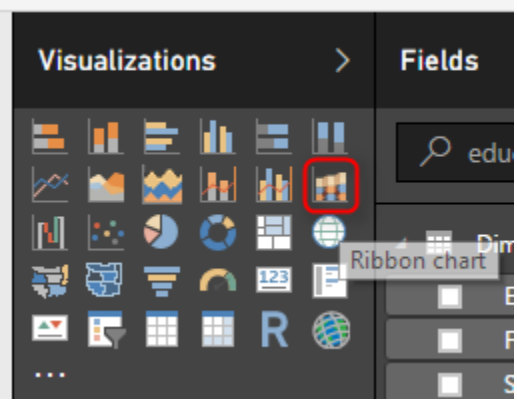
Ribbon Chart is a stacked chart similar to a stacked column chart with one big difference in stacked column chart values shown in the order of items in legend. However, in Ribbon chart items ordered based on which item has the majority of that measure in that particular axis value. To learn more that feature in details, let's look at the example below.

Sample Report

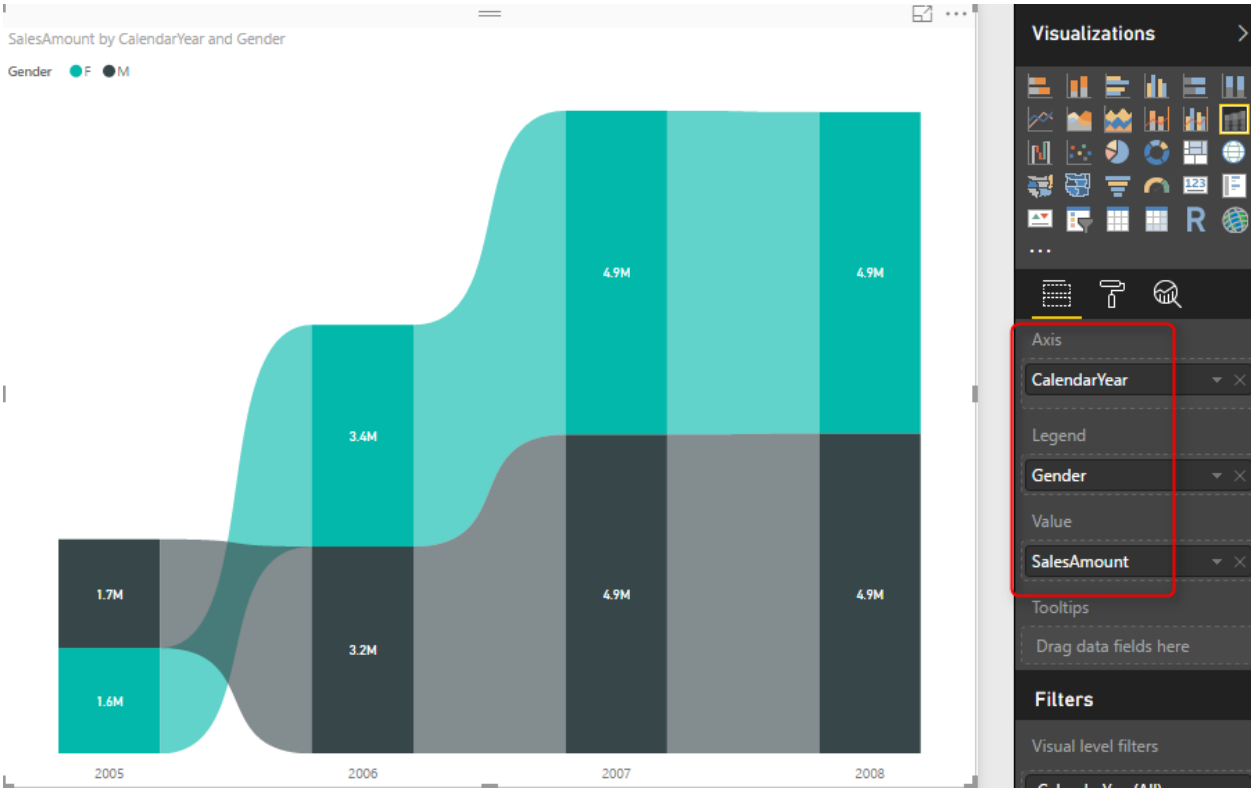
Create a sample report with getting data from AdventureWorksDW Excel file, and select these three tables; FactInternetSales, DimCustomer, DimDate. After selecting these tables. then create a relationship between DateKey (in DimDate table), and OrderDateKey (in FactInternetSales table).



Then in the report tab, create a report with a Ribbon Chart;



Set the Value to be SalesAmount (from FactInternetSales table), Axis to be CalendarYear (from DimDate table), and Legend to be Gender (from DimCustomer table);

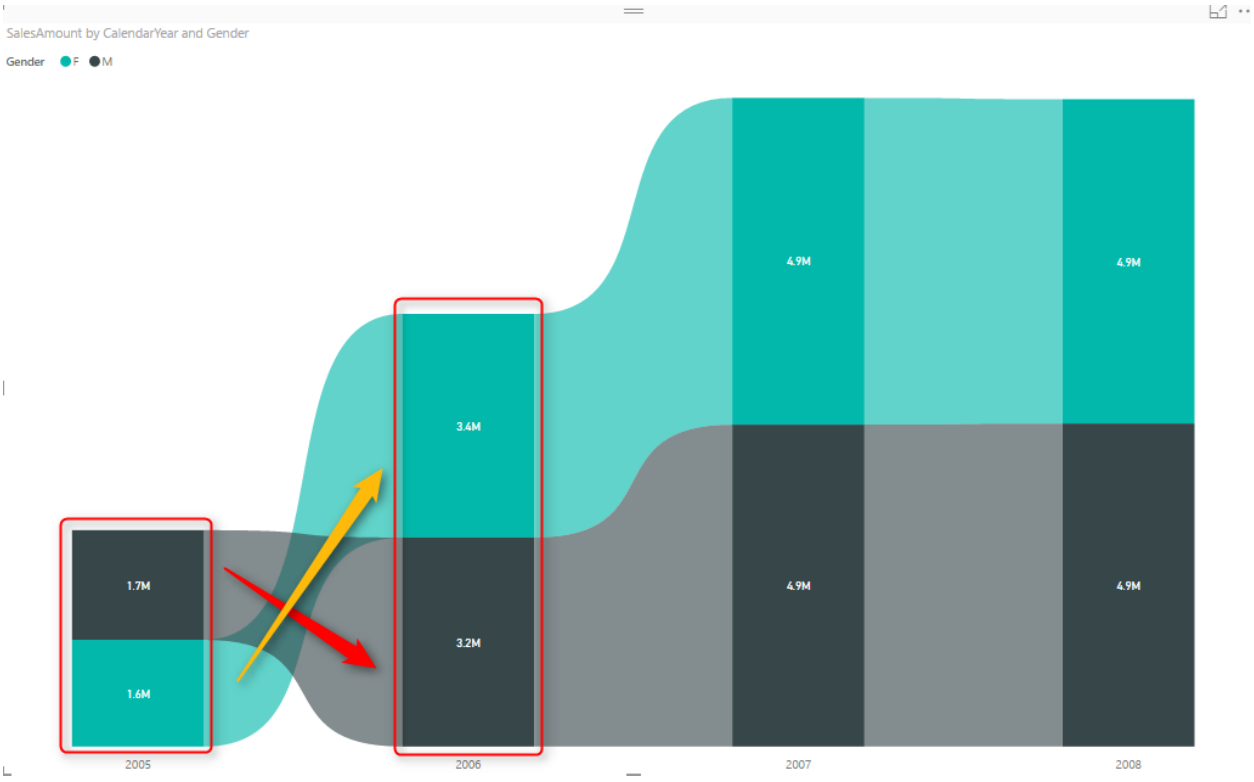


You would see the Ribbon chart visualizes the data in a very similar way to the stacked column chart. However, there is a difference!

Ribbon Chart is a Sorted Stacked Column Chart

Ribbon Chart shows a bigger value in each column at the top. Then the next value comes after. Look at the sales amount value for female and male in 2005 and 2006. In

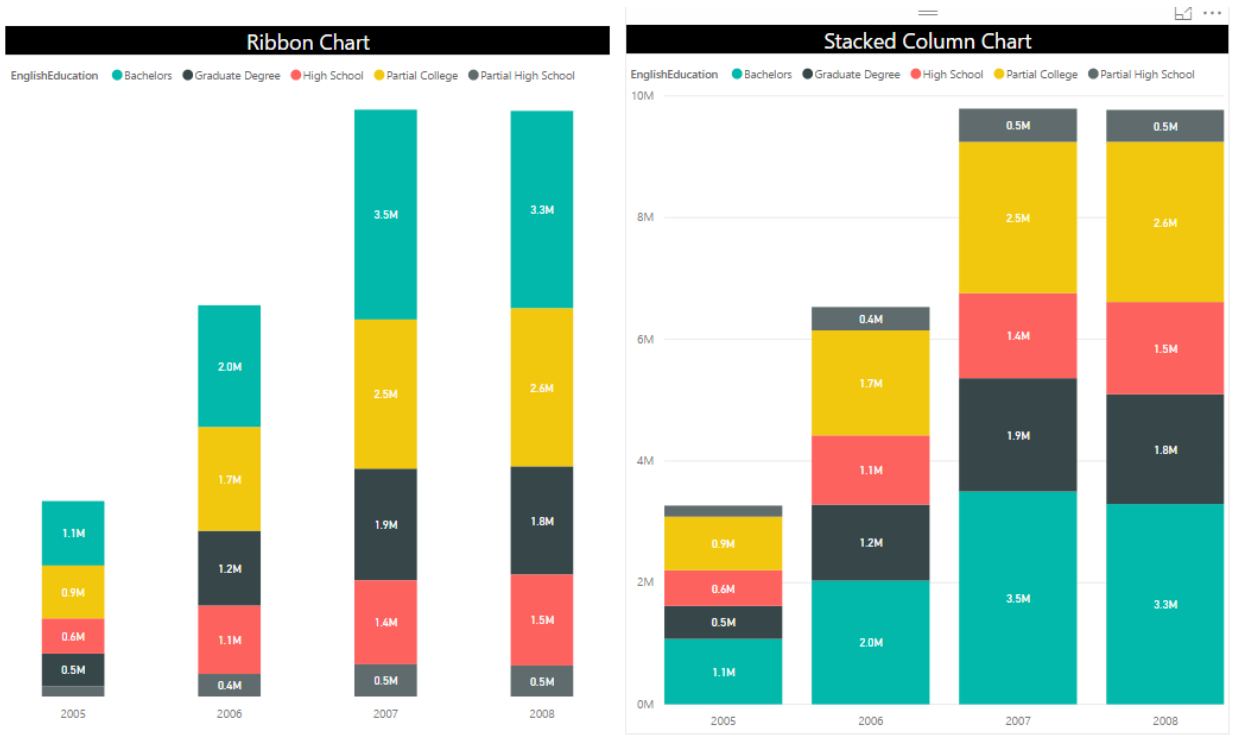
2005, Female (Black) had more sales than Male. However, in 2006, Male (Green) generated more revenue than the female, so it is on the top for the 2006 column.



This means that the Ribbon Chart is similar to combining Line Chart and Stacked Column Chart. This chart can show the trend over time (similar to the line chart), and also the ability to show values stacked on top of each other and show the total value (similar to the stacked column chart). Let's look at this chart compared to other charts in this category.

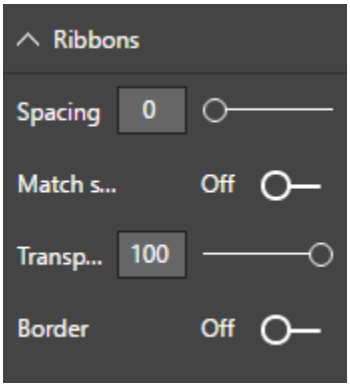
Ribbon Chart vs. Stacked Column Chart

The screenshot below shows these two charts with each other. The Ribbon chart is on the left-hand side. Please note that Ribbon chart customized in this view. I'll explain the customization in a second.

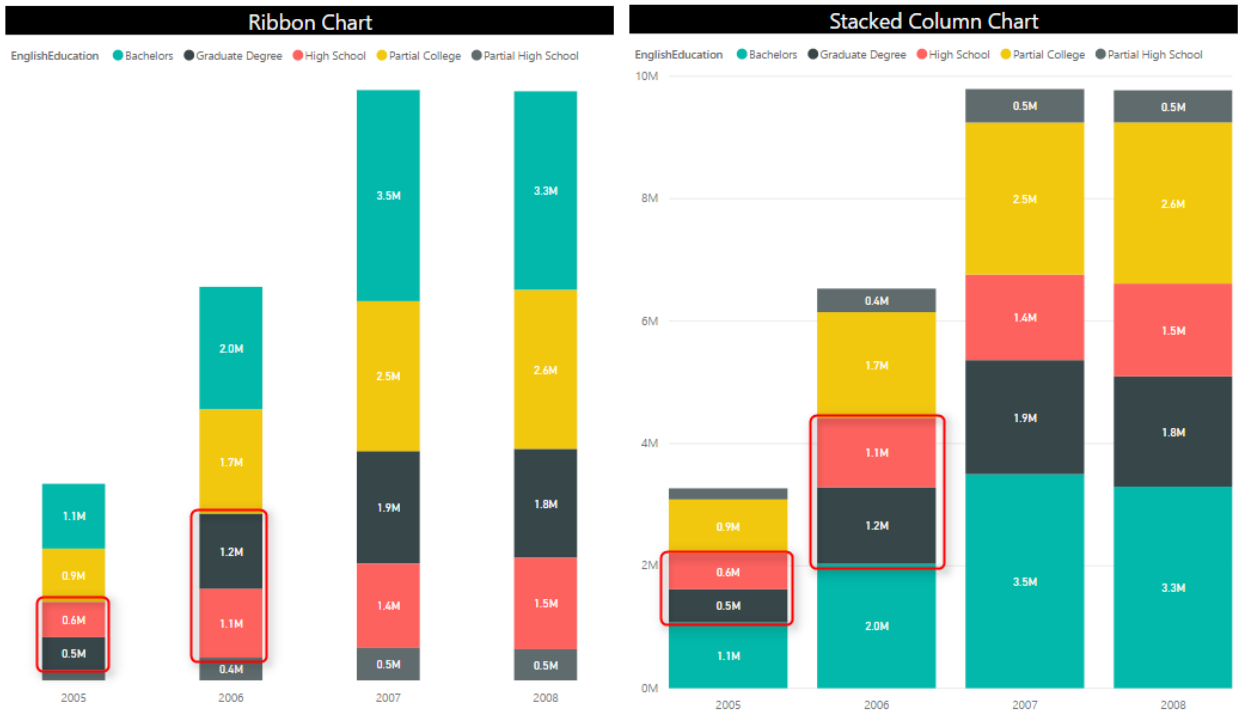


Customize the Formatting of Ribbon Chart

You can remove ribbons from the Ribbon chart, and change their color to be 100% transparent. Then it will be similar to a stacked column chart.

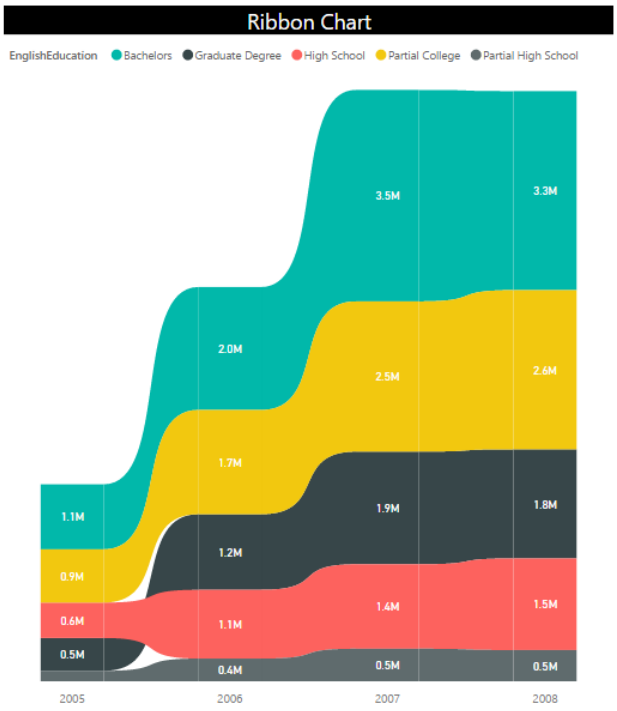


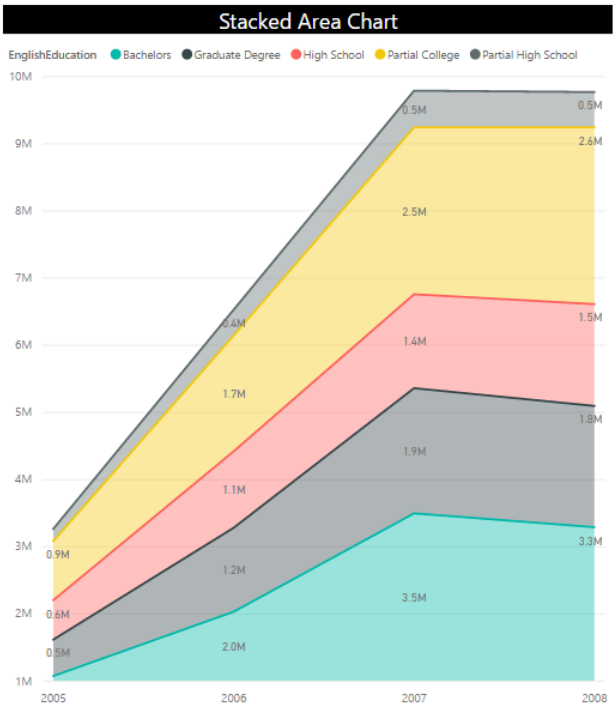
As you can see in the below screenshot; Stacked Column Chart is unable to show the difference from 2005 to 2006 between the High School and Graduate Degree Category. However, the Ribbon chart shows that beautifully.



Ribbon Chart vs. Stacked Area Chart

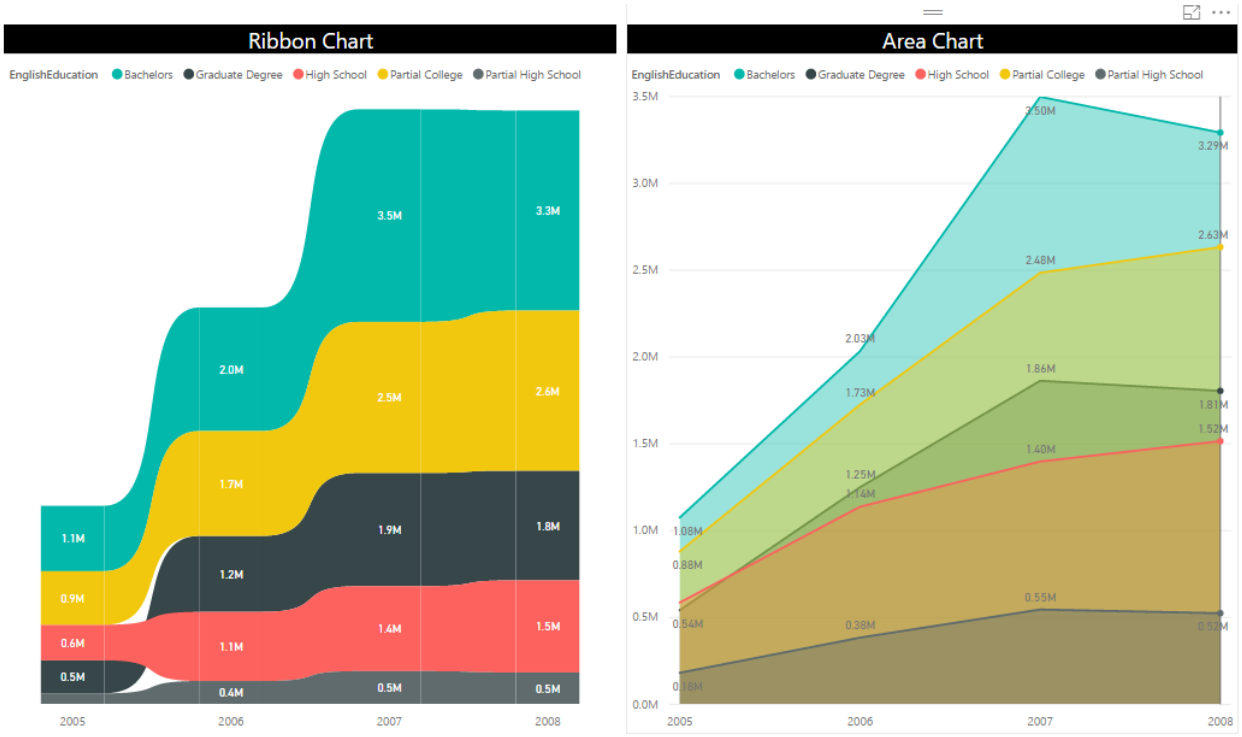
If we compare Ribbon chart with Stacked Area chart, we can see the trend over time in Stacked Area Chart, but it doesn't tell us that the data of which category is higher or lower. Still, Ribbon Chart is the winner in this storytelling scenario.





Ribbon Chart vs. Area or Line Chart

Area or Line chart is good for showing the trend. And they can show if the value of a specific category is higher or lower through time. However, they cannot stack values up on top of each other. Ribbon chart shows the trend as well as stacking values.



Good to Have for Ribbon Chart

Ribbon chart is a powerful addition to the set of visualizations in Power BI. This visual is still in its first version, and I believe lots of features will be added to this by the Power BI team in the next few months. However, These are features that I think would be good to have for this chart;

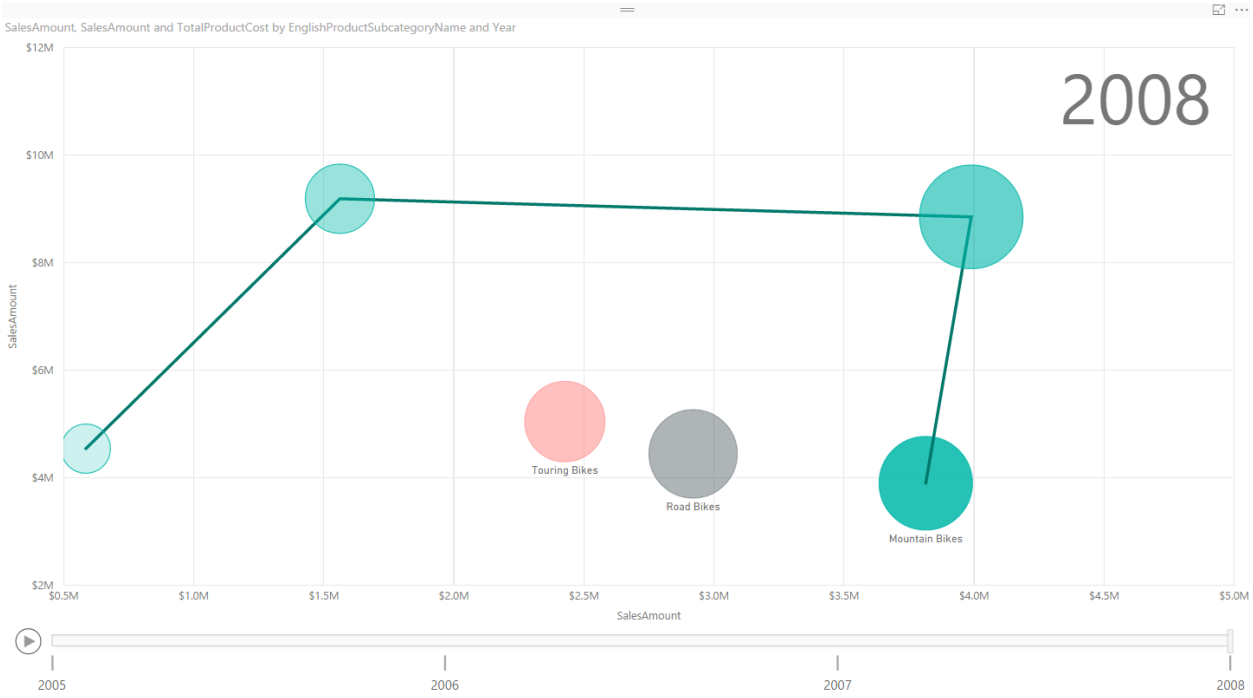
- Ability to Show and Customize the Y-Axis. At the moment there is no control for Y Axis
- Ability to add Analytics lines (For example, just a constant line) similar to a normal column chart.
- Ability to define Width for columns (This would be a good addition to column charts as well)
- Any other suggestions? Please mention in the comment area below (Power BI team would love to hear from you)

Summary

Ribbon chart is NOT another version of the stacked column chart. It is much more powerful than a stacked column chart. If you want to see the trend as well as the stacked values, then I highly recommend Ribbon chart. In this post, you've seen examples of comparing the result of this chart with others, and you can see there are stories that only this visual can tell. Please let me know how do you use Ribbon chart in your scenarios of data storytelling.

Storytelling with Power BI Scatter Chart

Published Date: July 30, 2016



Column or Bar chart can be easily used for showing a single measure's insight across a category. Mixed charts such as Line and Column chart can be used for showing two measure and comparing their values across a set of categories. However, some charts can be used to show values of three measures, such as the Scatter Chart. Scatter chart not only shows the values of three measure across different categories, but it also has a special Play axis that helps you to tell the story behind the data. In this post, you'll learn how easy it is to visualize something with Scatter chart and tell a story with that. If you like to learn more about Power BI, read Power BI online book; from Rookie to Rock Star.

Prerequisite

For this example like many other examples in this Power BI book, I'll be using the AdventureWorksDW SQL Server database. If you don't have this installed, you can easily download it from here and install it.

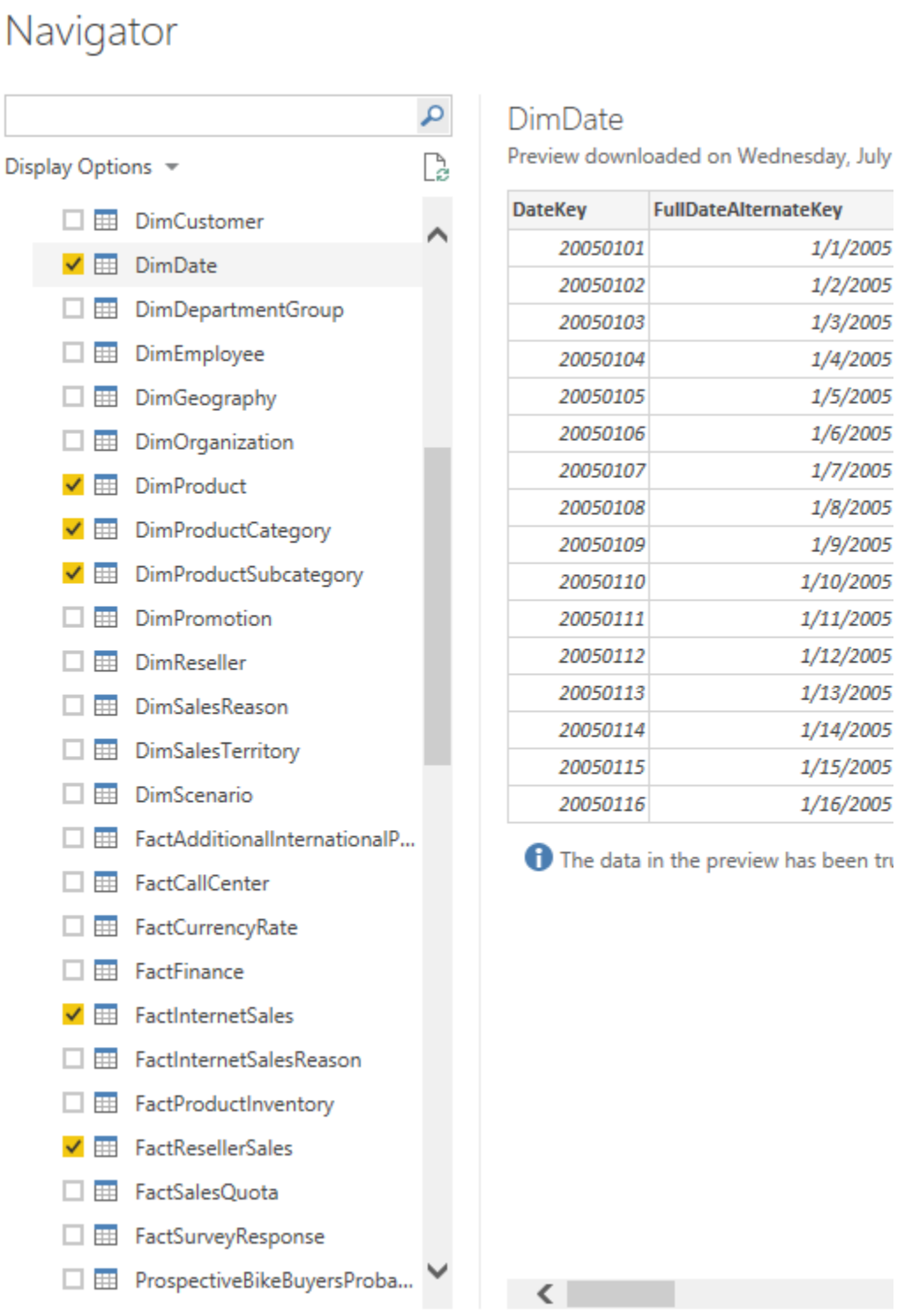
Scatter Chart

Scatter chart is a built-in chart in Power BI that you can show up to three measure with categorization in it. Three measures can be visualized in the position of the X axis, Y axis, and size of bubbles for scattering chart. You can also set up a date field in play axis, and then scatter chart will animate how measure's values are compared to each other in each point of time. Let's start building something simple with this chart and see how it is working in action. At the end of example you will see a summary chart as below;

Visualization Item	Scatter Chart	Comments
Measure 1	X-Axis	
Measure 2	Y-Axis	
Measure 3	Size of bubbles	
Category	Yes	As Legend
Detailed Category	Yes	As Details
Play Axis	Yes	
Color Formatting	Needs Improvement	Data Colors can't be set
Text Formatting	Needs Improvement	The title for X/Y axis can't be set
General Formatting	Needs Improvement	No Formatting option for Play Axis
Custom/Built-in	Built-in Chart	

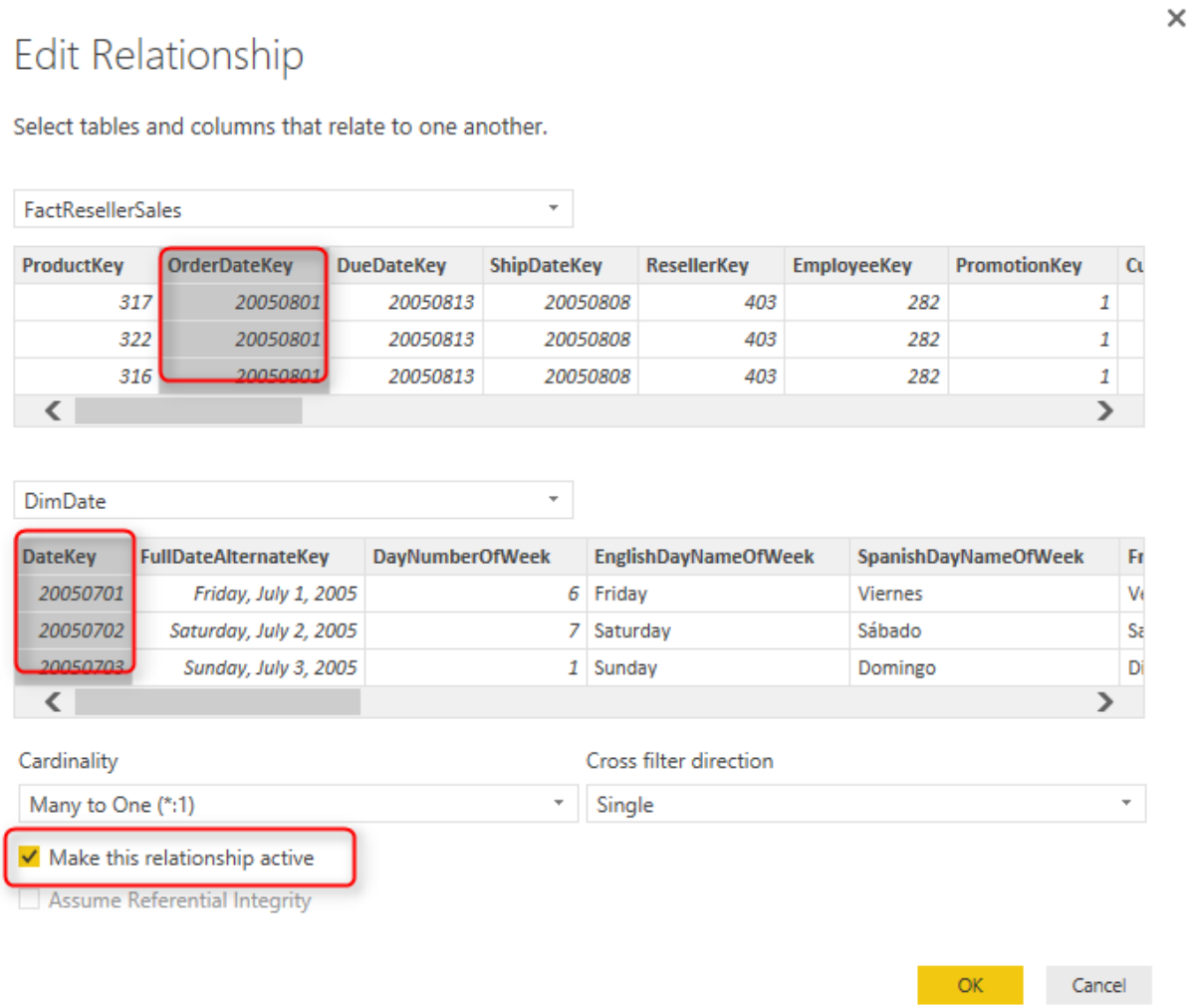
Building a Sample Report

Open Power BI Desktop, and start by getting Data from SQL Server AdventureWorksDW database. For this example you need to import data for six tables; FactInternetSales, FactResellerSales, DimDate, DimProduct, DimProductCategory, and DimProductSubCategory.

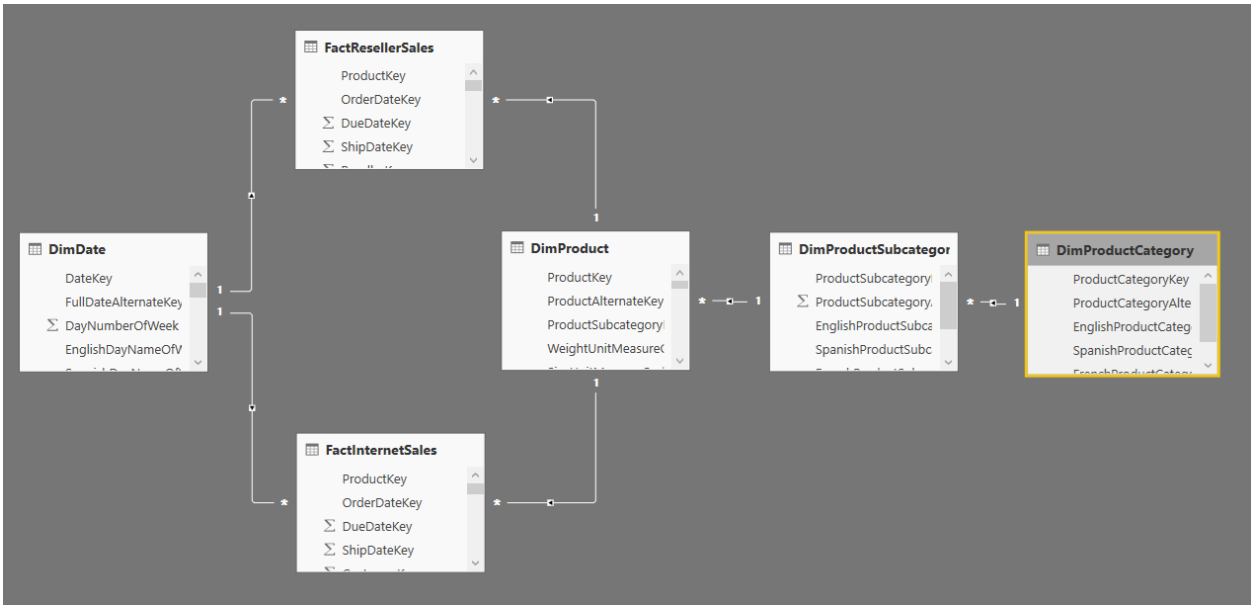


Just Load the data, don't edit. Then go to the Relationship tab to verify the relationship. remove inactive relationships between DimDate and FactInternetSales/FactResellerSales. Only keep one relationship active based on ORDER DATE. To change a relationship to

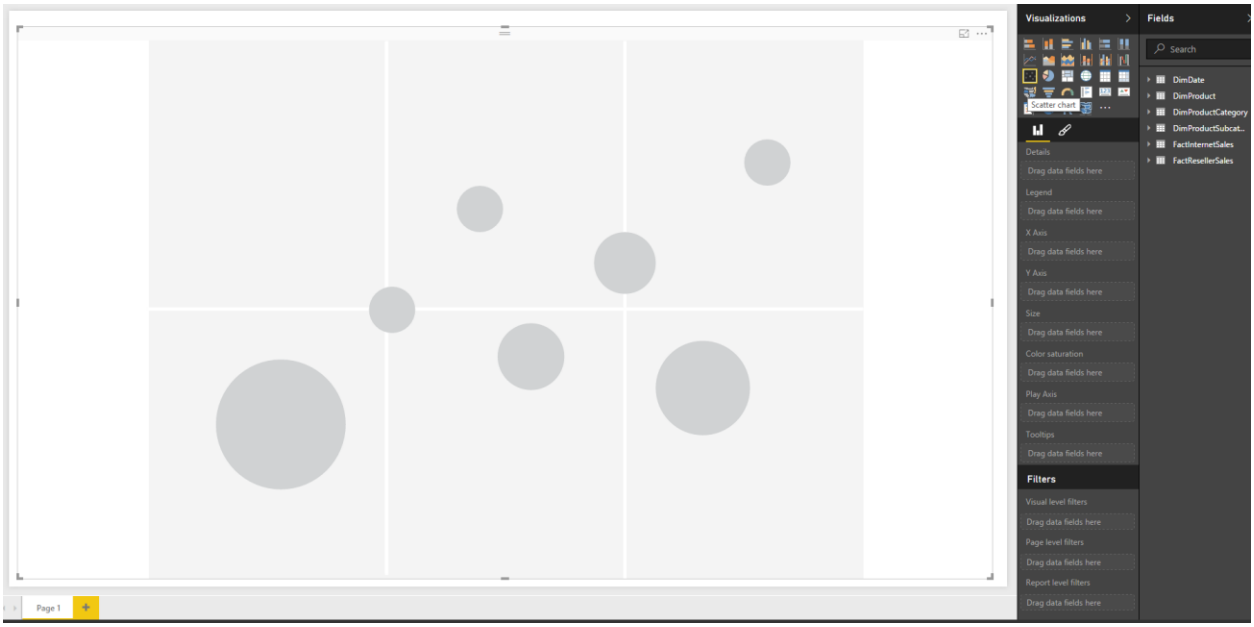
active double click on the relationship line and change it to active. You can only have one active relationship between two tables.



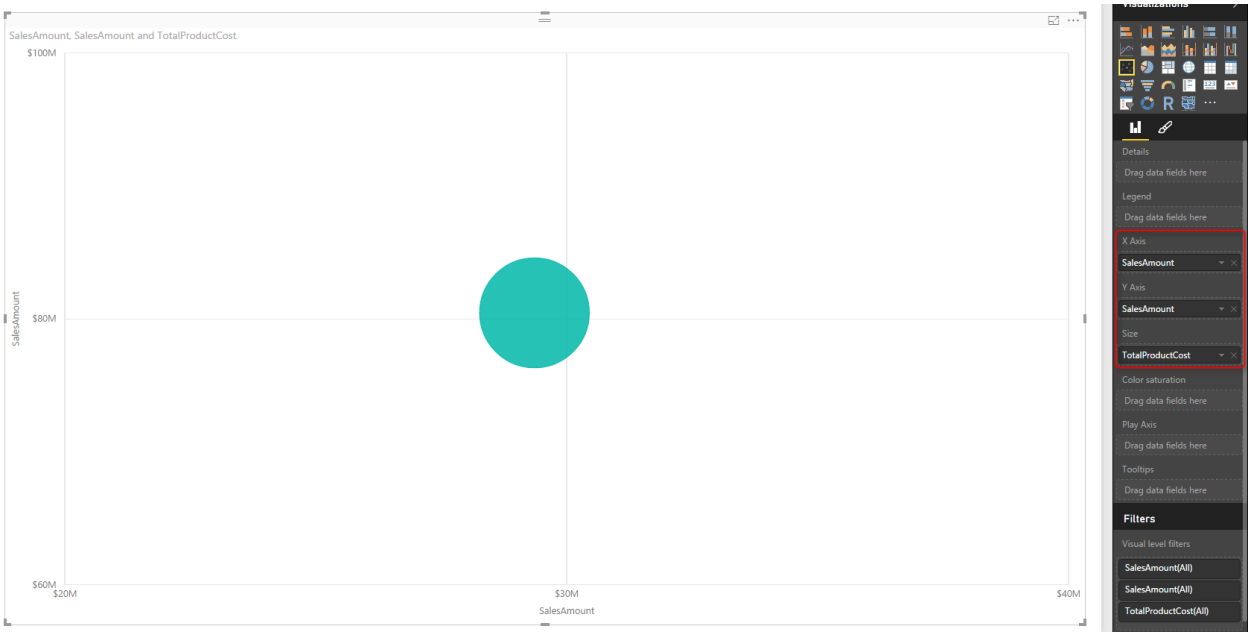
Your final relationship diagram should look like this;



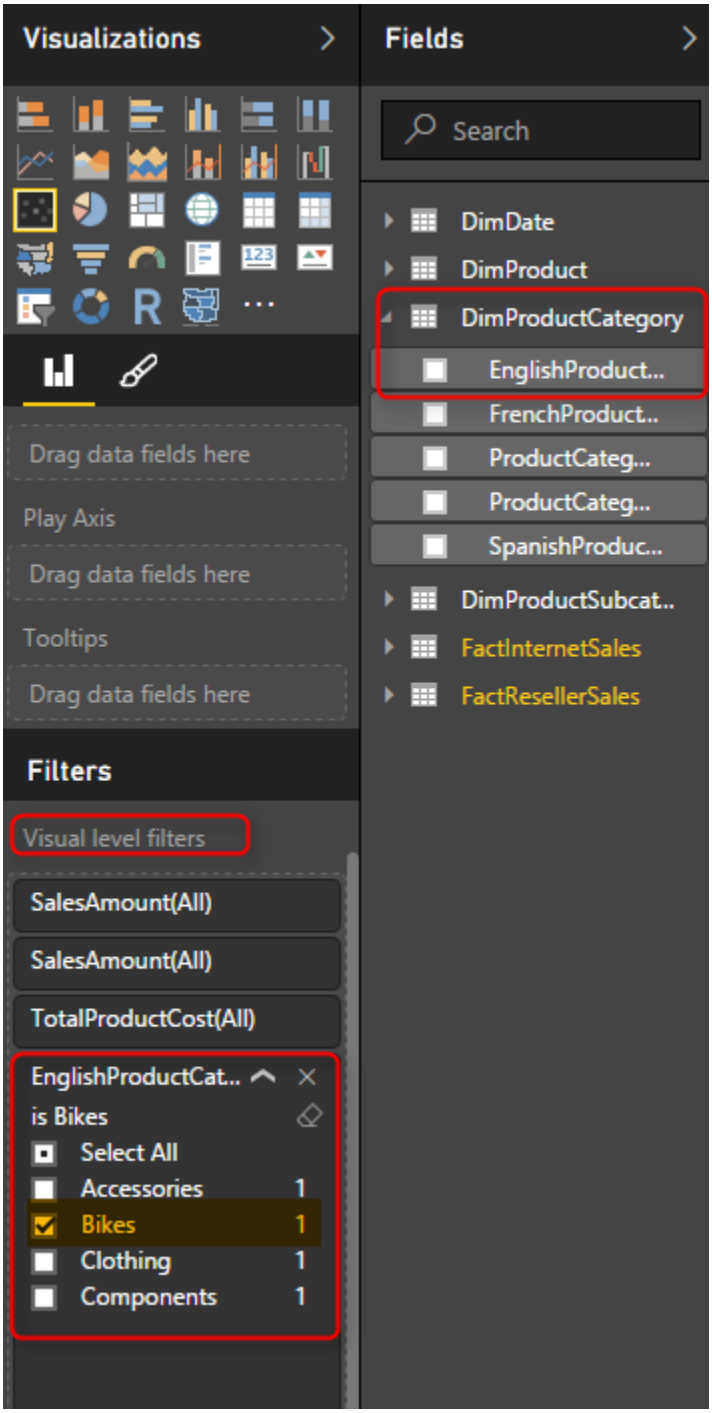
You might notice that this is not a best practice start schema model to work with, but let's make this example simple for now, and focus on the visualization side. Go to the Report, and create a Scatter Chart. Expand it to cover the whole report page.



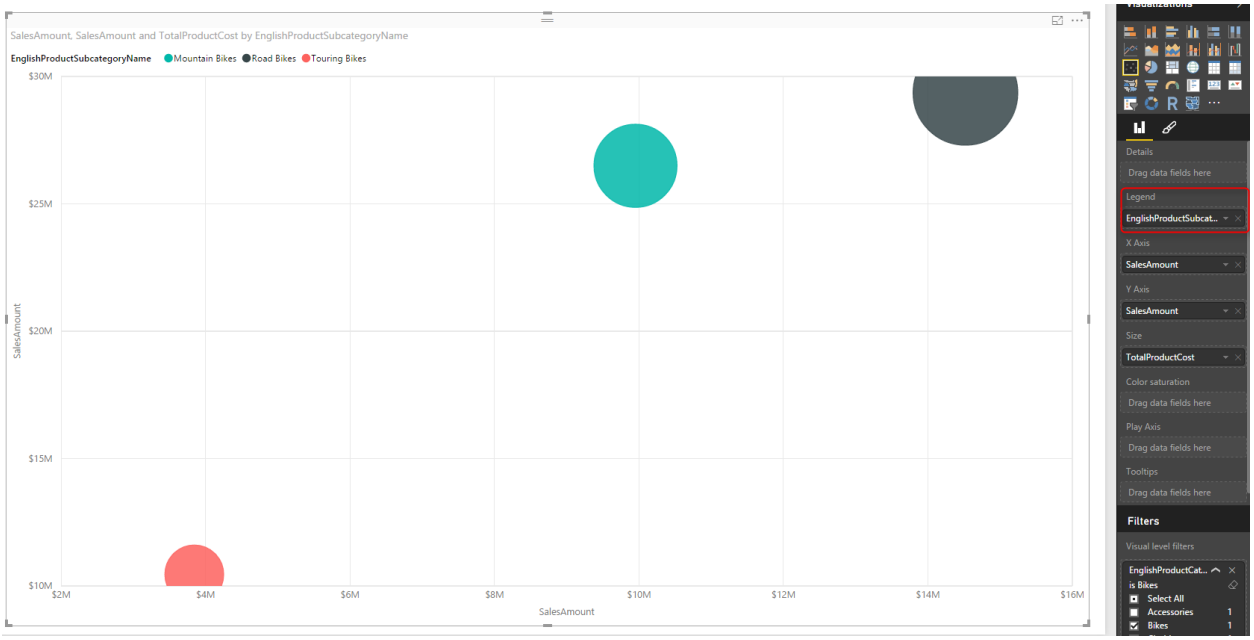
Add Sales Amount from FactInternetSales to X-Axis, and then Sales Amount from FactResellerSales to Y-Axis. Also, bring TotalProductCost from FactInternetSales into Size. These are three measures that we want to visualize here;



Now Let's see how each product subcategory of Bike is for this measure. For that add a Visual Level Filter for EnglishProductCategoryName from DimProductCategory, and set it to be Bike.

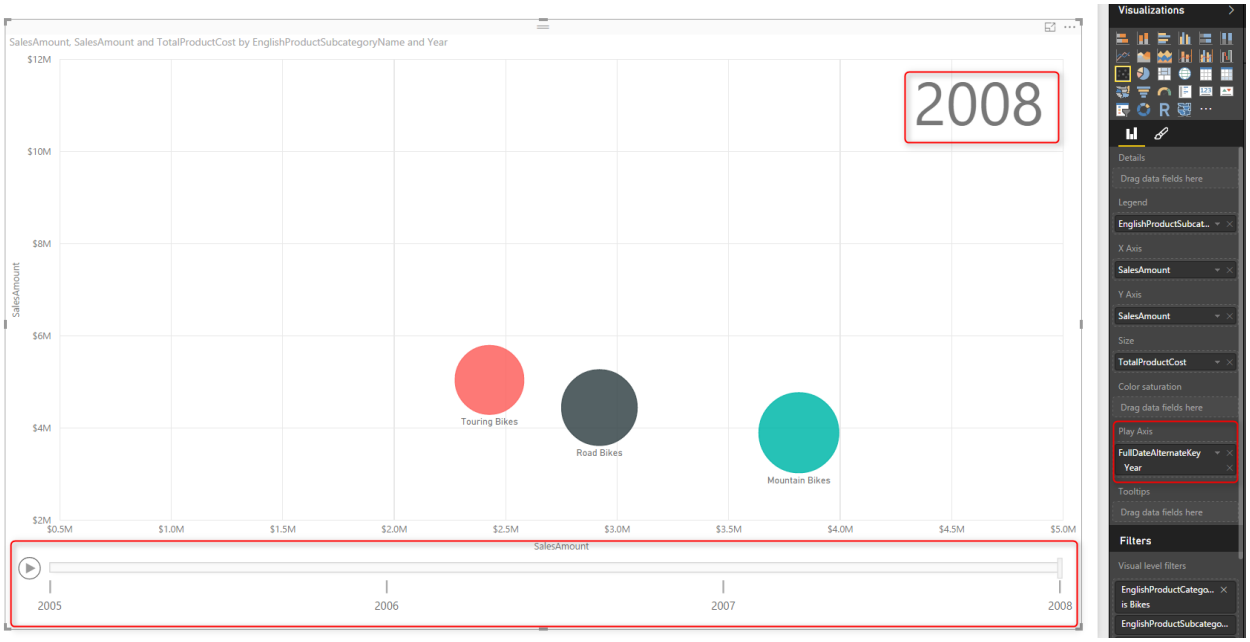


Now bring the EnglishProductSubCategoryName from DimProductSubCategory into the Legend.

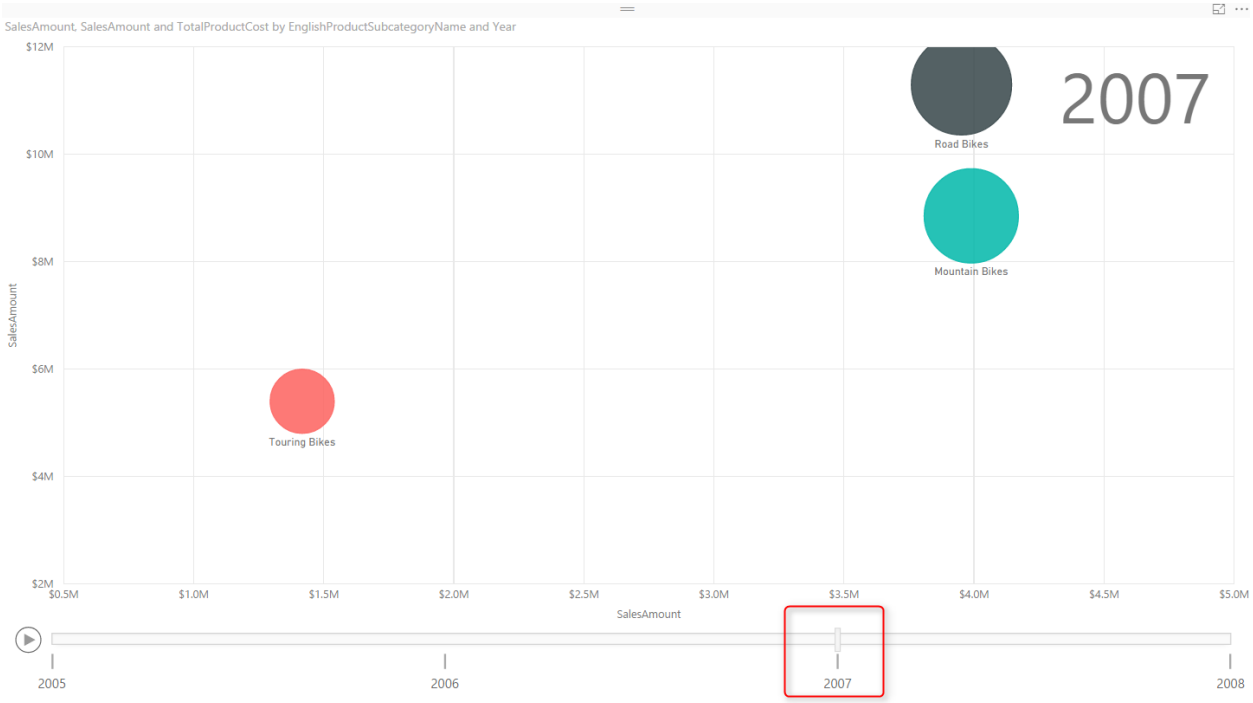


This shows the difference of categories for each measure. For example, you can see that the total internet sales and reseller sales of road bikes (black) are greater than the other two; Mountain bikes, and Touring bikes. Let's see was this the case all the time? Or just the total is different? Fortunately, with this chart, we can do that with Play Axis.

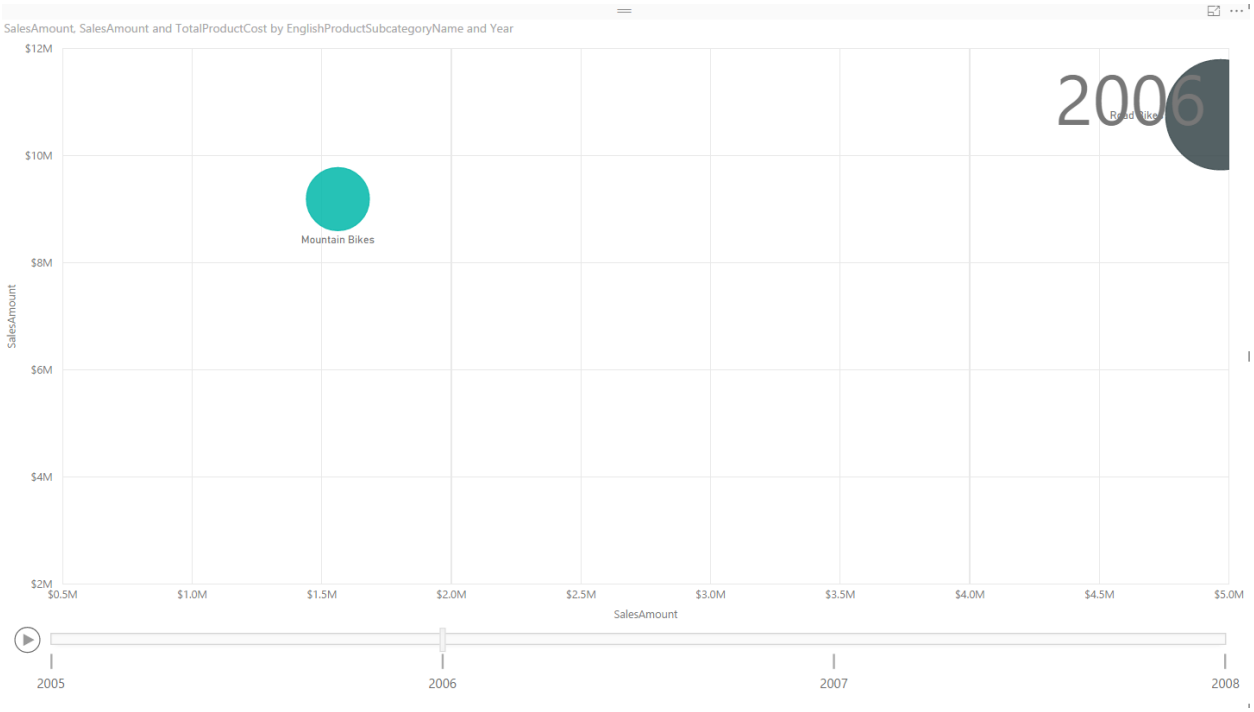
Drag and drop FullDateAlternateKey from DimDate to Play Axis. And you will see the values in both axis change immediately. The reason is that now this chart will show the value of one year at a time. And you can see the year title in the top right-hand corner of the scatter chart.



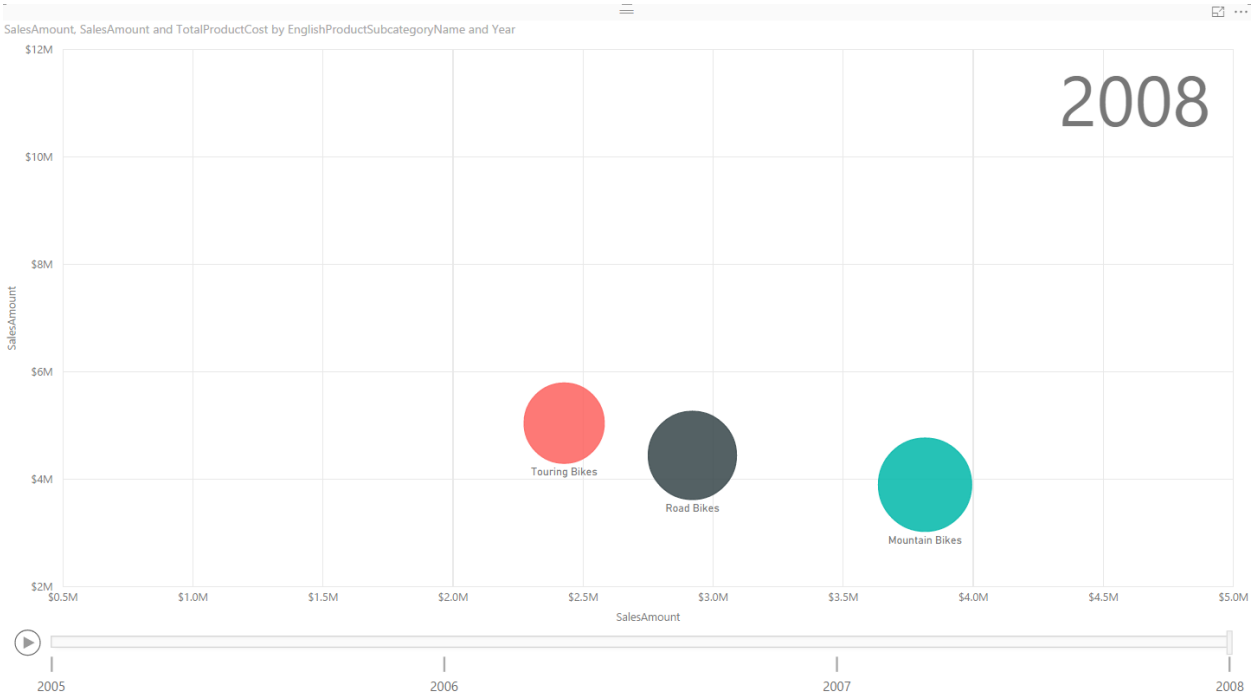
If you click on Play axis, you can see that this the subcategories are moving around because their sales for each year is different. And easily you can see how their sales were during these years. You can even move the player's bar navigator to a year like 2007 and see values at that point of the time. The screenshot below for the year 2007 shows that mountain bikes and road bikes at that year had almost the same internet sales amount. However, the reseller sales of road bikes were more.



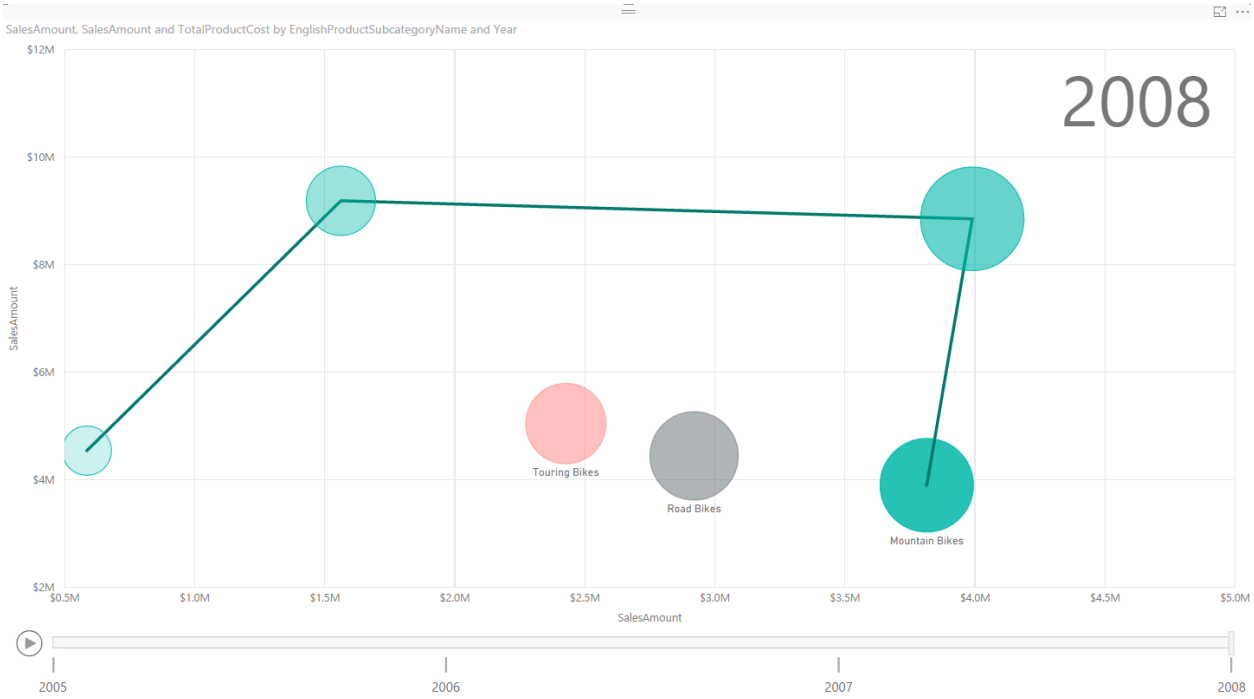
And if you go a year before you can see that there was no Touring Bikes even exists at that time, and sales of Road bikes were much more than mountain bikes in both internet sales and reseller sales.



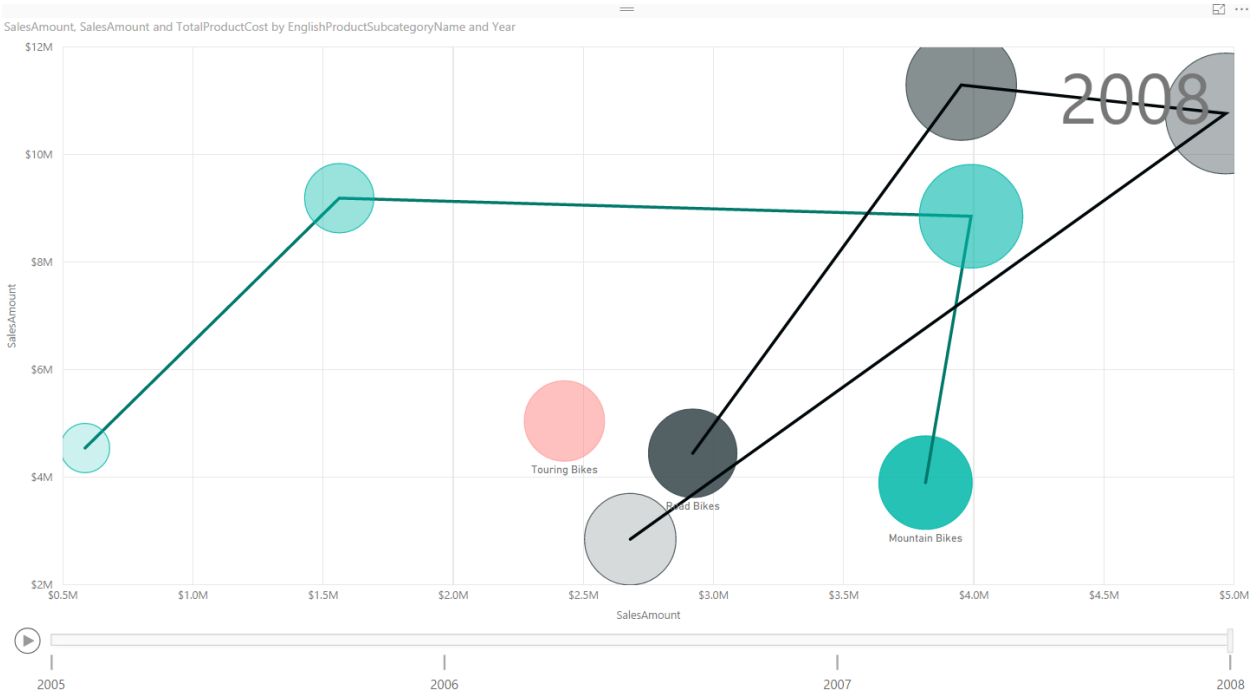
Also, you will see that in the year 2008 the internet sales of road bikes is less than two other types of bike.



It is easy to compare year to year changes in this way. You can even click on each category and see how it worked through time. Scatter chart shows you a line of all states for that category.

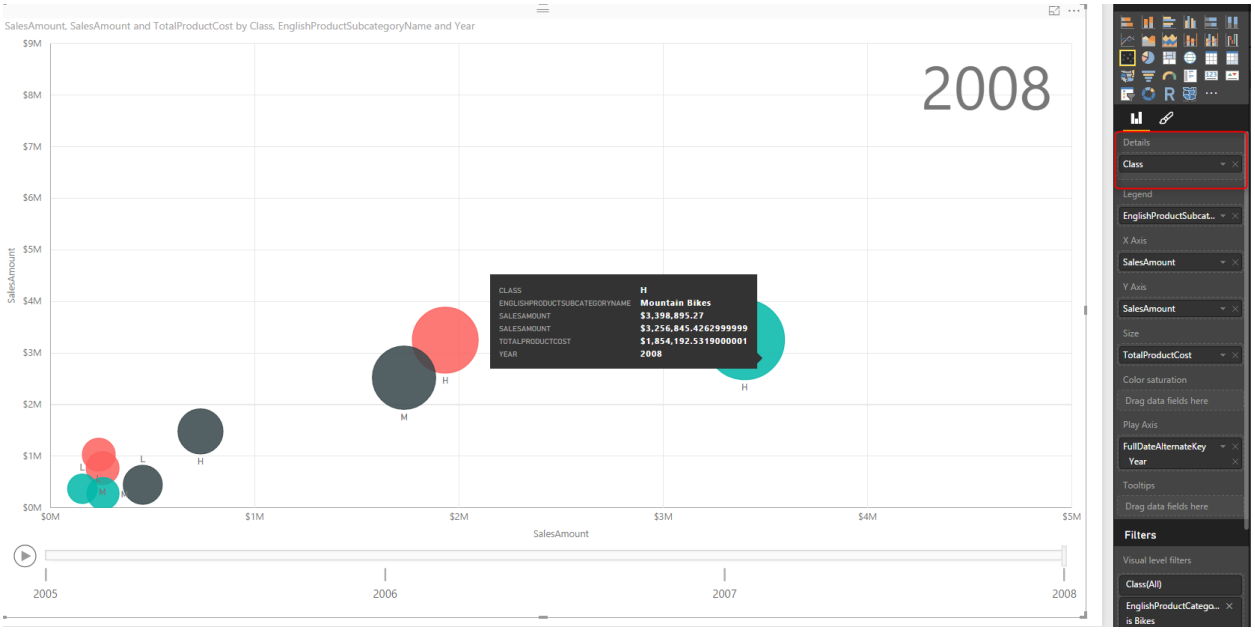


Even you can take one step further and select multiple items and simply compare them through the years. Click on Ctrl and choose Road and Mountain Bikes.



Now you can easily see that road bikes had better sales in years 2006 and 2007, but in 2008 it sold even less than mountain bikes for internet sales. The reseller sales of road bikes still are higher in the year 2008. It is easy to compare all three measures through the time and based on different categories with Scatter chart. Scatter chart helps you to tell the story behind the data easily.

You can also add more details to it. As an example let's add Class from DimProduct to Details of this chart. Now you will see more bubbles, for each subcategory we have bubbles with the same color, but different bubbles based on each product class.



Scatter chart also has a field for Color saturation and Tooltips which I haven't demonstrated here, feel free to play with it and enhance your visualization. Scatter chart is a powerful visualization that helps you to tell a story about data of multiple measures and categories with their values through changes of time.

Formatting

Unfortunately will all power in this visualization; there aren't enough formatting options for it at this time. You can apply general formatting like a title for the whole chart, but you cannot change the title for X or Y Axis, which seems necessary. In this example, the field name we've used was the Sales Amount identical name but from two different tables. It is a basic need that I can change the title of the axis, but I can't. The only workaround for this is to change the name of the column in data tap of Power BI, or Power Query.

Data colors can't be set as well. This option exists in many other charts such as column/bar chart, and I believe it will be available soon here for this chart.

There is no control over the speed of Play axis or any formatting on this axis at this stage.

Summary

In Summary Scatter chart is one of the most useful charts in Power BI which helps for storytelling with multiple measures, categories, and changes of values through the time.

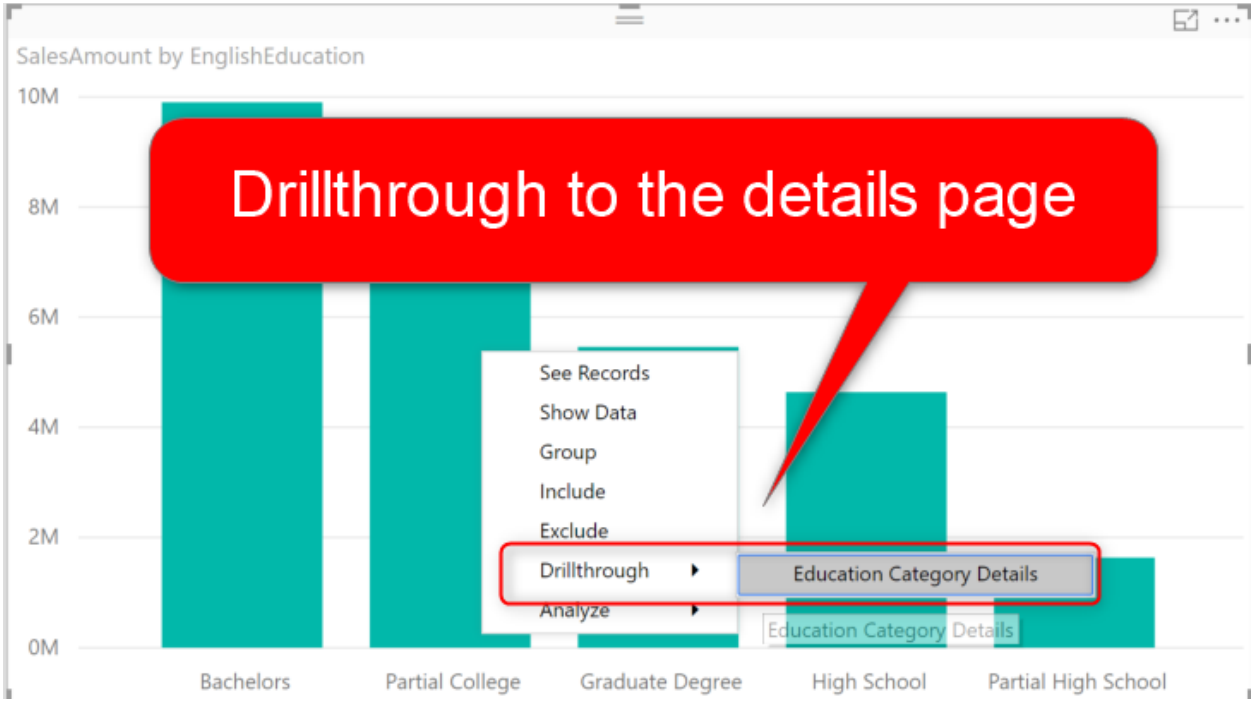
However this visualization item, still needs some improvements for formatting, which I believe with great efforts of the Power BI team will be applied in the very near future. Here is a summary of features for this visualization item;

Visualization Item	**Scatter Chart**	**Comments**
Measure 1	X-Axis	
Measure 2	Y-Axis	
Measure 3	Size of bubbles	
Category	Yes	As Legend
Detailed Category	Yes	As Details
Play Axis	Yes	
Color Formatting	Needs Improvement	Data Colors can't be set
Text Formatting	Needs Improvement	The title for X/Y axis can't be set
General Formatting	Needs Improvement	No Formatting option for Play Axis
Custom/Built-in	Built-in Chart	

Part II: Extending Visual Features

Master-Detail Design with Drillthrough Filter in Power BI

Published Date: September 3, 2018



One of the most common requirements in any reporting solution is the ability to drill through from master page to the details page and see the details of an item or category. In this post, I will explain how this feature is simply possible in Power BI, and what are things to consider when you are implementing such a scenario. The drill-through filter is not a new feature in Power BI, but is it one of the most helpful and wanted features which makes your life much easier for designing reports and visualizations. If you want to learn more about Power BI, read Power BI book from Rookie to Rock Star.

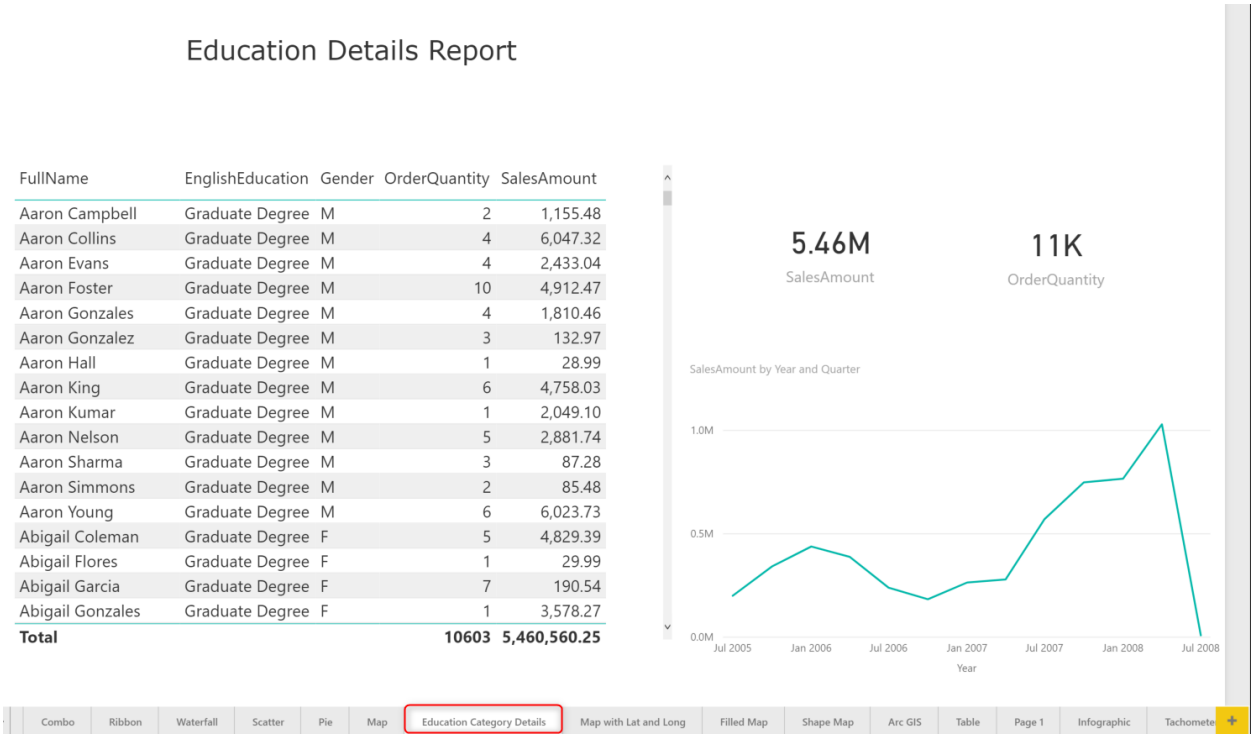
Sample Scenario

Here I have a sample report which demonstrates sales amount by education category and gender. The data in this report is coming from AdventureWorksDW.

As you can see in the above report, there is no space to add more visuals. I want to create the ability to drill down into one of the education categories and see the details of that category. I want to see some more details, such as the name of customers, the quantity of the order, and other information alongside with sales amount. Let 's see how this functionality is possible.

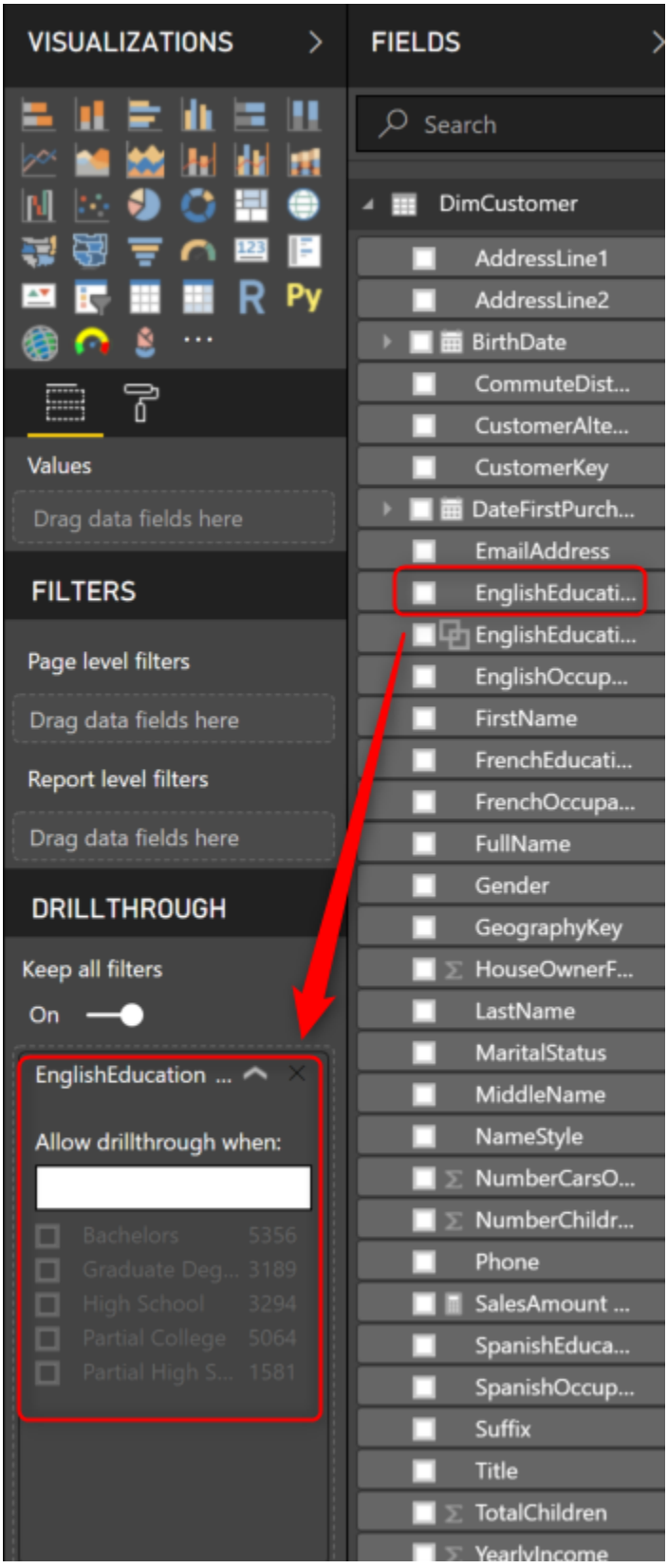
Drillthrough Filter

A page that has the drill-through functionality can be any page in Power BI Desktop. You need to create a page and put all the visuals you need on that page. Here is a sample page I have created:

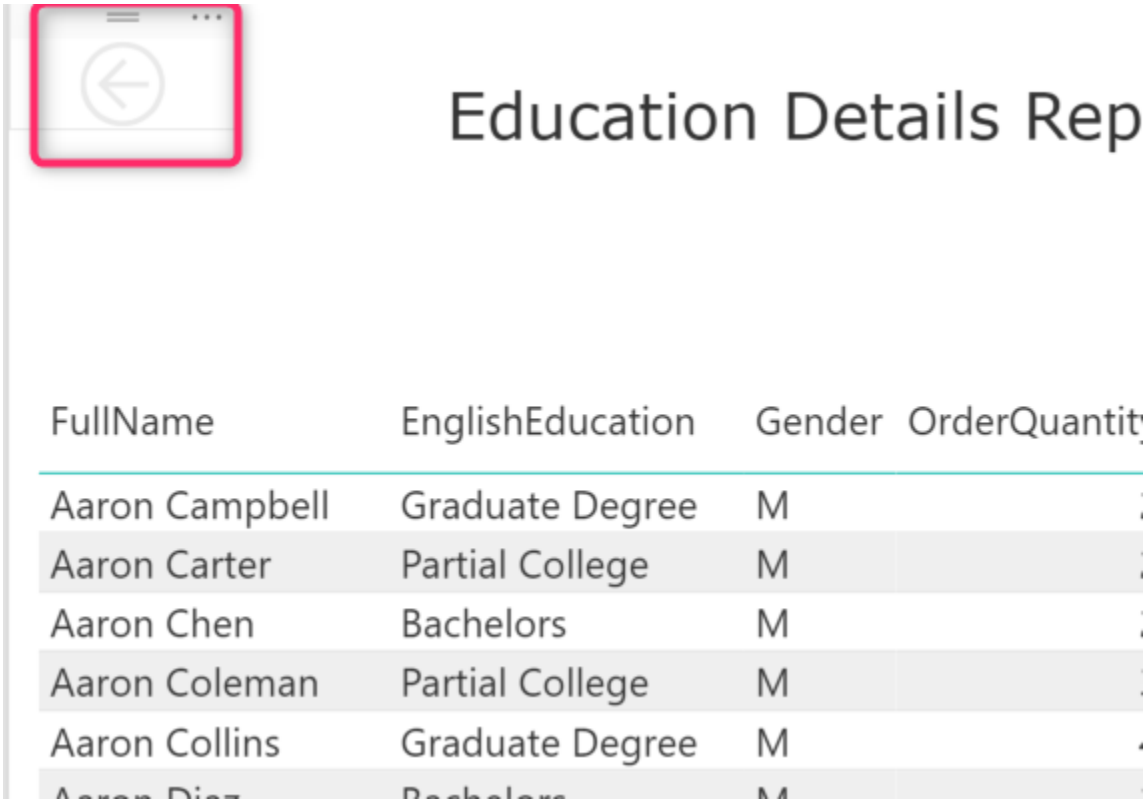


One of the important considerations for the details page is the name of this page. This name is what you will see in the drill through option from the master page. It should be something that gives the user the understanding that this is a details page.

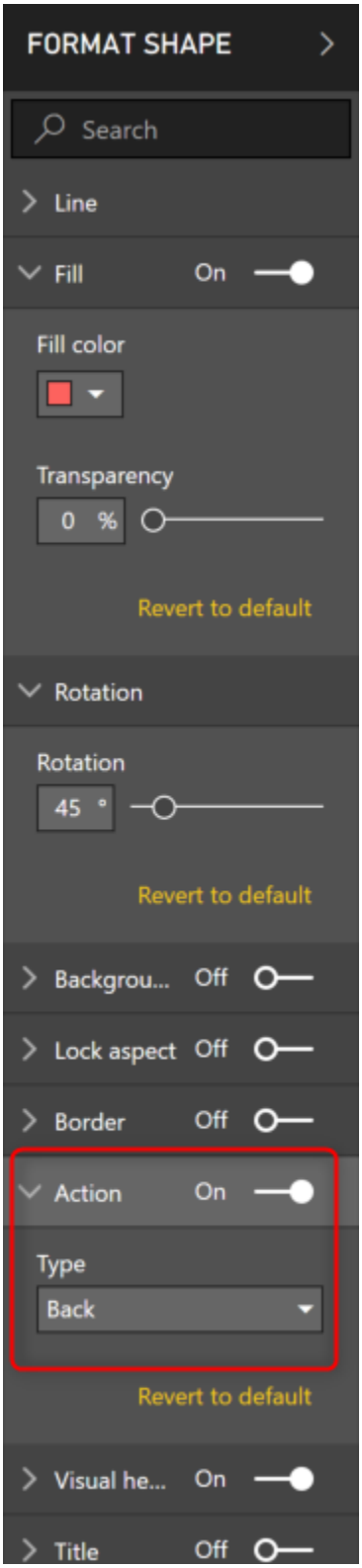
To convert this page to a drill-through page, you need to drag and drop the data field that you want to pass from the master page to the details page, into the Drillthrough filter section of the details page. From the master page, we want to go to the details of EnglishEducation field. So that is the field you need to drag and drop to the Drillthrough section.


VISUALIZATIONS
FIELDS
Search
DimCustomer
AddressLine1
AddressLine2
BirthDate
CommuteDist...
CustomerAlte...
CustomerKey
DateFirstPurch...
EmailAddress
EnglishEducati...
EnglishEducati...
EnglishOccup...
FirstName
FrenchEducati...
FrenchOccupa...
FullName
Gender
GeographyKey
HouseOwnerF...
LastName
MaritalStatus
MiddleName
NameStyle
NumberCarsO...
NumberChildr...
Phone
SalesAmount ...
SpanishEduca...
SpanishOccup...
Suffix
Title
TotalChildren
YearlyIncome
Values
Drag data fields here
FILTERS
Page level filters
Drag data fields here
Report level filters
Drag data fields here
DRILLTHROUGH
Keep all filters
On
EnglishEducation ...
Allow drillthrough when:
Bachelors 5356
Graduate Deg... 3189
High School 3294
Partial College 5064
Partial High S... 1581

After dragging and dropping the field, you will see a section like a filter that you can choose different values of the EnglishEduction. Do not select anything in that section. You will also notice that there is a BACK button added to the top left-hand side of your page.

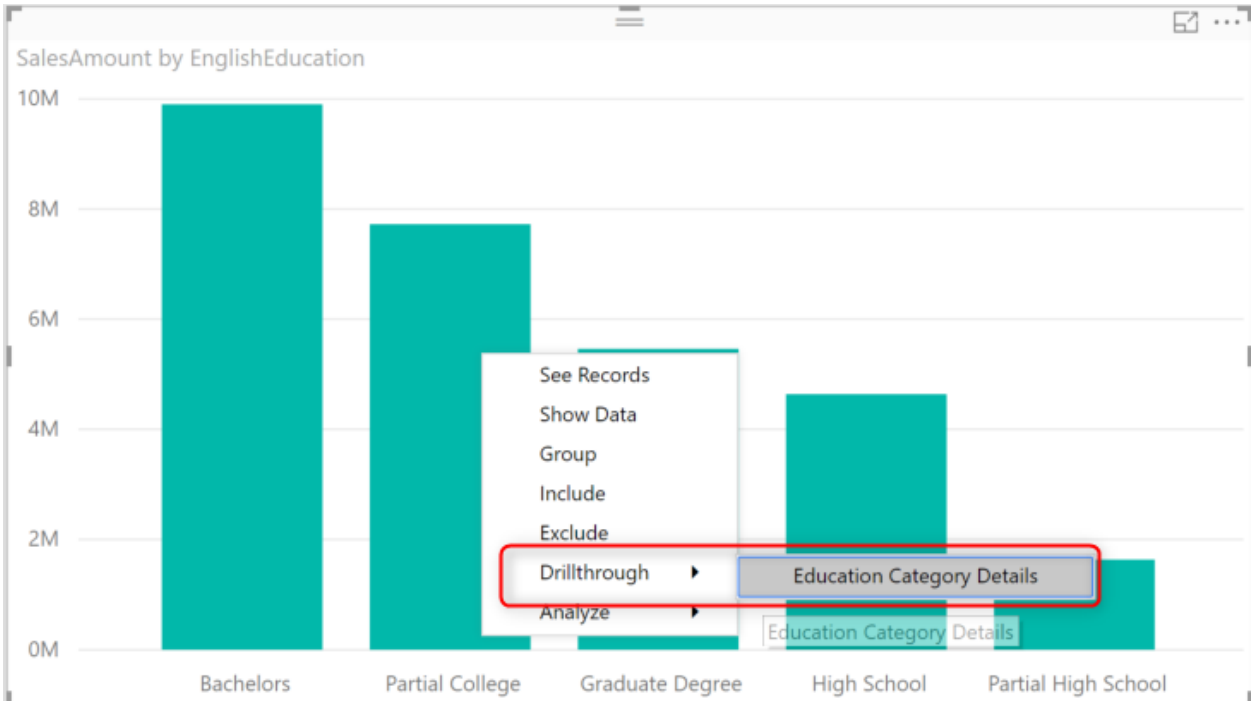


This button will enable you to navigate back to the page that you are coming from (which in this case, would be the master page). You can format the button if you like, changing colors, adding texts, and other formatting options are possible. You can apply whatever formatting you like. The only part you should keep intact is the Action of this button to be of type Back. The back action makes sure that user can get back to the master page from this details page.

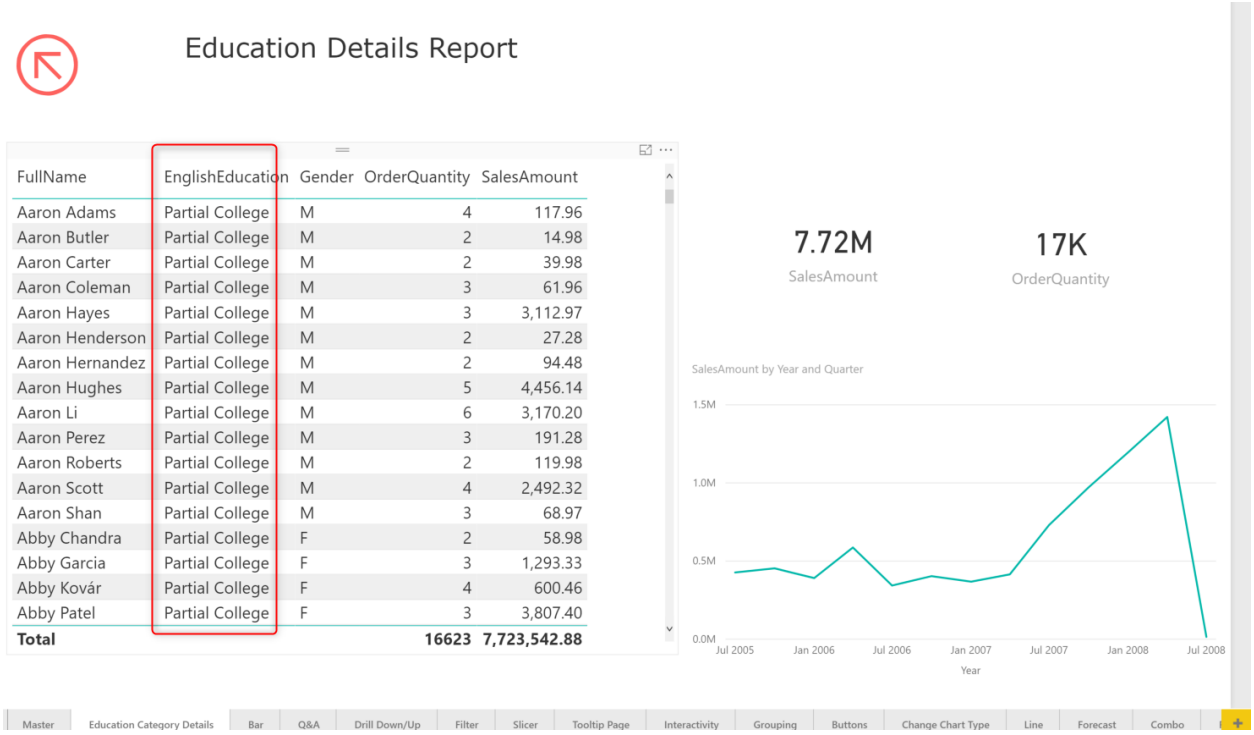

FORMAT SHAPE
Search
Line
Fill
On
Fill color
Transparency
0 %
Revert to default
Rotation
Rotation
45 °
Revert to default
Backgrou...
Off
Lock aspect
Off
Border
Off
Action
On
Type
Back
Revert to default
Visual he...
On
Title
Off

Testing Functionality

Now let's see how this drill-through functionality works. Go to the master page, and right-click on a column in the column chart that has education as part of its axis, then you will see a Drillthrough option that will lead you to the details page.

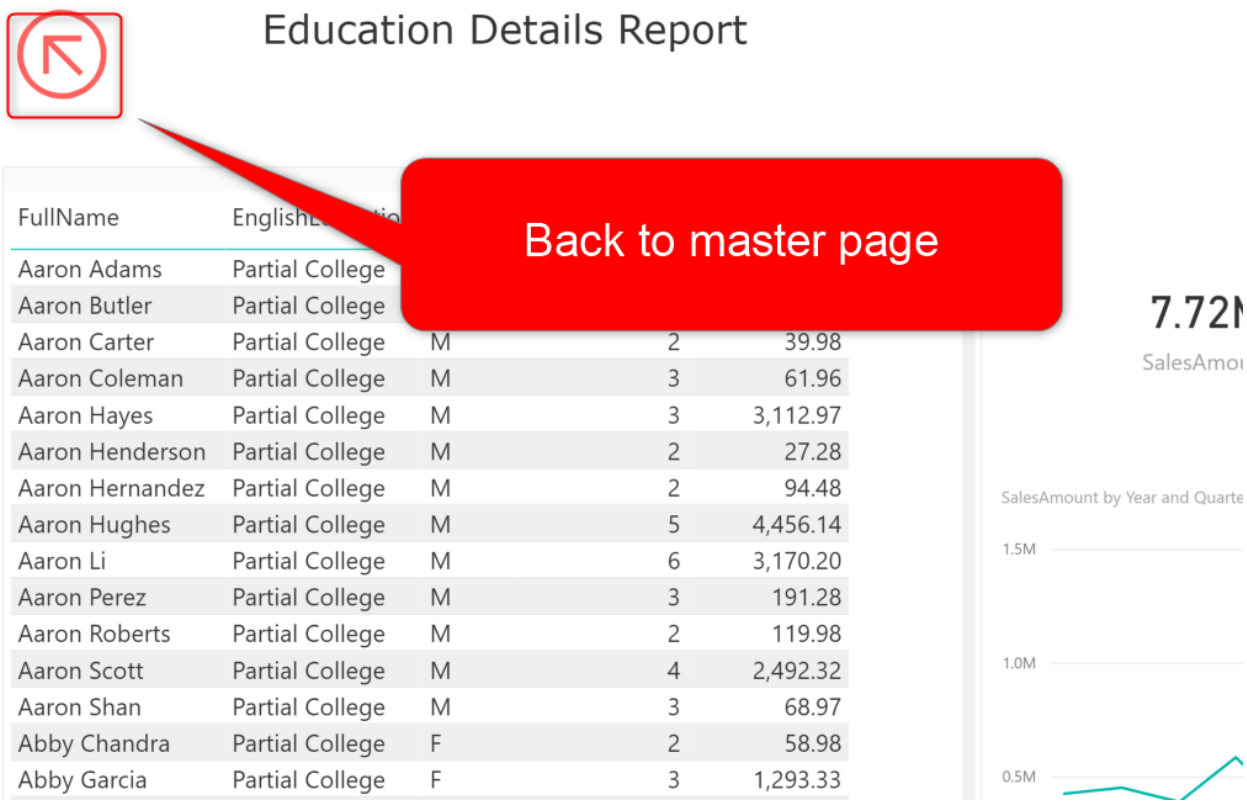


Once you click on the Education Category Details, you will be navigated to the details page, and the details page will be only filtered for the category that you came from (in the screenshot above, Partial College)



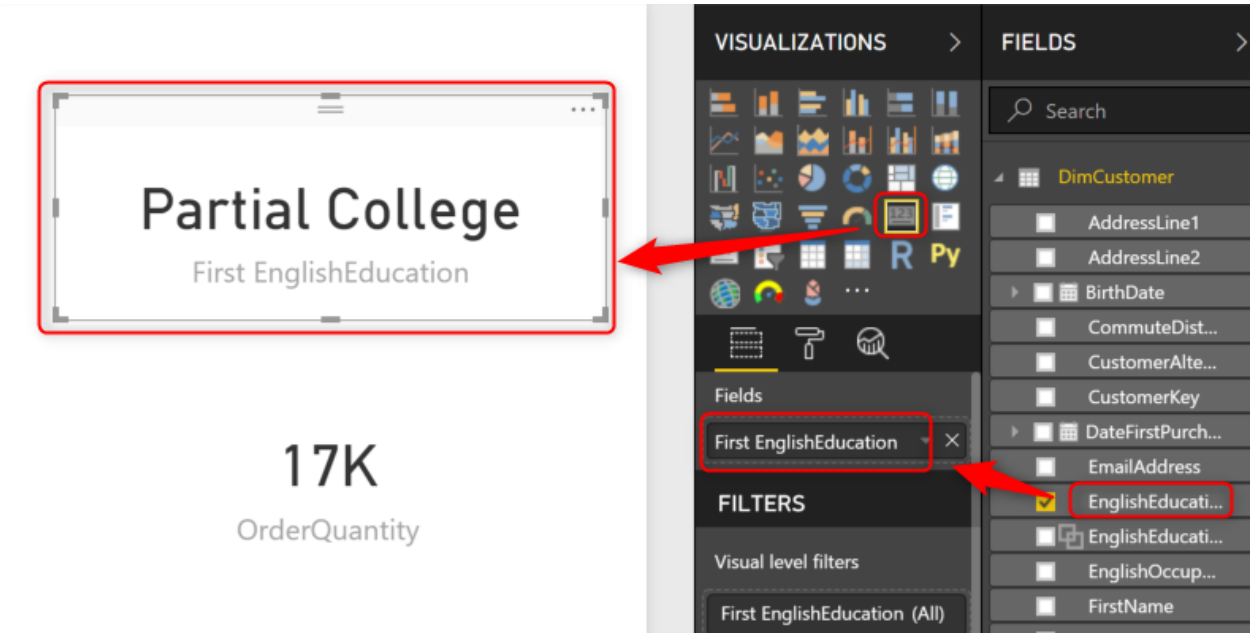
Everything in this page is FILTERED for education category that we drilled from the master page. You can now go back to the previous (master) page with Ctrl+click.

*Note that button actions need Ctrl+Click in the Power BI Desktop. They work with a normal click on the website.

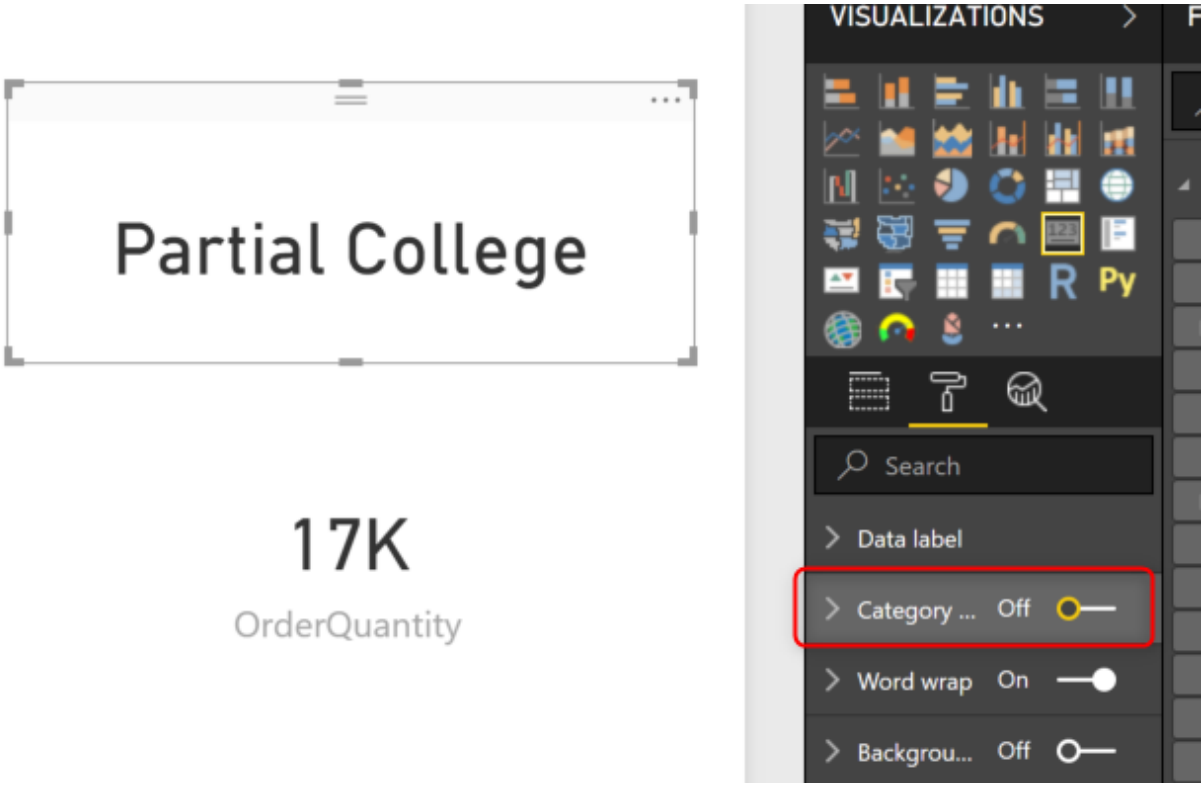


Some Improvements

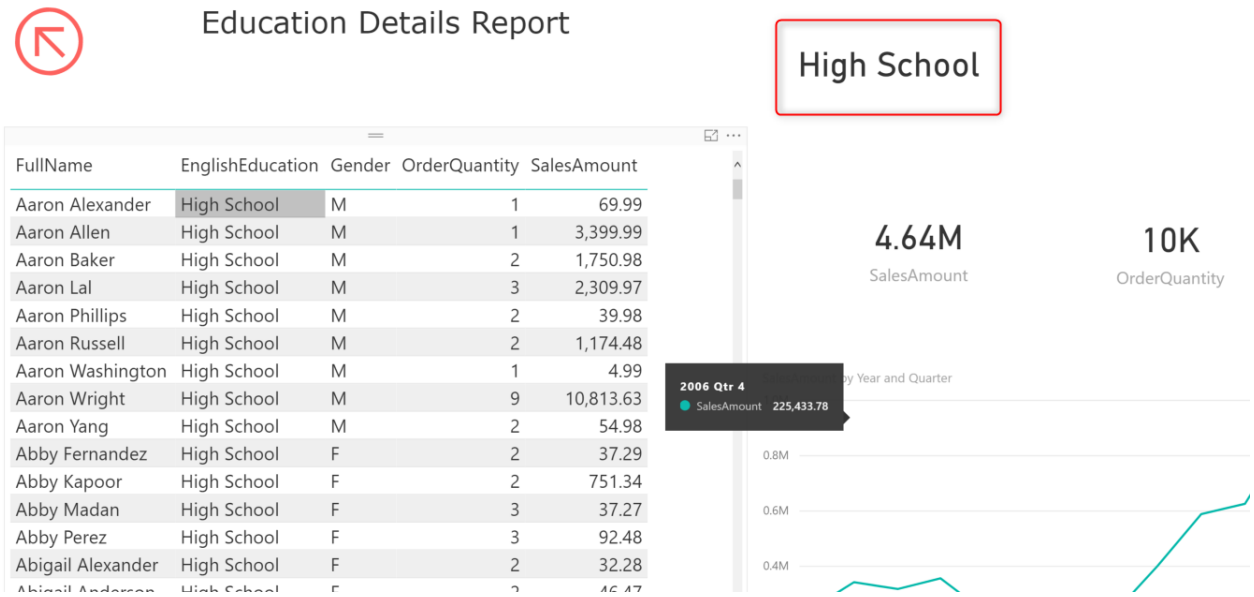
Drill-through experience can be improved with bringing the selected item somewhere in the header of the report page. For this purpose, you can easily use a Card Visual and show EnglishEducation there. When you add a text field to card visual, it will show the First value of that item in the table. When only one item is selected, then the first item is that item itself. As a result, you always get the selected category through this method.



You can also remove the category label, as the title of First EnglishEducation is misleading.



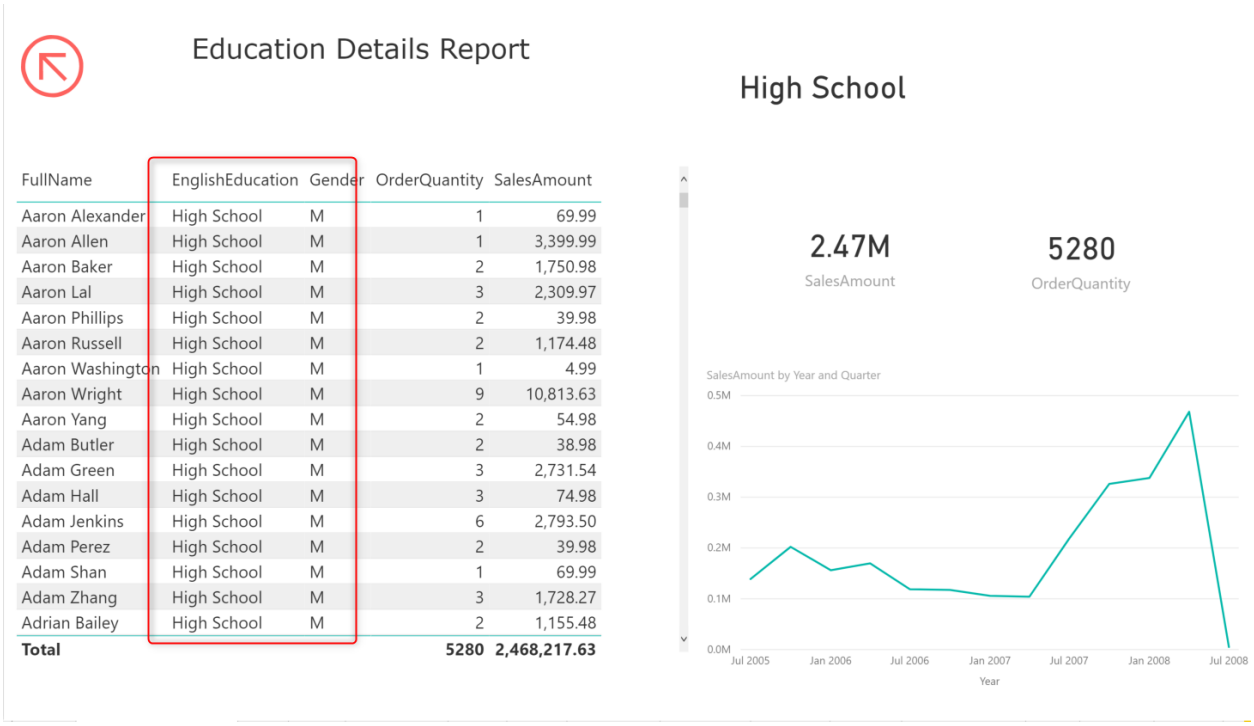
Now you can see the selected education category in the details page for any category selected.



Keep All Filters

One of the great features added to this functionality is “Keep all filters” option. This option by default is on. And it will pass all filters from the master page to the details page. Let’s see what this feature mean. Let’s assume you also want to go to the details of an education category and a gender. For example, you want to drill-through to Highschool data for Male. If you go to the master page and click on a chart that has both filters on it, then use Drillthrough option, you get the option to do it without any extra actions.

As a result, now you can see the drill-through details page showing only EnglishEducation as High School, and Gender as Male.

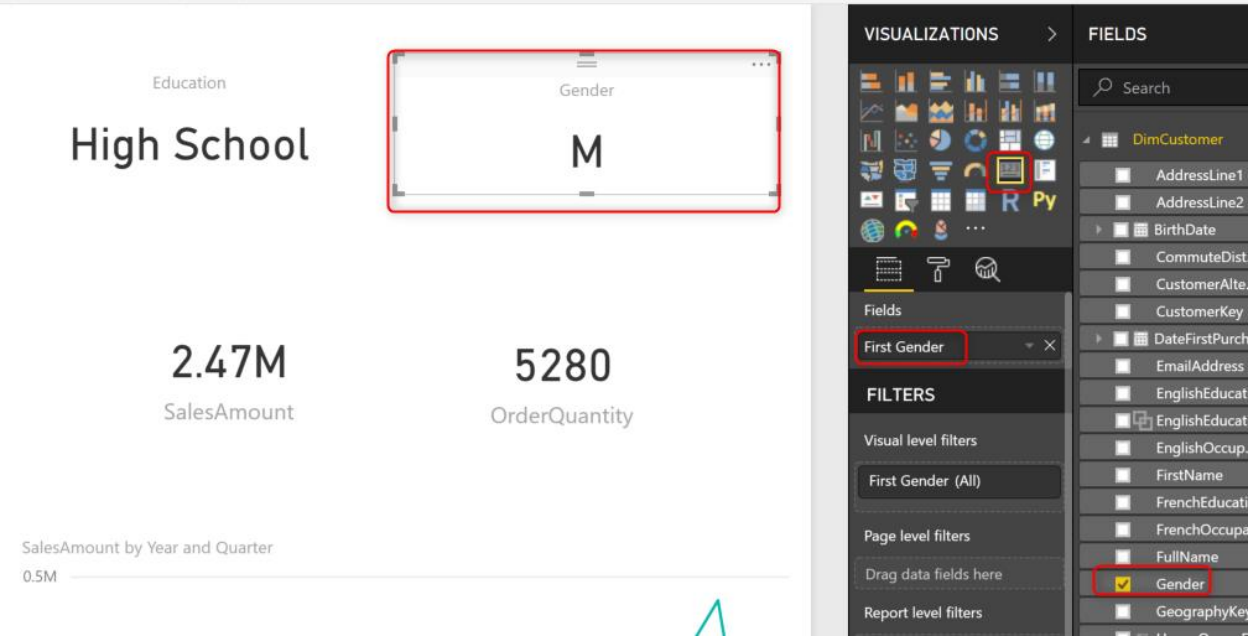


FullName	EnglishEducation	Gender	OrderQuantity	SalesAmount
Aaron Alexander	High School	M	1	69.99
Aaron Allen	High School	M	1	3,399.99
Aaron Baker	High School	M	2	1,750.98
Aaron Lal	High School	M	3	2,309.97
Aaron Phillips	High School	M	2	39.98
Aaron Russell	High School	M	2	1,174.48
Aaron Washington	High School	M	1	4.99
Aaron Wright	High School	M	9	10,813.63
Aaron Yang	High School	M	2	54.98
Adam Butler	High School	M	2	38.98
Adam Green	High School	M	3	2,731.54
Adam Hall	High School	M	3	74.98
Adam Jenkins	High School	M	6	2,793.50
Adam Perez	High School	M	2	39.98
Adam Shan	High School	M	1	69.99
Adam Zhang	High School	M	3	1,728.27
Adrian Bailey	High School	M	2	1,155.48
Total			**5280**	**2,468,217.63**

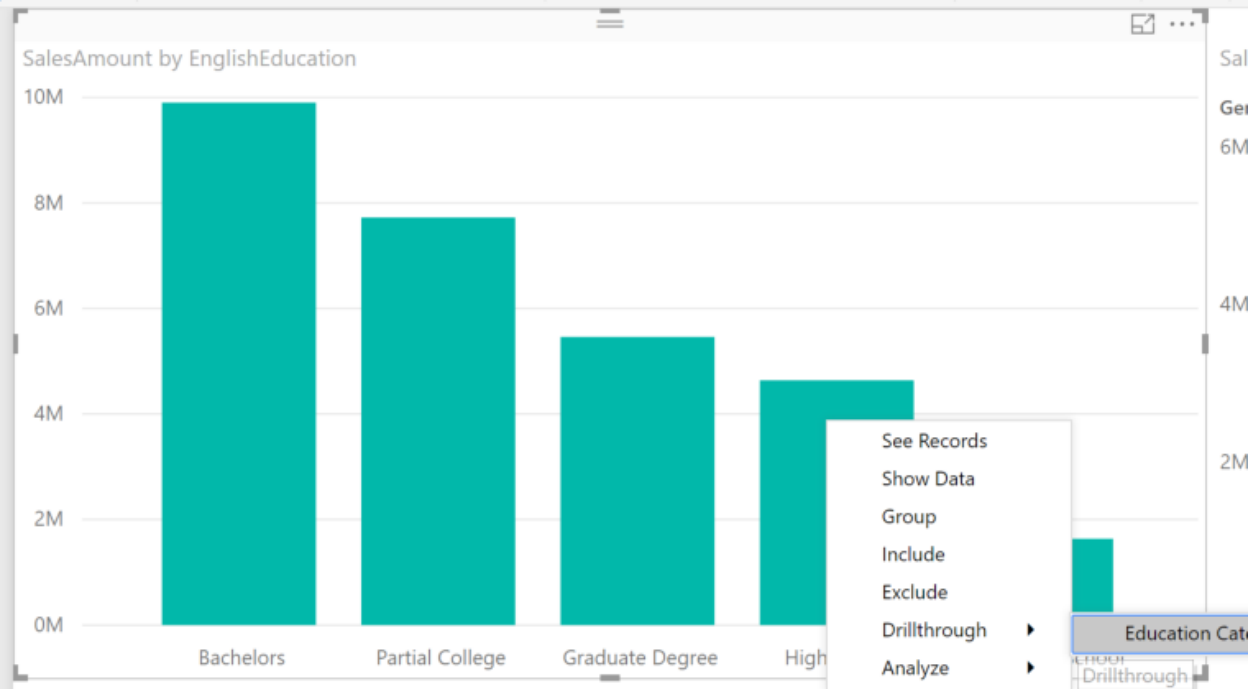
"Keep all filters" option means it will pass any filter from the master page to the details page, even if you have not added that field in the Drillthrough section of the details page. If you turn this feature off, then Drillthrough only works for pre-defined fields.

Multiple Selection

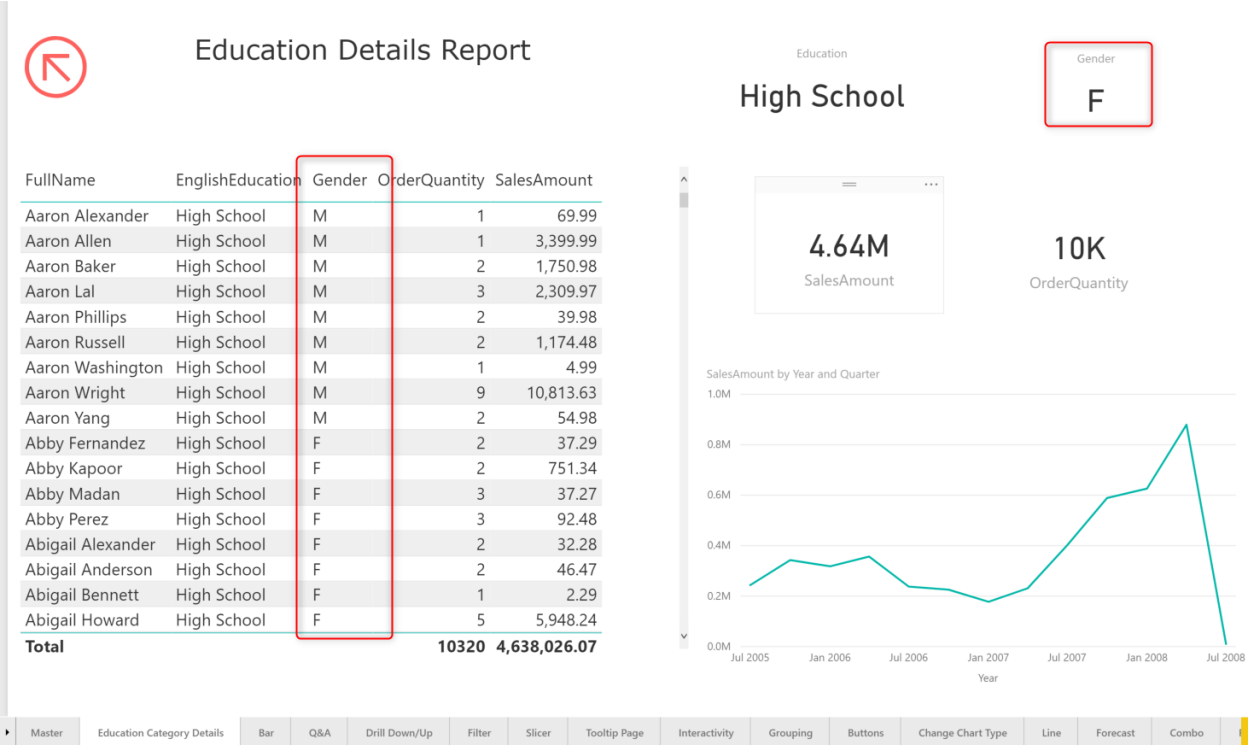
You can use the same approach to create a card visual for selected Gender in the details page.



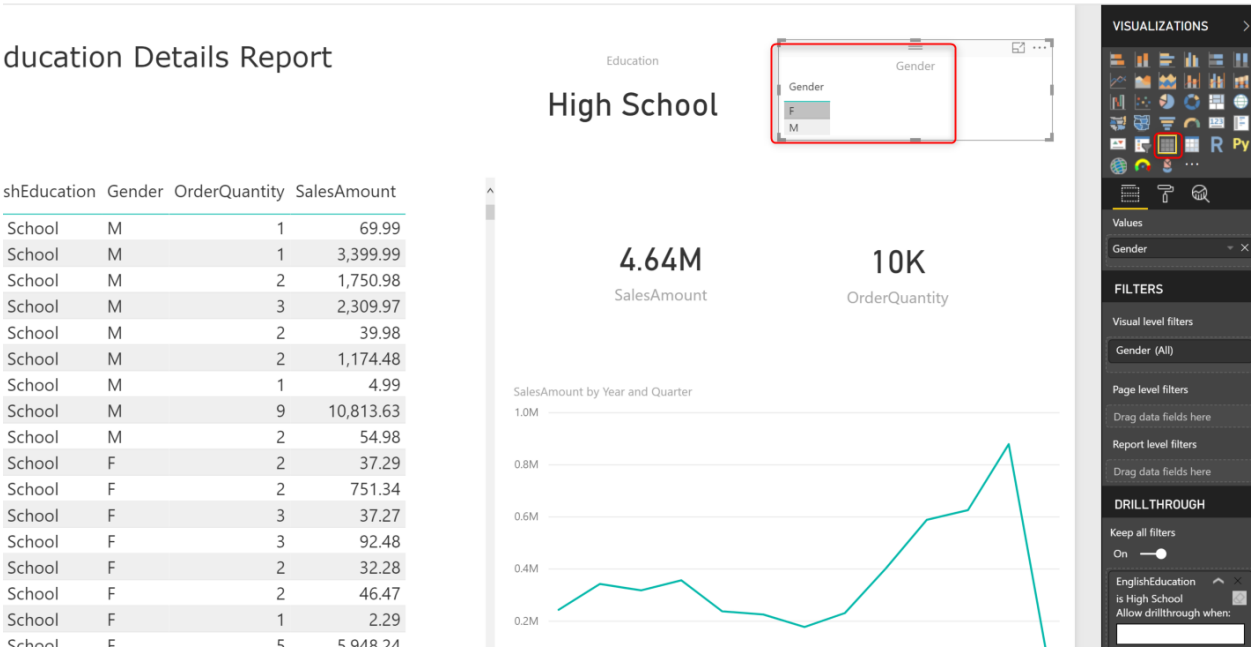
The challenge that you may face now is what if in the master page, someone uses the Drillthrough option, on a chart that doesn't have Gender on it?



The details page, in that case, will show both genders as you can see in the table. But the card visual that we used as part of a header is just showing the first, which is wrong!

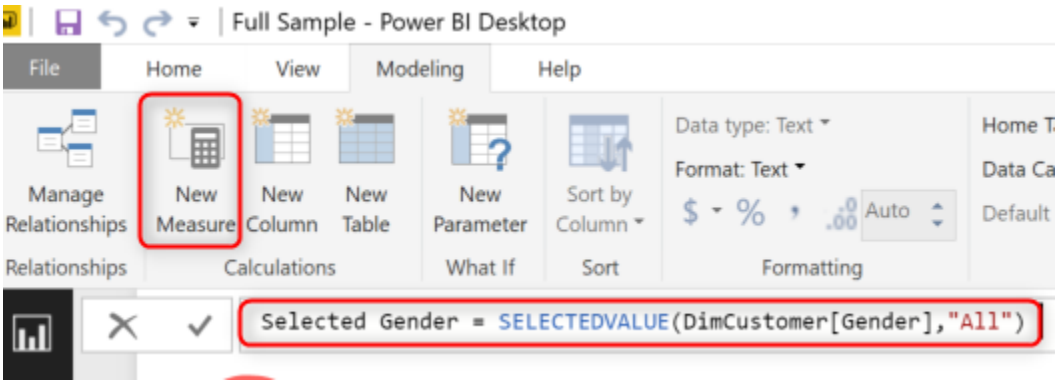


The reason for this behavior is obvious; you have more than one value, and the card visual picks only the first value instance. What is the solution then? You have two options: one is to use a visual that shows multiple values. Such as Multi-Row card visual, or table, and set the field as Do Not Summarize.

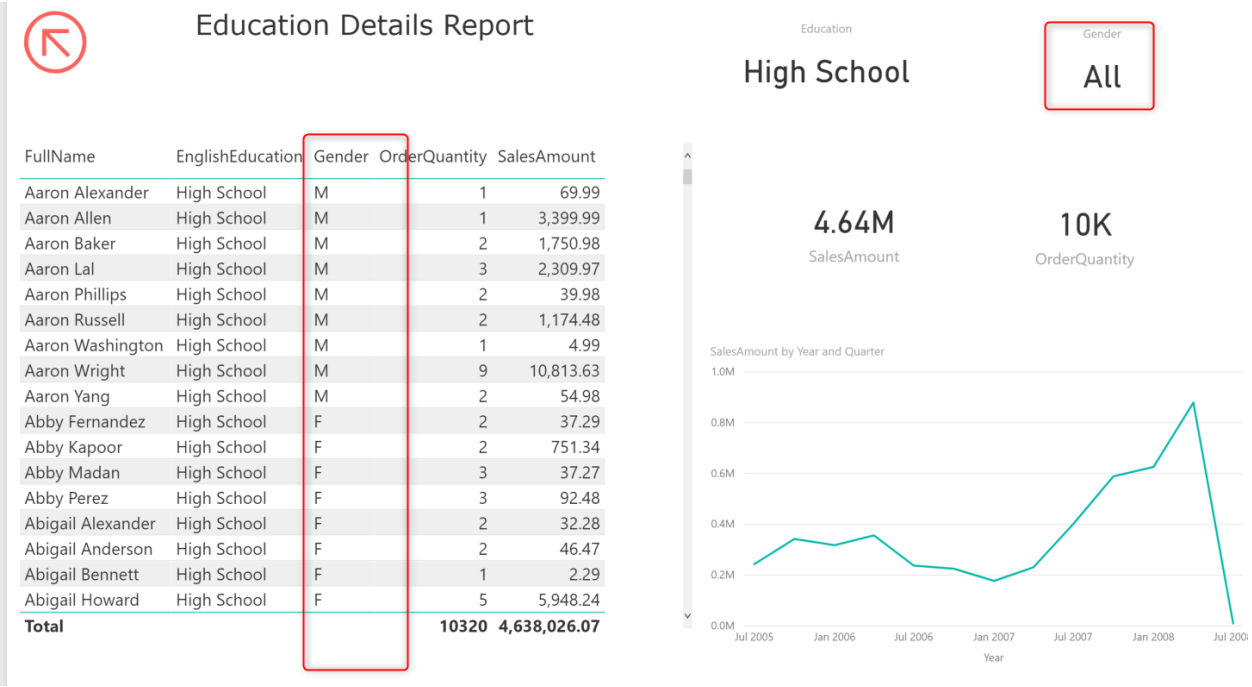


Or another approach is to get help from DAX. You can write a simple DAX expression to find out what are the selected values. You can create a measure with expression below:

```
Selected Gender = SELECTEDVALUE(DimCustomer[Gender],"All")
```

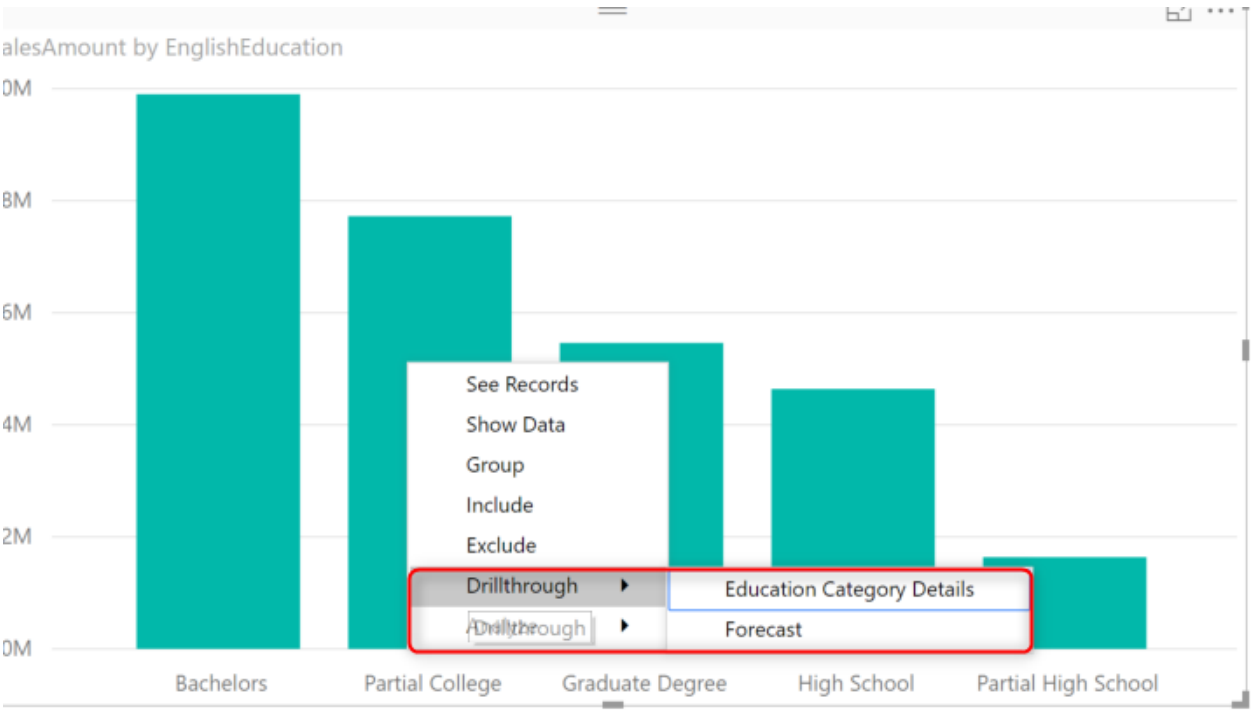


The expression above is saying that; if gender is selection, the measure will return that gender. As a result, otherwise, it will return a text: "All." This measure can now be used in a card visual. Here is the output now:



Multiple Details Pages

You can have multiple details pages, here is an example of what it will look like from a user point of view;

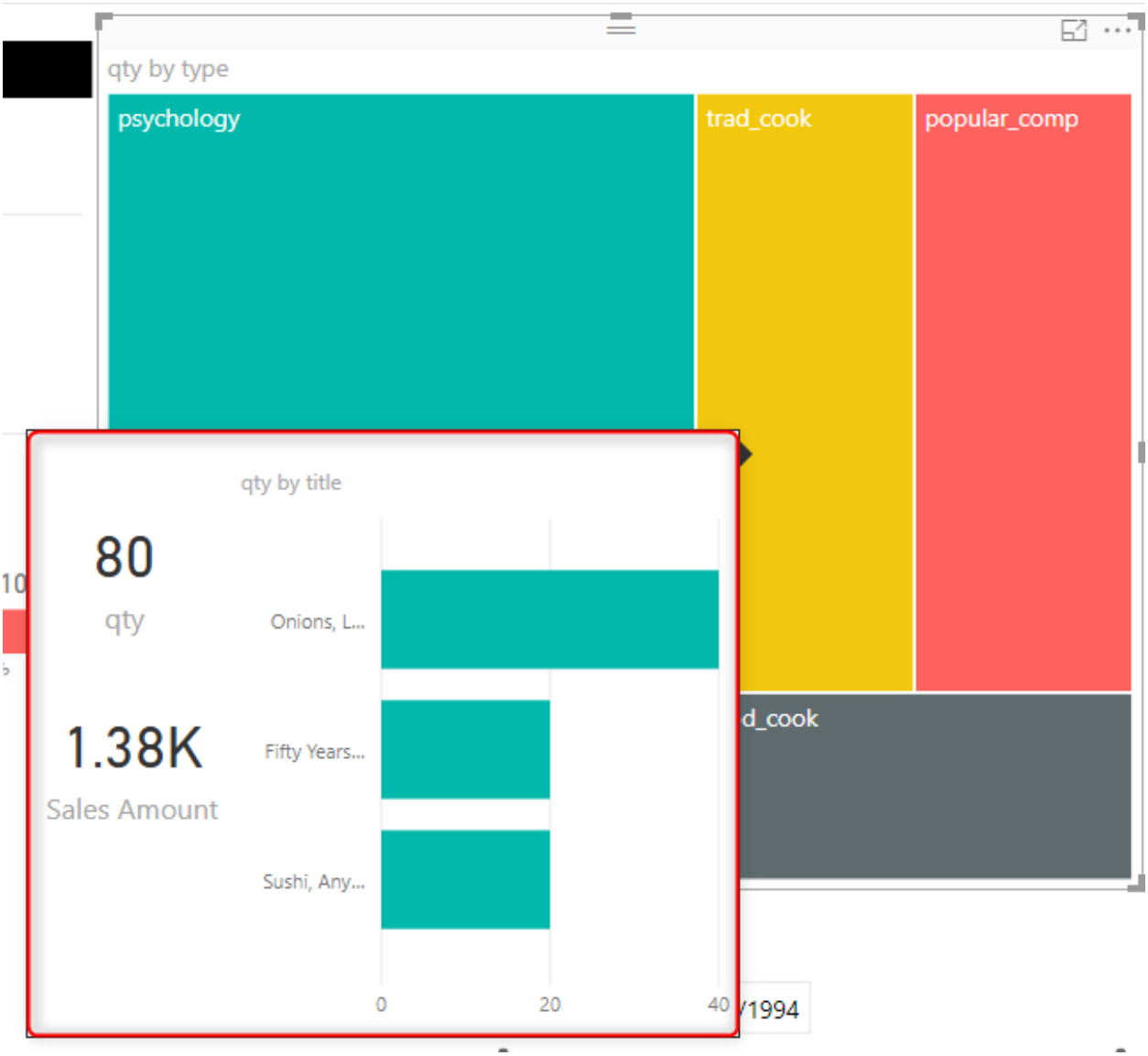


Summary

Drill-through is one of the most common reporting actions that enable you to save some space on the master page, and add more details in a details page. The Drillthrough filter in Power BI works seamlessly with minimum configuration for this behavior. In this post, you have seen how you can implement a scenario that the user can navigate from master page to the details and back.

Report Page Tooltip - Revolution in Visualization of Power BI

Published Date: March 8, 2018



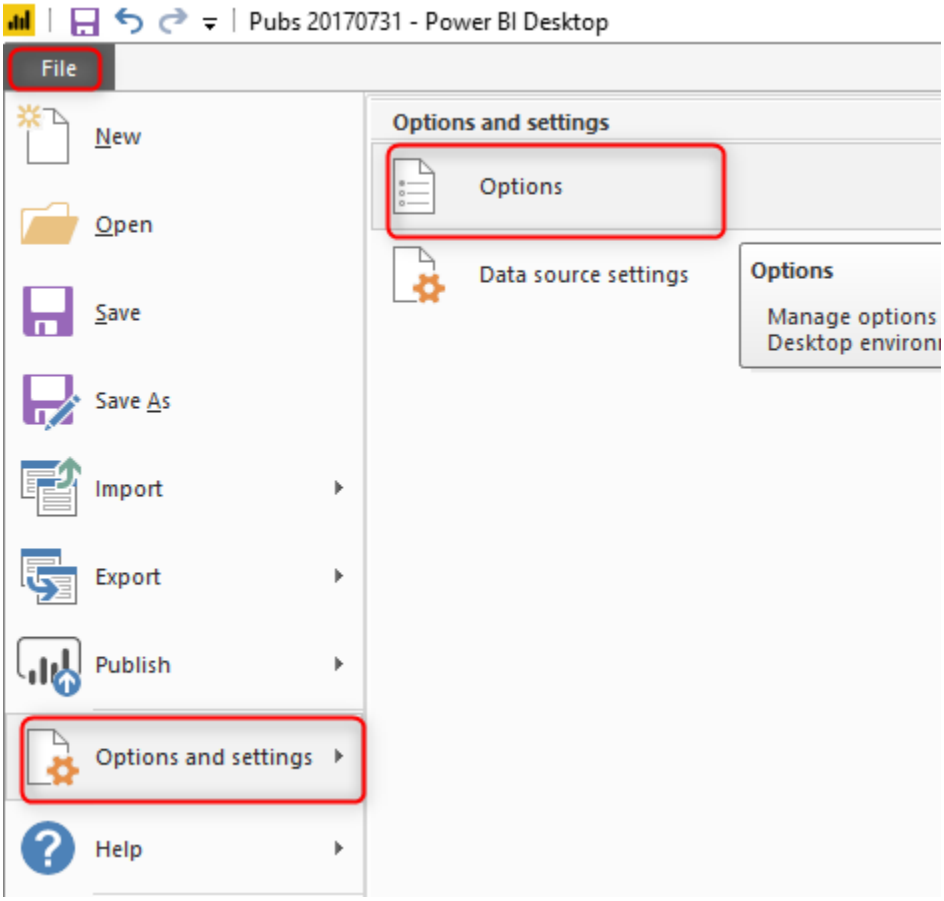
A very exciting feature that is added in the most recent version of Power BI Desktop March 2018 is Report Page Tooltips. This is a specific type of tooltip which can be a report itself. Which this feature you can have your drill down report designed separately, and then with hovering on a chart, you can easily see the drill down as another report.

This is a revolutionary feature added to Power BI Desktop, read rest of this post to learn how to use this stunning feature.

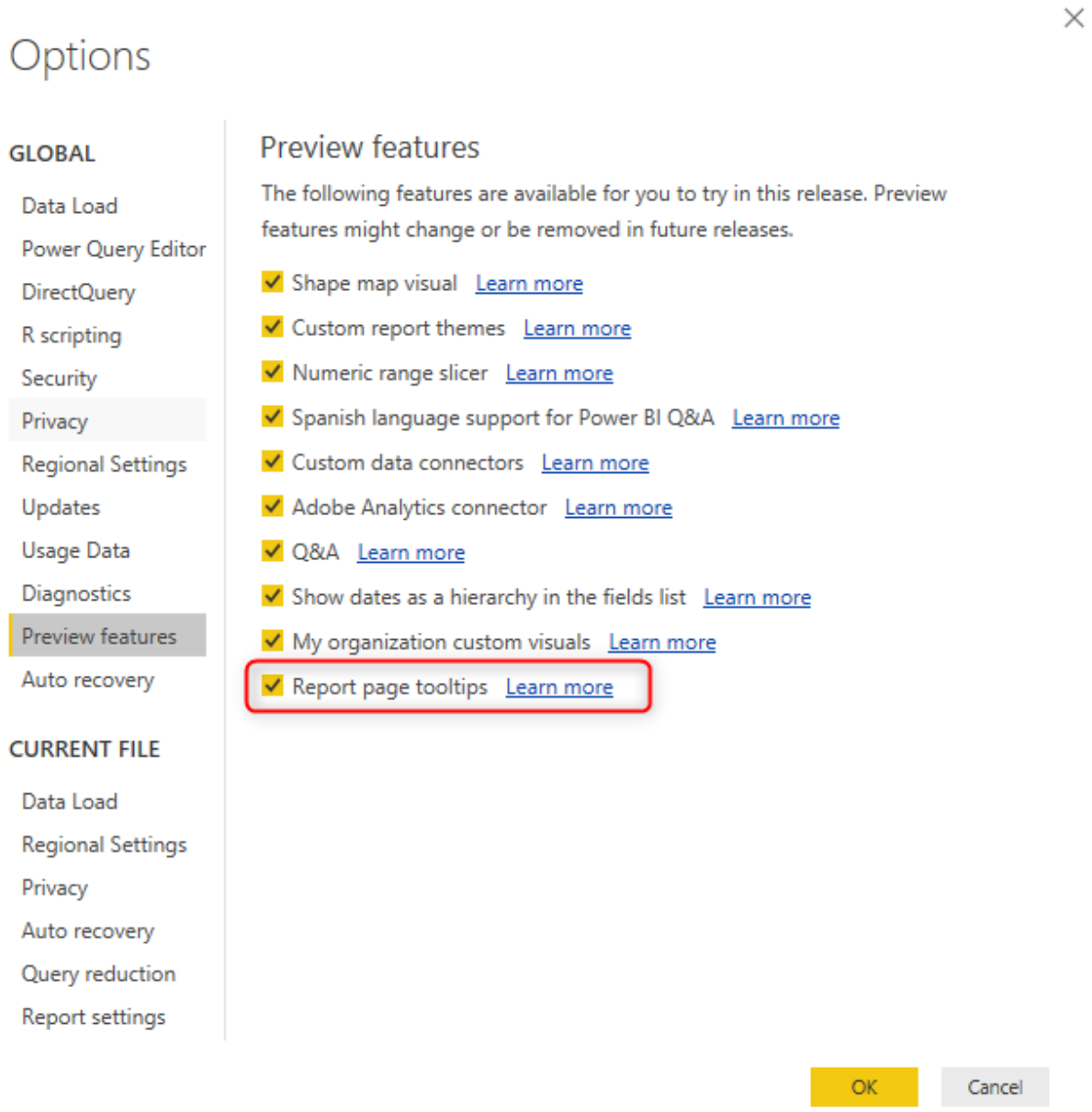
Prerequisite

You need to download the Power BI Desktop release in March 2018. (Released a few hours ago!).

You also need to enable the Report Page Tooltip feature (because it is still preview at the time of writing this blog post). You can enable it from Files, Options and Settings, Options

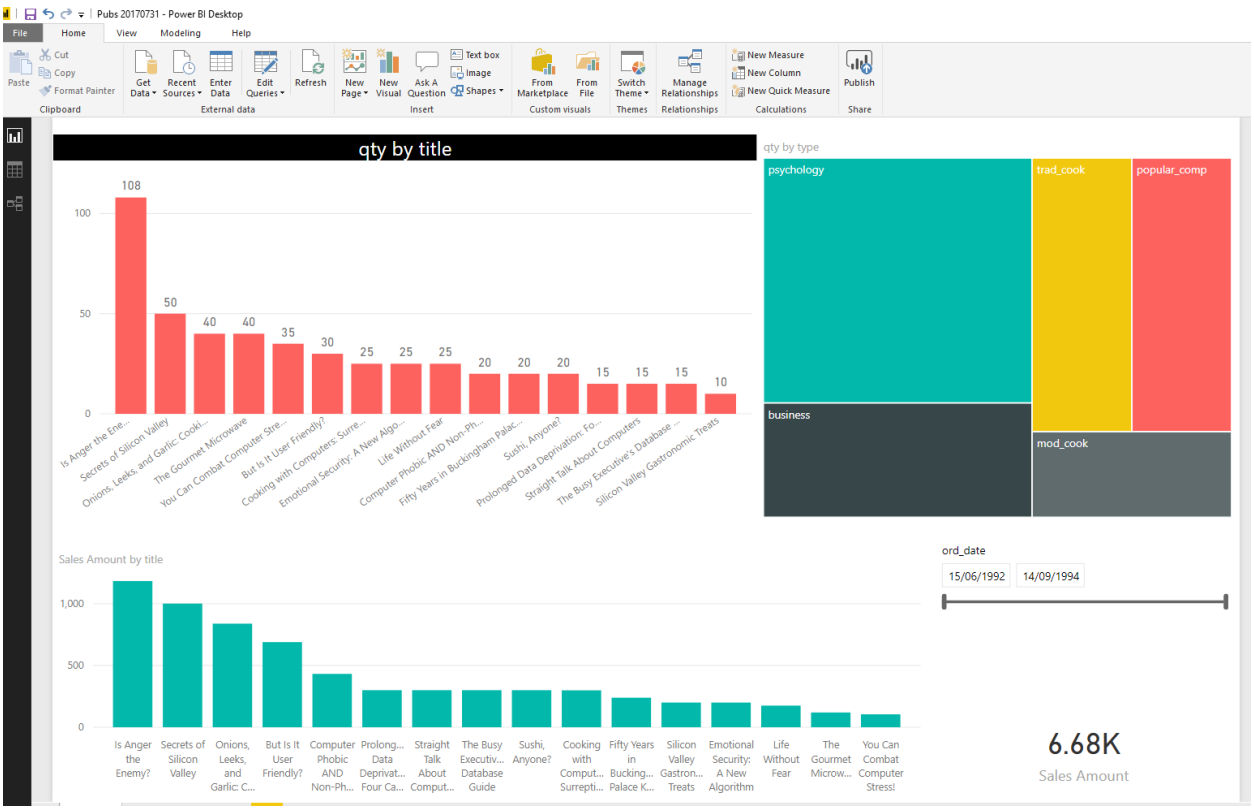


then you need to select Report Page tooltip option



Sample Report

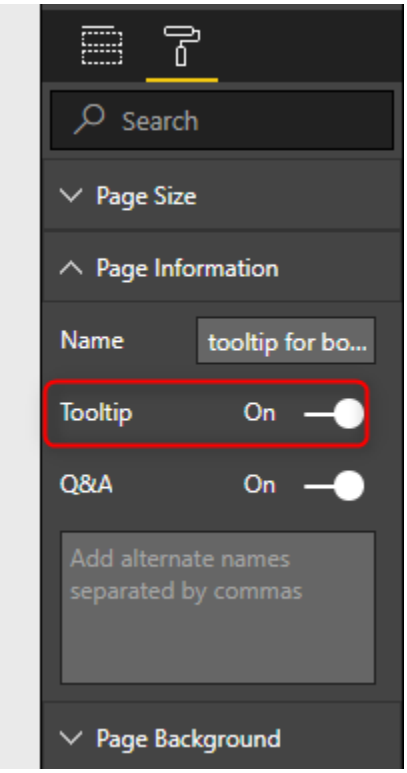
Open a sample Power BI report. Here is my sample of Pubs data set;



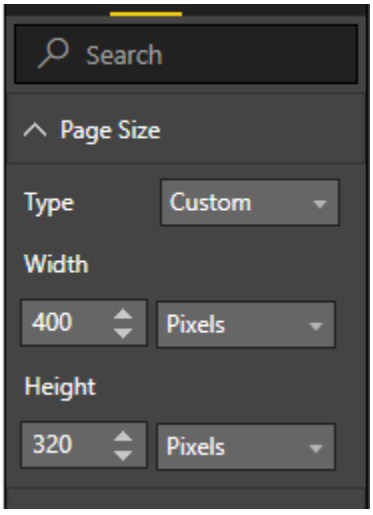
Let's say we want to add a report page tooltip to the treemap visual. Here are steps to do:

Create a Report Page

First, you need to create a new report page and assign it as a tooltip page. This is a normal report page with a few specific features. Create the new page, and then in the page's format settings, in the Page Information, set Tooltip to be ON

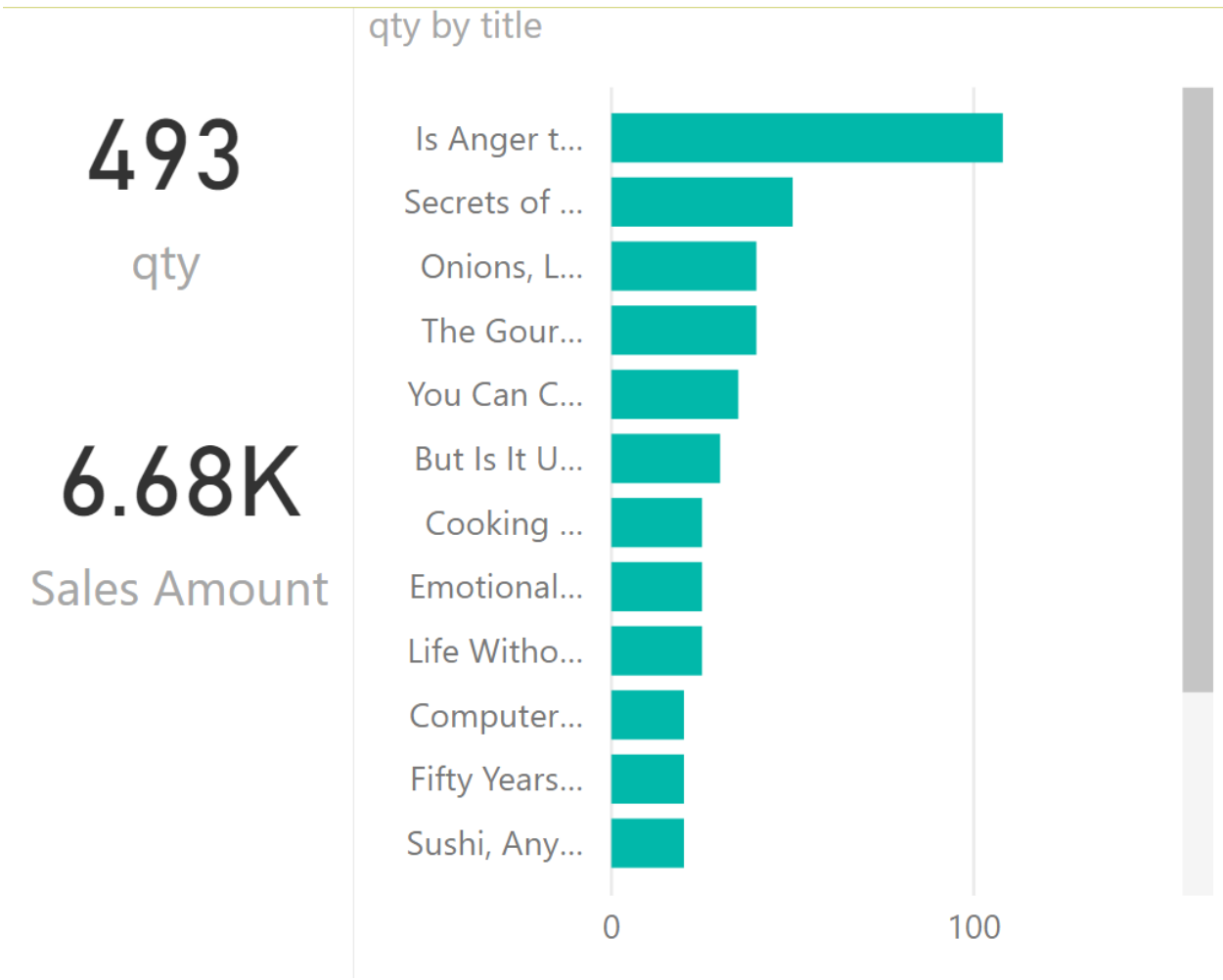


Then set the size of this page. You don't want the big page to appear when you hover on a chart. You want a small screen. For example, I set these sizes:



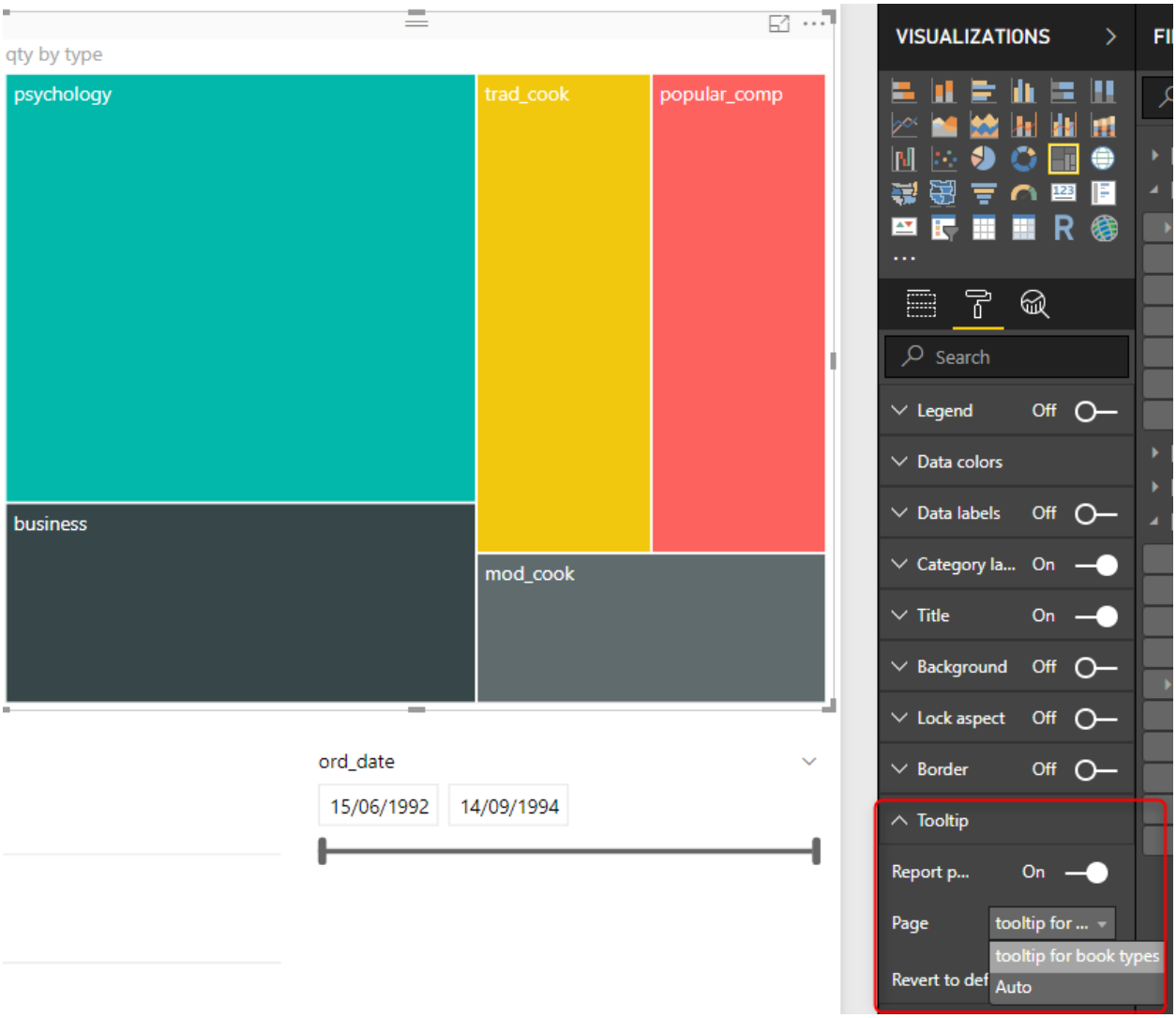
Now you can design your report page like any normal page. Put charts and visuals on it.

You don't need to put a drill through filter on a tooltip report page



Add the report as Tooltip

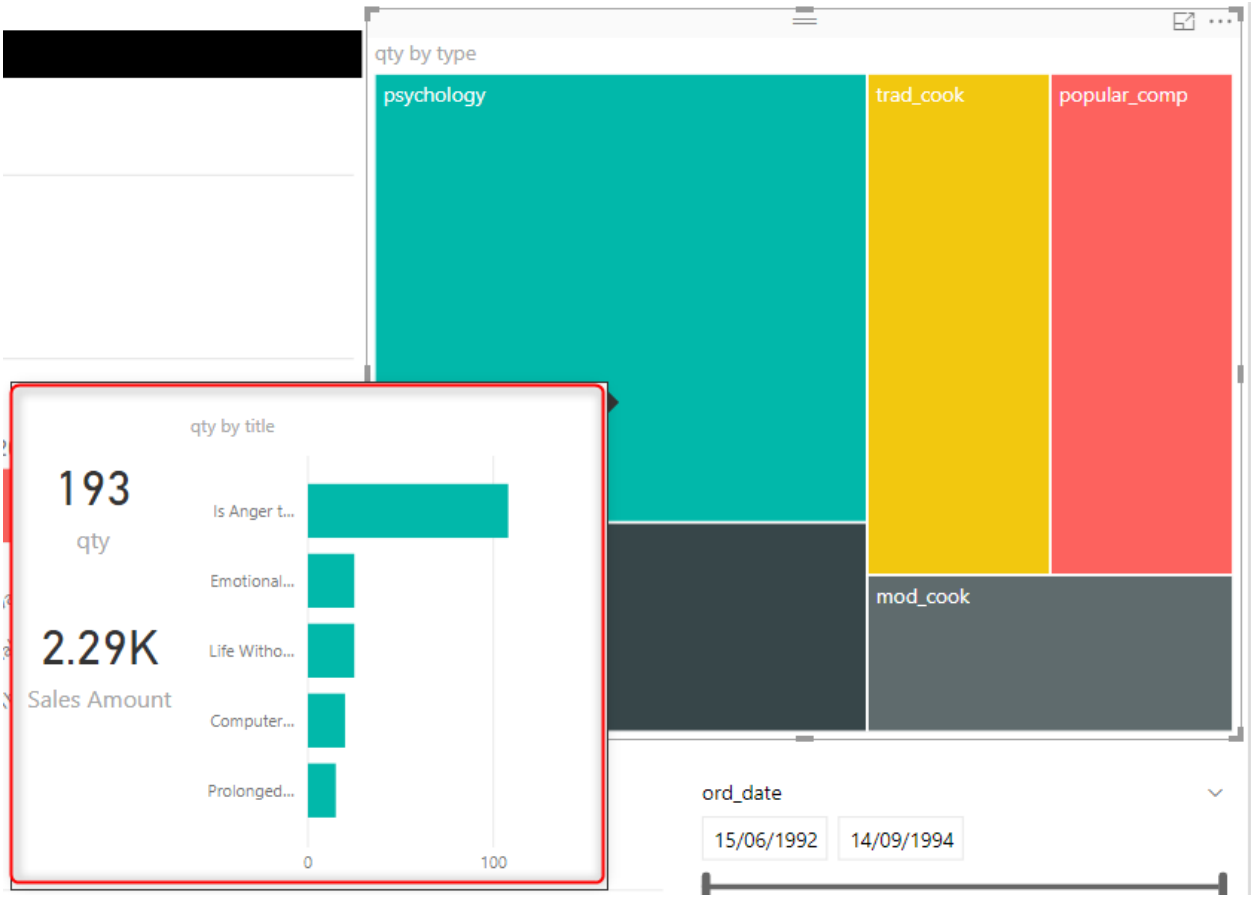
Your report is now ready to be added as a tooltip to another visual. In the Format of that visual go under Tooltip and you would be able to select any report page that has the tooltip property of that ON.



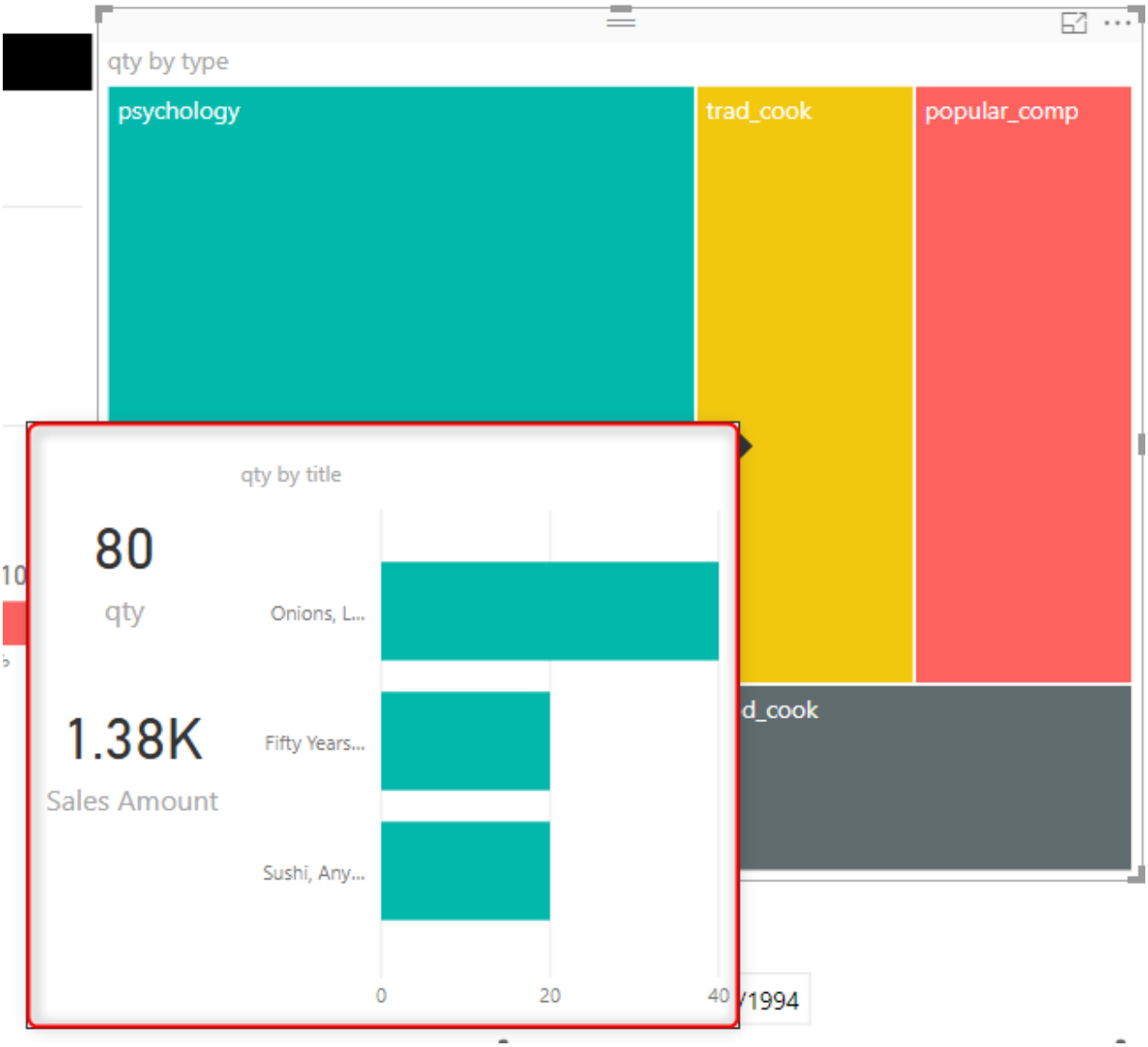
All done, let's test it now

Test

When you hover with your mouse on the treemap, you can see the other report is now showed as a tooltip. Fantastic, isn't it?



The great thing about this is that this automatically passes the selection, you can see the tooltip is only showing data of psychology now. If I hover on another type, then tooltip also changes. Very smart!



Summary

This was a very quick post but showed you a very fantastic feature added today in Power BI Desktop. From my point of view, this is an awesome feature and probably reduce the amount of drill down and up in all reports. Now you can drill down with different visual; you have the power of analysis with different visualizations in different levels. Can't wait to see more enhancement for this feature. Give it a try and let me know what scenarios you like to use this feature in it.

Control the Interaction in Power BI Report

Published Date: November 29, 2016

Power BI reports are highly interactive, If you select a column in a column chart other charts will be highlighted. Selecting a slicer value will filter all other visuals in the report. This interactivity can be controlled easily. Even though this feature has been released in early phases of Power BI, there are still many clients who don't know how to control the interaction of visuals in Power BI report. In this post, you will learn how easy and useful in controlling the interaction between Power BI visual elements. If you want to learn more about Power BI; read Power BI online book from Rookie to Rock Star.

What is Interactivity of Power BI Visuals?

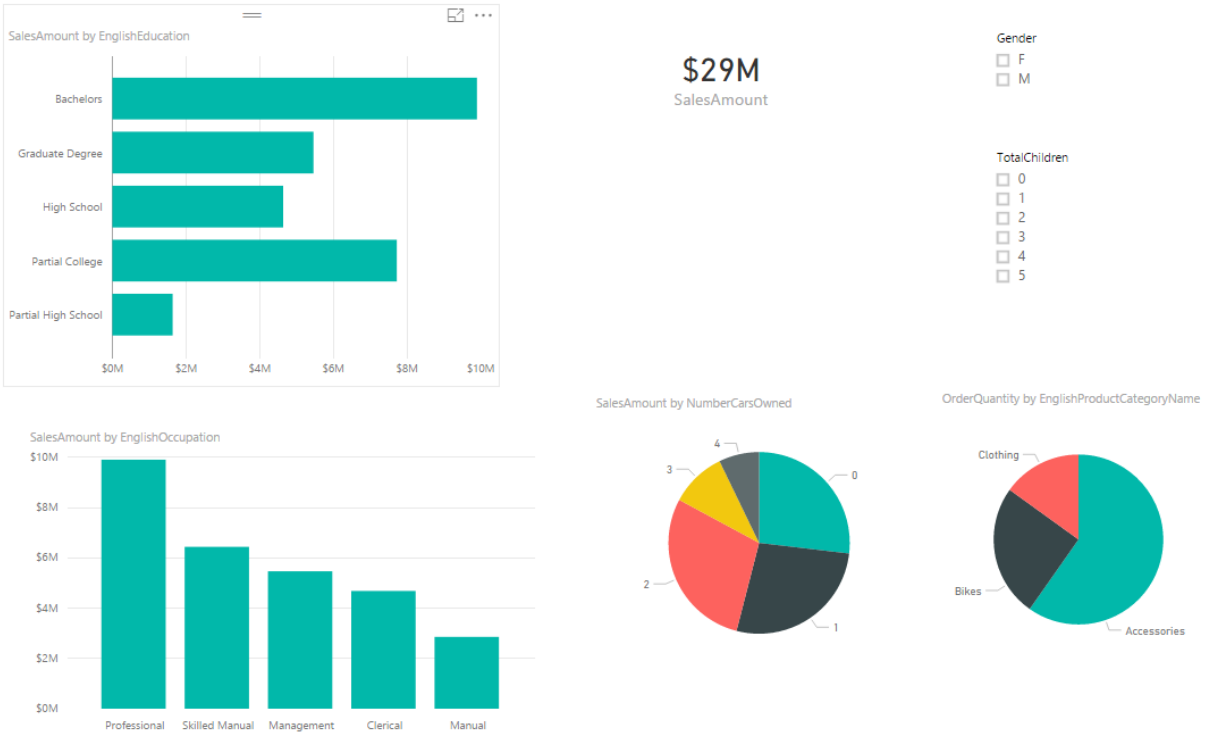
Power BI visuals are interacting with each other. Selecting an item in a visual will effect on the display of another chart. Sometimes this effect is highlighting items in another chart, and sometimes filtering values in the other visual. By default, all visuals in a report page are interactive with each other. However, this interactivity can be controlled and modified. This functionality is very easy to change, but because there are still many people not aware of it, I ended up writing this post about it.

Prerequisite

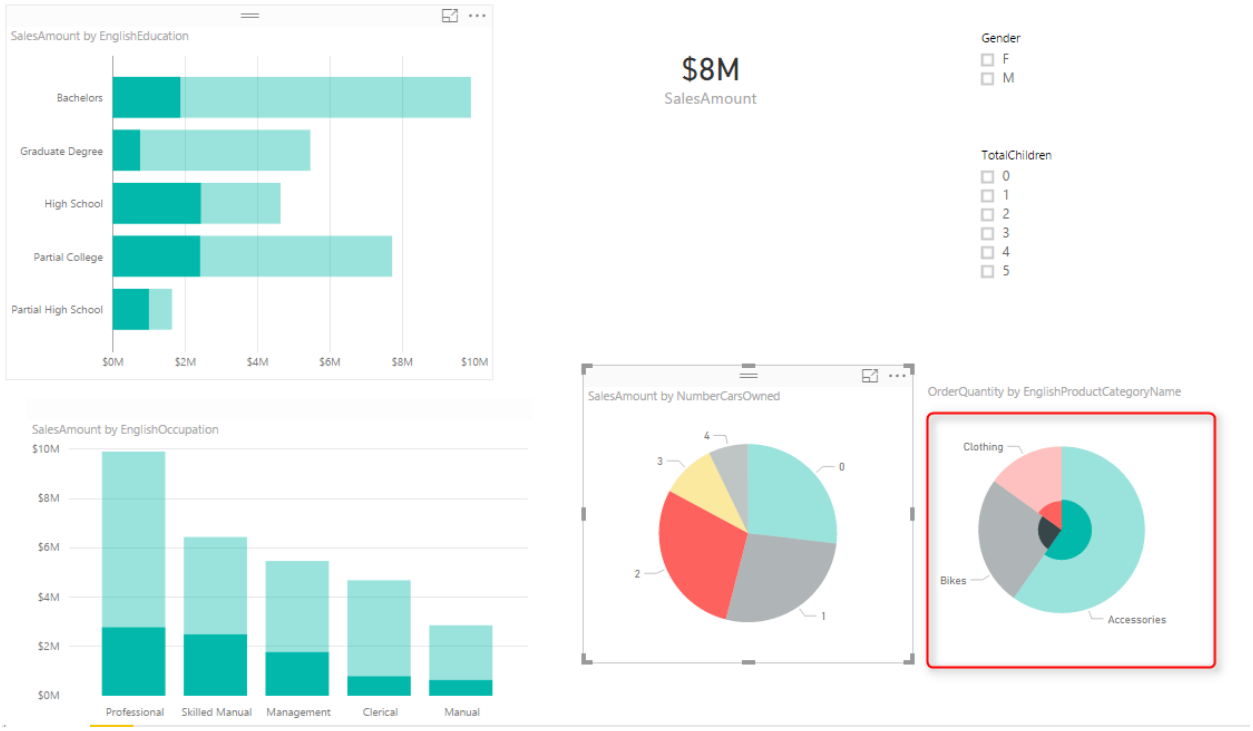
Let's start by building a very simple report from the AdventureWorksDW database with few visuals. For this example bring these tables into your model: FactInternetSales, DimCustomer, DimProductCategory, DimProductSubcategory, DimProduct.

Default Behavior

Build a sample report with a Bar Chart on EnglishEducation (from DimCustomer) as Axis, and SalesAmount (from FactInternetSales) as Values. Build a Column Chart with EnglishOccupation (from DimCustomer) as Axis, and SalesAmount (from FactInternetSales) as Values. Build a Card visual with the total of SalesAmount. Build a Pie Chart with NumberCarsOwned (from DimCustomer) as Legend and SalesAmount as the value. Another Pie Chart with EnglishProductCategoryName (from DimProductCategory) as Legend, and OrderQuantity (from FactInternetSales) as Value. Also create two filters; one with Gender (from DimCustomer), and another with TotalChildren (from DimCustomer). Here is a view of the report;



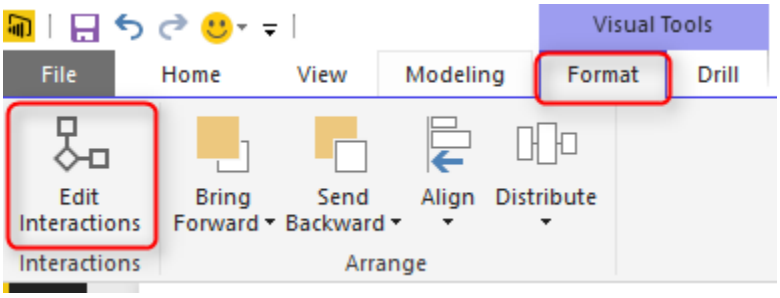
As I mentioned earlier, All visuals in Power BI report page are interactive with each other. If you click on a chart other charts will be highlighted:



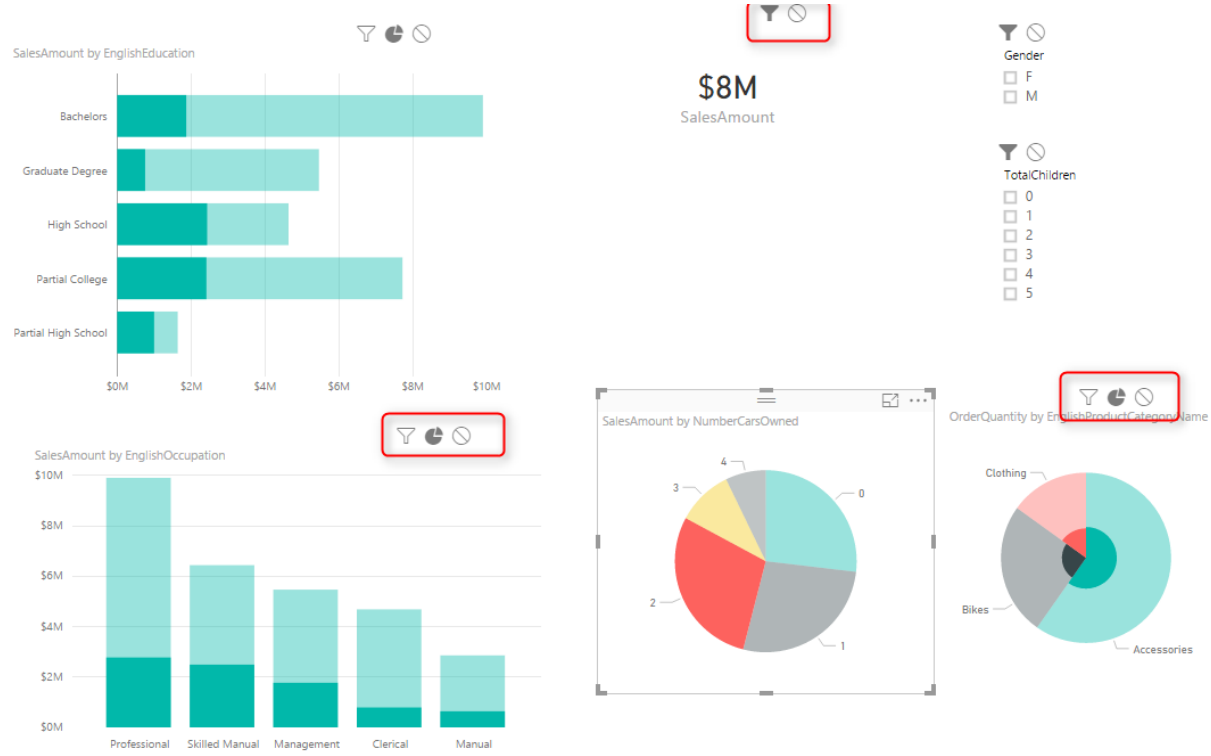
In the sample report above NumberCarsOwned 2 is selected in the Pie Chart, and related values to it highlighted in column chart and bar chart respectively. Also the total Sales Amount in the card visual changed from $29 million to $8 million. However, if you look at the other Pie Chart (mentioned with the red area in the screenshot above), the Pie chart for product category and quantities are highlighted, but it is not easy to find out exactly which one is bigger (is Clothing bigger or Bikes?). Despite the nature of Pie Chart which makes things hard to visualize. There are still more things we can do here to make it more readable. If instead of highlighting this pie chart it was filtered (like the card visual) we would have better insight out of this visual.

Changing the Interaction

To change the interaction of a chart with other charts, simply select the main chart (the chart that you want to control effect of that on other charts), and then from Visual Tools menu, under Format, click on Edit Interactions.

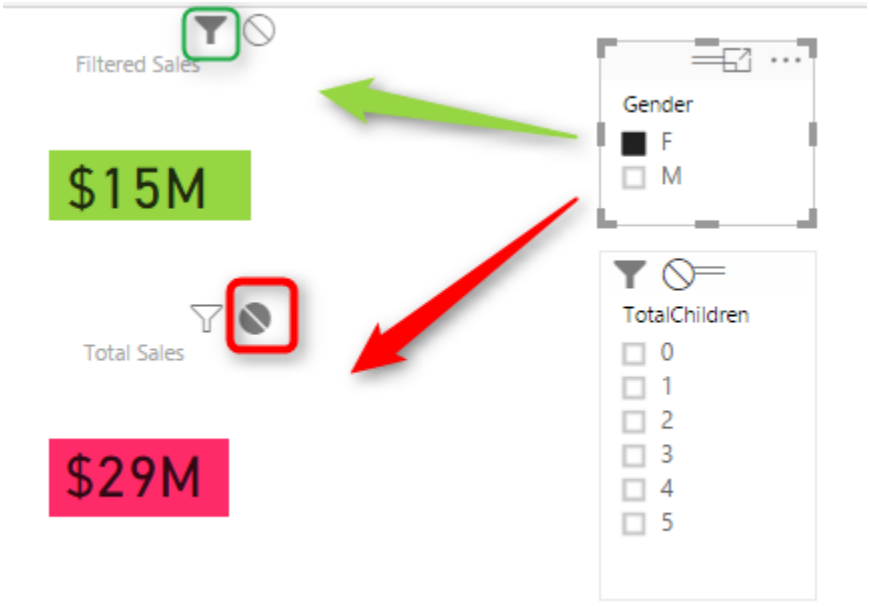


You will now see all other visuals on the page with two or three buttons on the top right-hand side corner of each. These are controls of interaction.



The darker color in this icon set shows which interaction will apply. For example for the interaction from NumberCarsOwned Pie Chart and the SalesAmount Card Visual, the selection is Filter. But for the ProductCategory Pie Chart is highlighting (the middle option). Now change this option to be Filter. And you will see immediately that second pie chart (product category) shows a filtered view of the selected item in NumberCarsOwned pie chart. The first pie chart is acting as a filter for the second pie chart.

This behavior also can be set to None. For example, let's say you want to have a total of sales amount regardless of gender selection, and then a total of sales amount for the selected gender in the slicer. To do this copy the SalesAmount Card Visual, and then click on Gender Slicer. Click on Edit Interaction, and set one of the card visuals to None, the other one as default with Filter.

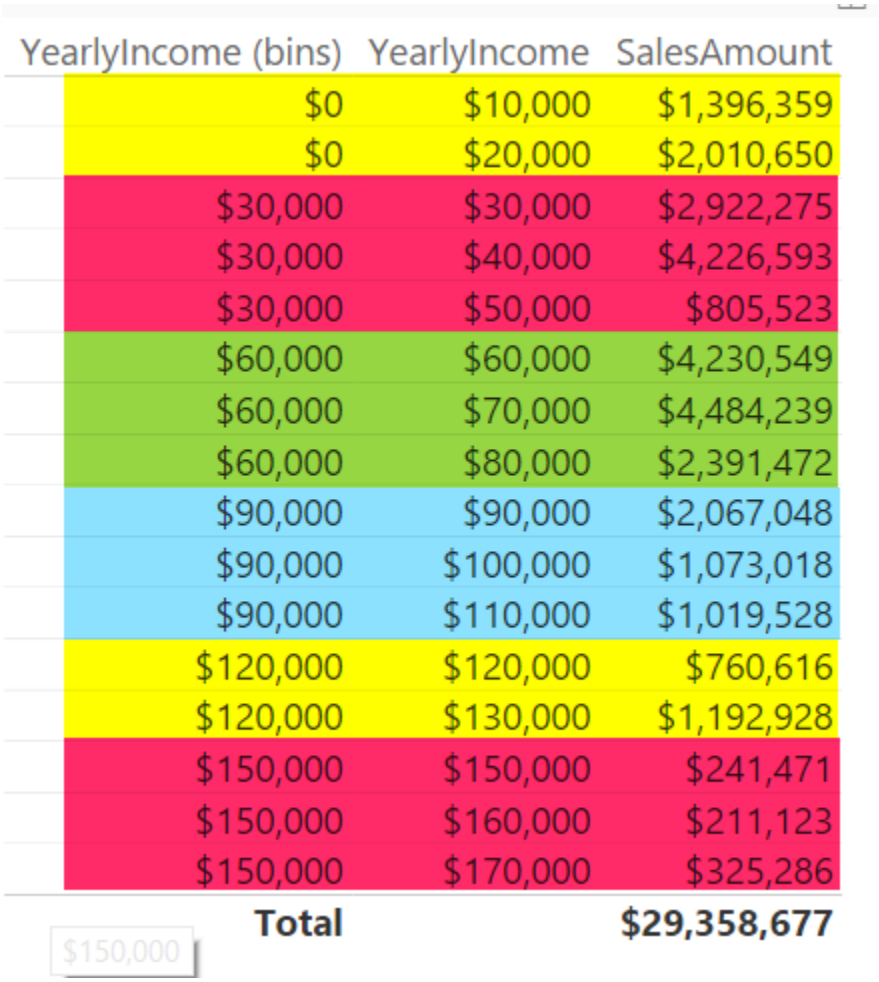


As you can see you can set interaction between every two individual elements in a page. This is extremely helpful when you are expecting to select an item to have a different

impact on different visualization. Hope this simple tip helps to make your visualization better with Power BI.

Grouping and Binning; Step Towards Better Data Visualization

Published Date: November 3, 2016



YearlyIncome (bins)	YearlyIncome	SalesAmount
$0	$10,000	$1,396,359
$0	$20,000	$2,010,650
$30,000	$30,000	$2,922,275
$30,000	$40,000	$4,226,593
$30,000	$50,000	$805,523
$60,000	$60,000	$4,230,549
$60,000	$70,000	$4,484,239
$60,000	$80,000	$2,391,472
$90,000	$90,000	$2,067,048
$90,000	$100,000	$1,073,018
$90,000	$110,000	$1,019,528
$120,000	$120,000	$760,616
$120,000	$130,000	$1,192,928
$150,000	$150,000	$241,471
$150,000	$160,000	$211,123
$150,000	$170,000	$325,286
Total		$29,358,677

The latest update of Power BI Desktop (October 2016) has many features. Two of these features are grouping and binning. These features used to create groups of items and visualize them better in the report. Previously you could do that by Power Query or DAX calculated columns, and now it is all possible simply through the graphical user interface of report editor. In this post, I'll show you how to create banding (binning) and grouping simply with these features. If you like to learn more about Power BI; read the Power BI online book from Rookie to Rock Star.

Prerequisite

For running examples of this post, you need to have AdvantureWorksDW SQL Server database sample installed. Or you can get the excel version of it.

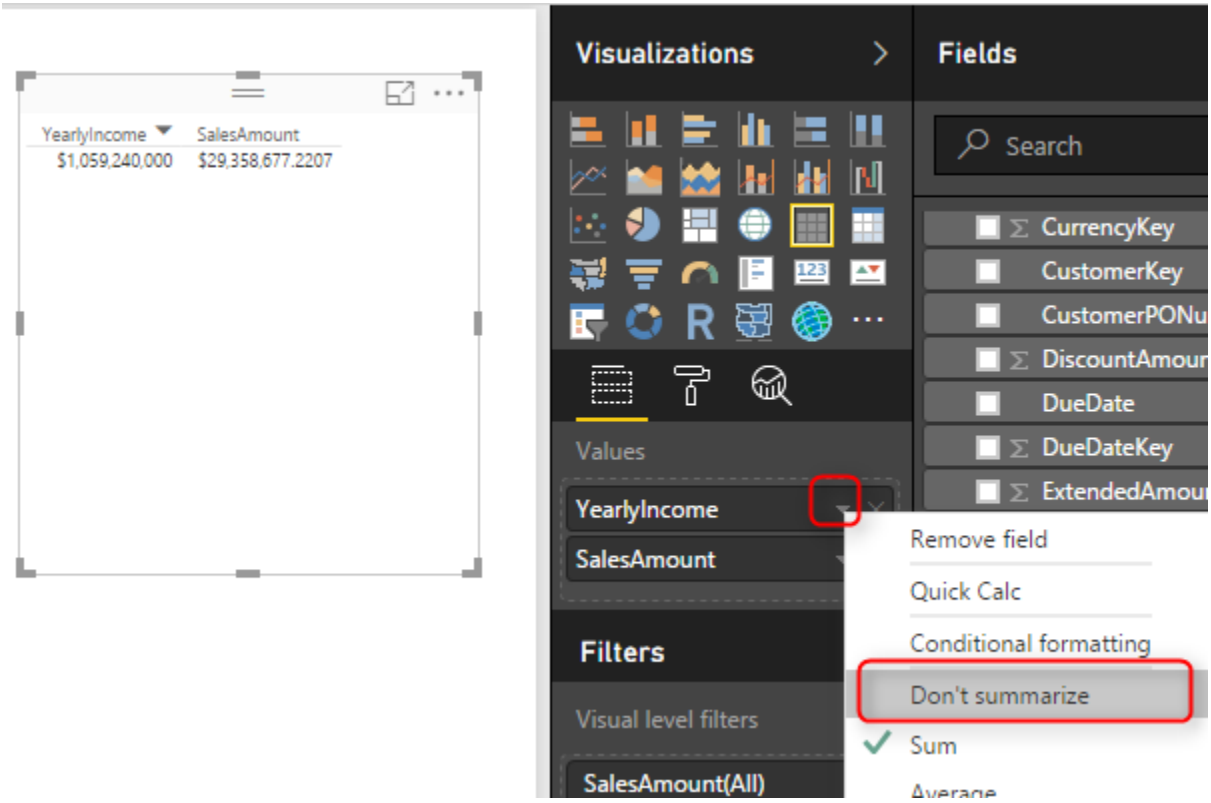
Get Data; Start with getting Data from AdventureWorksDW, and choose tables: FactInternetSales, DimDate, and DimCustomer.

Set the relationship between DimDate and FactInternetSales to be only based on OrderDateKey as Active relationship, remove inactive relationships between these two tables.

Banding or Binning

Binning is grouping a numeric field based on a division. This type of grouping is called Banding as well. For example, you might have customers with a different yearlyIncome range from $10,000 to $100,000, and you want to create a banding by $25,000. This will generate four groups of yearly income for you. This is exactly what Binning in Power BI does. Let's look at the example.

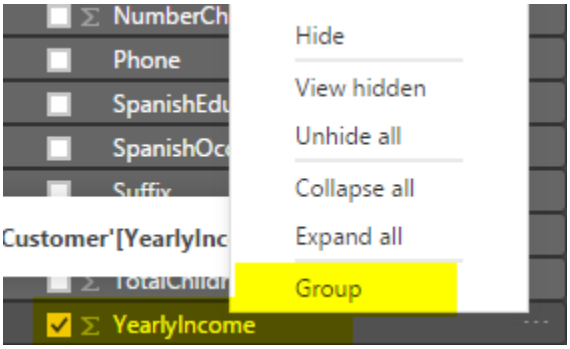
Create a Table in Power BI Report and visualize YearlyIncome (from DimCustomer), and SalesAmount (from FactInternetSales) in it. Change the aggregation of YearlyIncome from Sum to Do Not Summarize as below



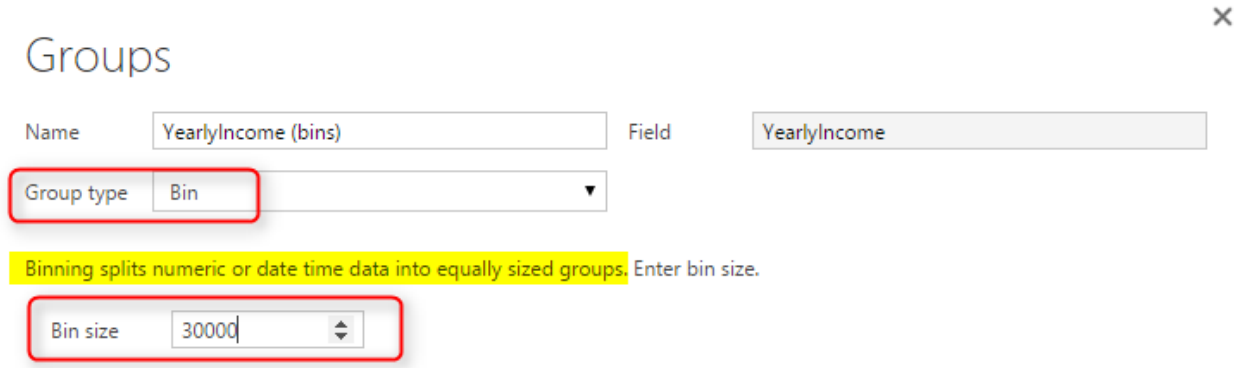
This will visualize each yearlyIncome value with the sales amount associated with it.

YearlyIncome	SalesAmount
$10,000	$1,396,359
$20,000	$2,010,650
$30,000	$2,922,275
$40,000	$4,226,593
$50,000	$805,523
$60,000	$4,230,549
$70,000	$4,484,239
$80,000	$2,391,472
$90,000	$2,067,048
$100,000	$1,073,018
$110,000	$1,019,528
$120,000	$760,616
$130,000	$1,192,928
$150,000	$241,471
$160,000	$211,123
$170,000	$325,286
Total	**$29,358,677**

Now let's create groups of people based on their yearly income categorized in buckets of $30,000. Right click on the YearlyIncome column in the fields section and select Group.



In the Groups, window make sure Bin is selected as the group type (by default for numeric or date/time columns this will be the default). And set the size to 30000. This is the size that values of YearlyIncome will be split based on it.

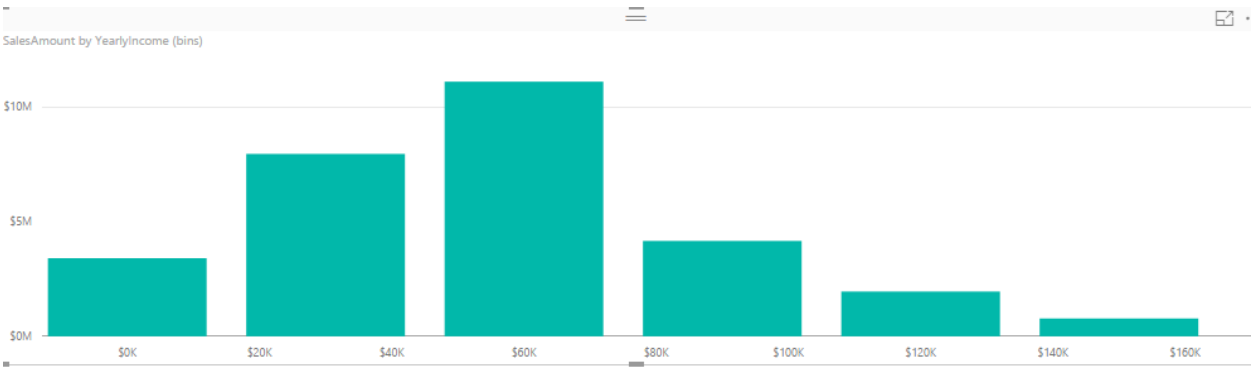


Press OK in the Group Window, and bring this newly generated field (named YearlyIncome (bins)) to the table.

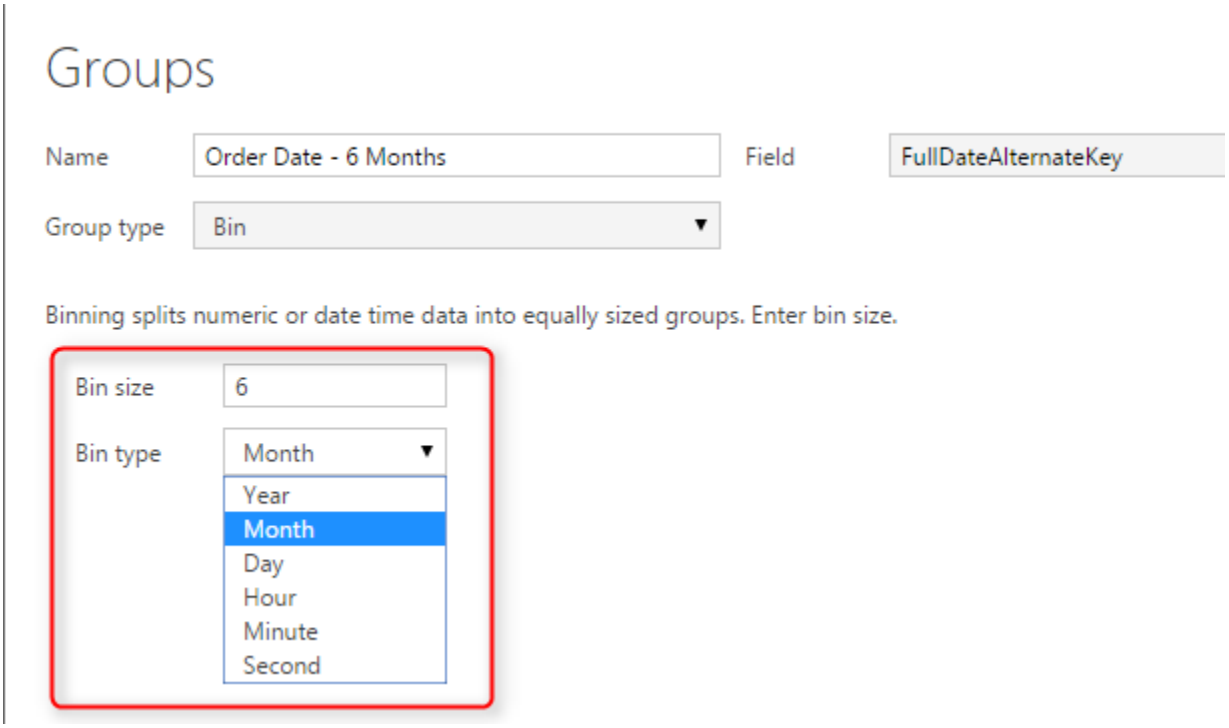
YearlyIncome (bins)	YearlyIncome	SalesAmount
$0	$10,000	$1,396,359
$0	$20,000	$2,010,650
$30,000	$30,000	$2,922,275
$30,000	$40,000	$4,226,593
$30,000	$50,000	$805,523
$60,000	$60,000	$4,230,549
$60,000	$70,000	$4,484,239
$60,000	$80,000	$2,391,472
$90,000	$90,000	$2,067,048
$90,000	$100,000	$1,073,018
$90,000	$110,000	$1,019,528
$120,000	$120,000	$760,616
$120,000	$130,000	$1,192,928
$150,000	$150,000	$241,471
$150,000	$160,000	$211,123
$150,000	$170,000	$325,286
Total		**$29,358,677**

Color coding above shows that YearlyIncome values grouped by the division result of the value of yearly income by group size which is $30,000. If you want fewer groups, you can increase the group size. If you want more detailed groups, you can decrease the group size.

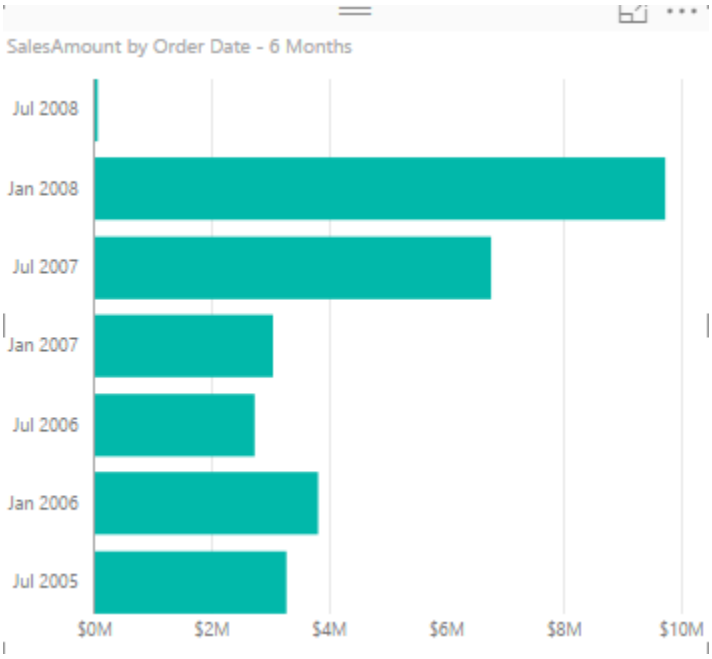
Now you can remove the YearlyIncome from the table view, change the table to be Column Chart to see which group generates the most revenue.



This binning can be applied to DateTime values as well. For example, if you want to see revenue based on half year's banding, you can simply create a group with Bin size of 6 by Month. Let's see the example; Right click on FullDateAlterneteKey column (from DimDate), and create the group;



Now create a Bar chart with this new column (named Oder Date – 6 Months) and Sales Amount.



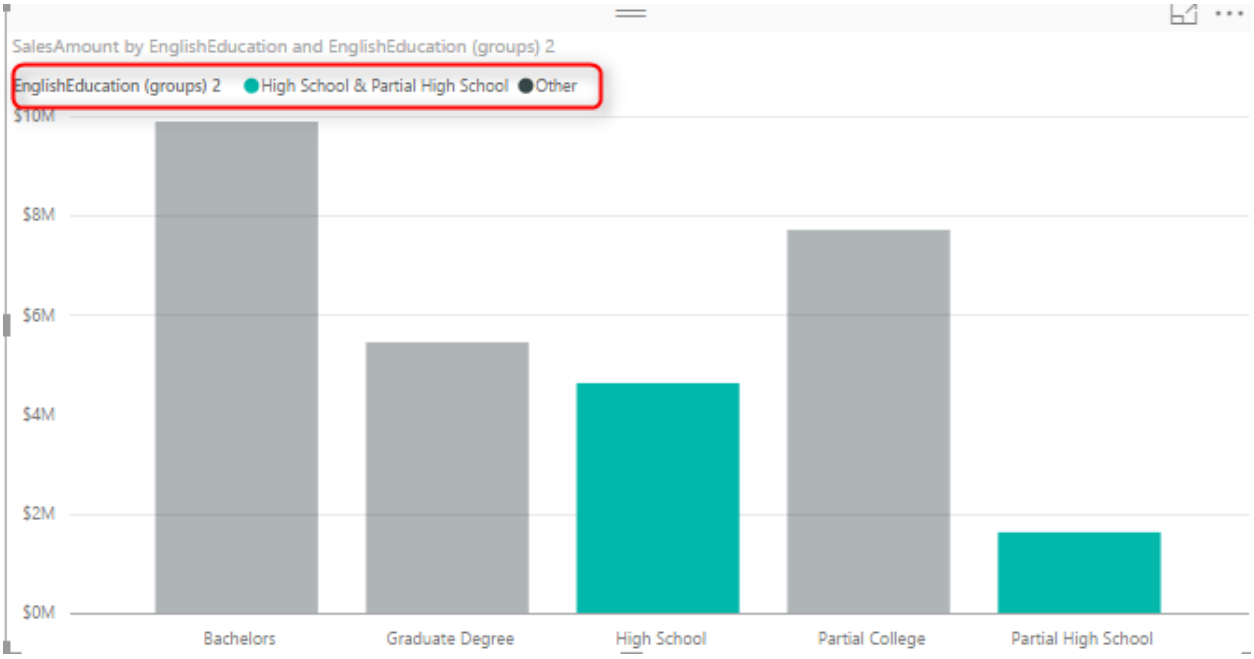
You can simply create other banding or binning for Years, Months, Days, Hours, and Minutes as well.

Grouping

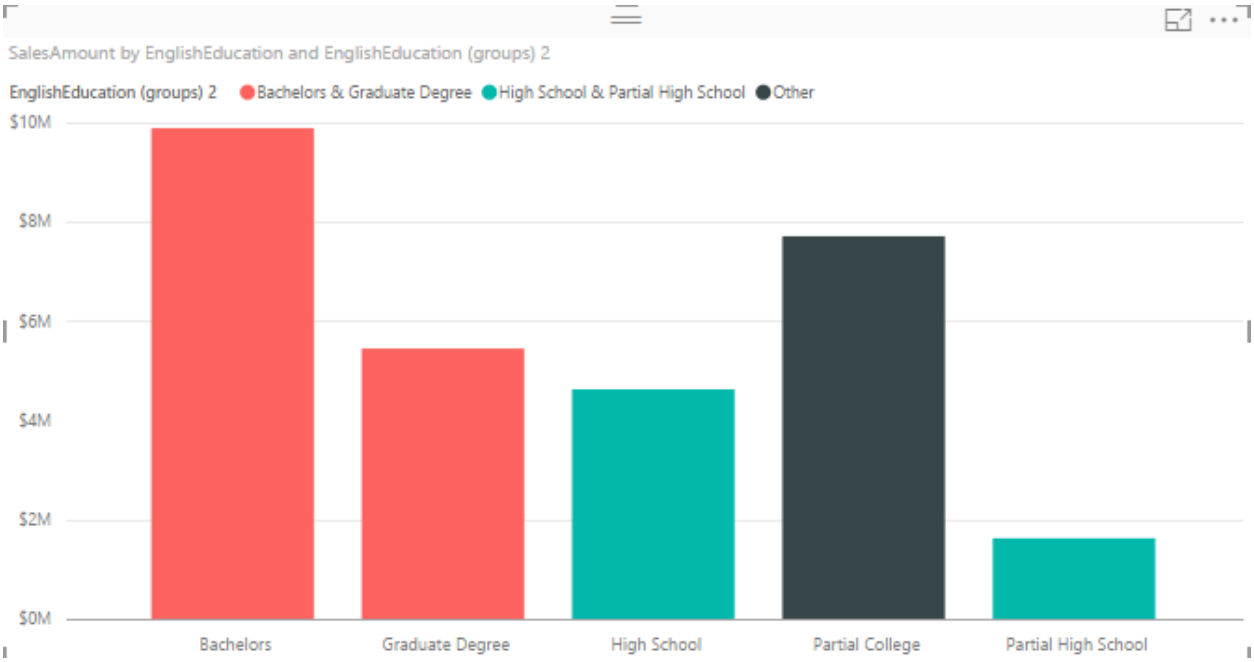
You Can Create a group of multiple items in a visualization. This group can be simply created by Ctrl+Click and selecting items, then grouping them. As an example; create a Column Chart with English Education (from DimCustomer), and SalesAmount (from FactInternetSales).

Now Ctrl-Click and select High School and Partial High School, then right click and select Group.

You will see now them grouped with a legend on the top of a chart showing this group, and an "other" group.



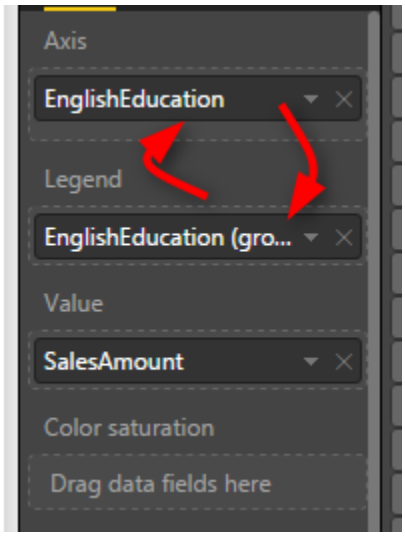
Now create another group for Bachelors and Graduate Degree in the same way.



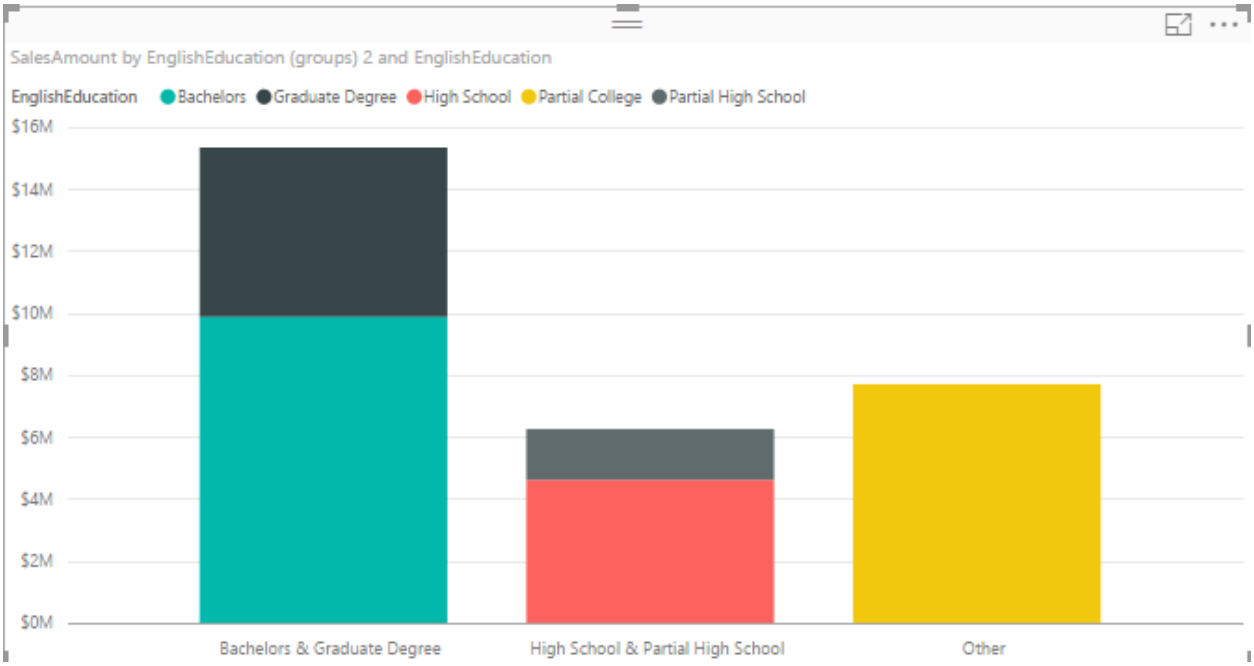
You have now three groups; higher education (Bachelors and Graduate Degree), College (Others), and High School (High School and Partial High School).

Once you have the grouping you can do many nice visualizations with that, an example can be creating a Stacked Column Chart with These Groups as the Axis, and the English

Education as the Legend. To do so; Change these two in the chart and change it to be Stacked Column Chart.



Now the chart will look like this;



This shows how much revenue each category generates in total, and also inside the category which subcategory (English education) generates the most or least revenue.

Behind the Scene

What is happening behind the scene is that there is a **DAX calculated column** (the calculation is not visible in Power BI) created for each binning. This was exactly the method of implementing such thing previously. There is also another method which is creating the banding through Power Query.

Grouping and Binning is part of your model. That means if you create another report or chart you can use the Group there. Even if you create calculated tables or any DAX calculations you can use these new Group columns there.

Summary

There are heaps of possibilities that these new grouping features bring to your visualization. Having these grouping as part of your model also is great to have unique experience in your reporting solution. However, There are always complex grouping conditions that still need to write a bit of DAX code or Power Query M script.

Bookmarks and Buttons: Making Power BI Charts Even More Interactive

Published Date: May 15, 2018

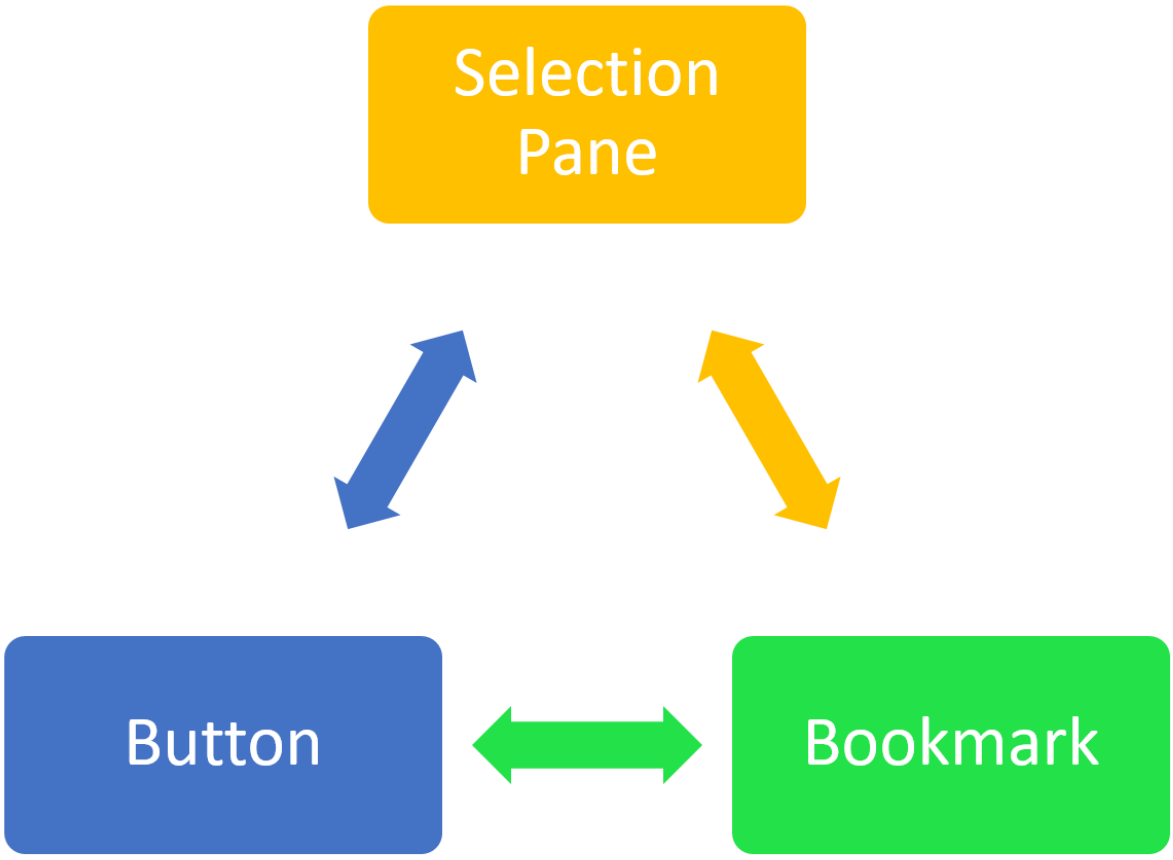
In the previous post, I explained a usage of bookmarks and buttons in Power BI, which was for clearing all slicers. Buttons and bookmarks are the gold combinations in Power BI. You can do a wide range of creative activities with this combination. In this post, I will show you some other usages of buttons and bookmarks which is related to visual's interactions. We are going to learn about;

- Changing the chart type dynamically
- Changing the axis of charts dynamically
- Changing font sizes of a chart dynamically
- Changing color of a chart dynamically

There are heaps of more examples can be done with buttons and bookmarks, but these few will take the entire full blog post here. If you want to learn more about Power BI, read the Power BI book; from Rookie to Rock Star.

Key Components of the Design

The key components of designing examples below, are three settings; Bookmarks, Buttons, and Selection Pane.



Bookmarks

Bookmark saves the state of the page, exactly as it is at the time of saving a bookmark. This means you can then select the bookmark and see the page with the state that you have saved it. Bookmark is not a screenshot, it will be an interactive Power BI report page, with a state saved as is.

Selection Pane

You can hide or unhide visuals in a Power BI report through the selection pane. There is an eye icon beside every visual, which gives you the control over the visibility of that visual on the report page.

Buttons

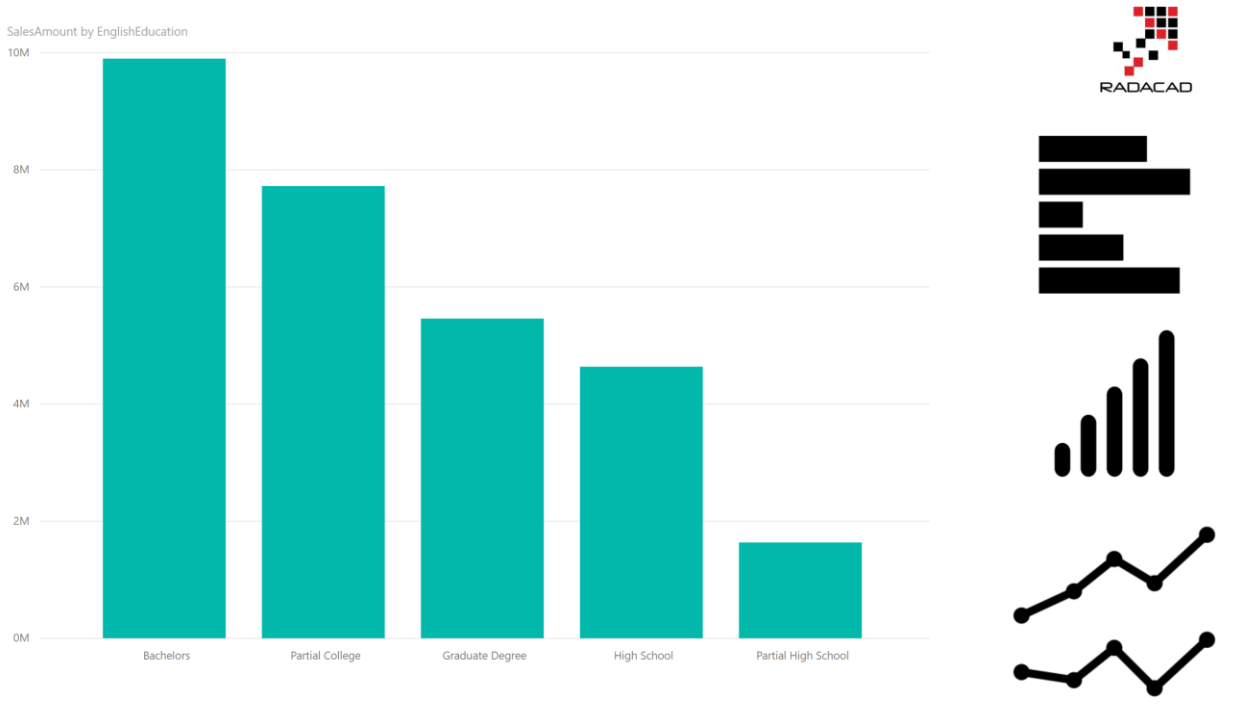
Buttons are action objects in Power BI. You can create a button (or even an image or shape), and then set the action of that to be; back, Q&A, or bookmark. In this post, we are only talking about the bookmark action feature.

Combination of the three above; Magic

When you combine the three features above, you can make the magic happens! You can put visuals on top of each other, and then hide or unhide them, add a bookmark, and connect the action of a button to that bookmark. Examples below are very few examples of the thousands of possibilities with this magic combination!

Changing the Chart Type Dynamically

Consider the report below;



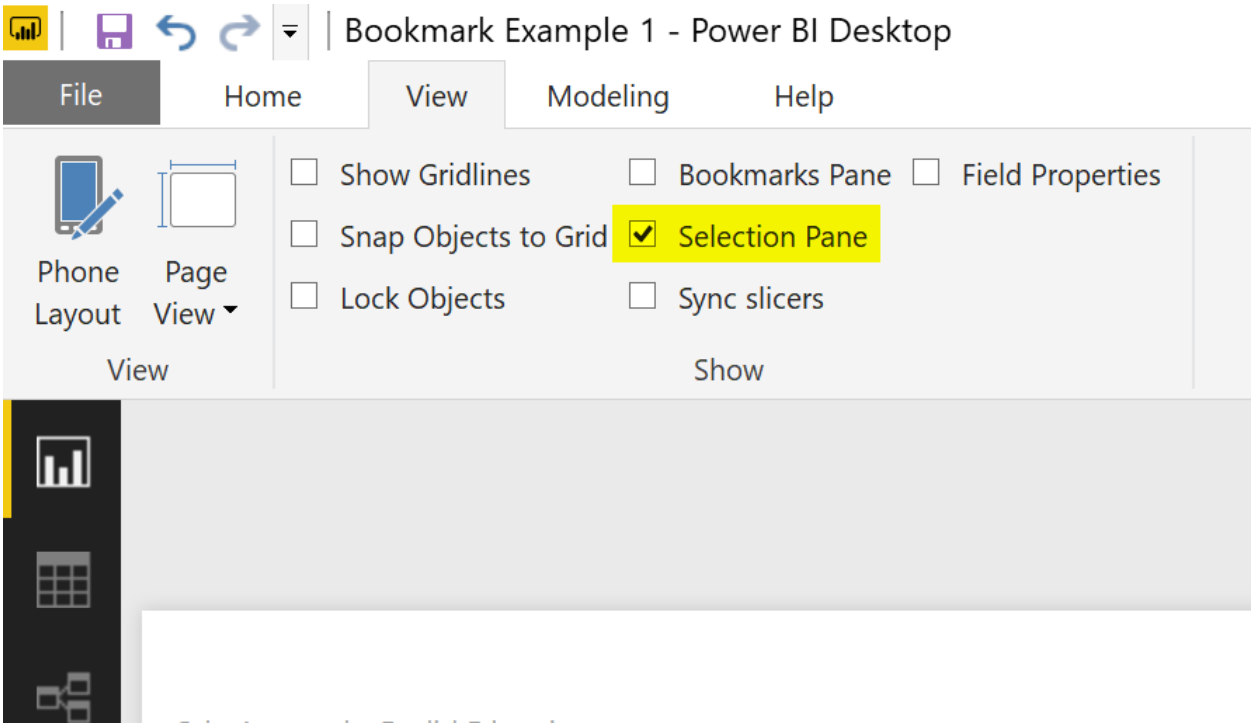
The chart on the left-hand side is a column chart. The three charts in the right-hand, are, however, images (or logos). I want to select the image in the right-hand side and then change the chart type in the main section (left-hand) with that. Let's see how we can do that.

Step 1: Create multiple visuals

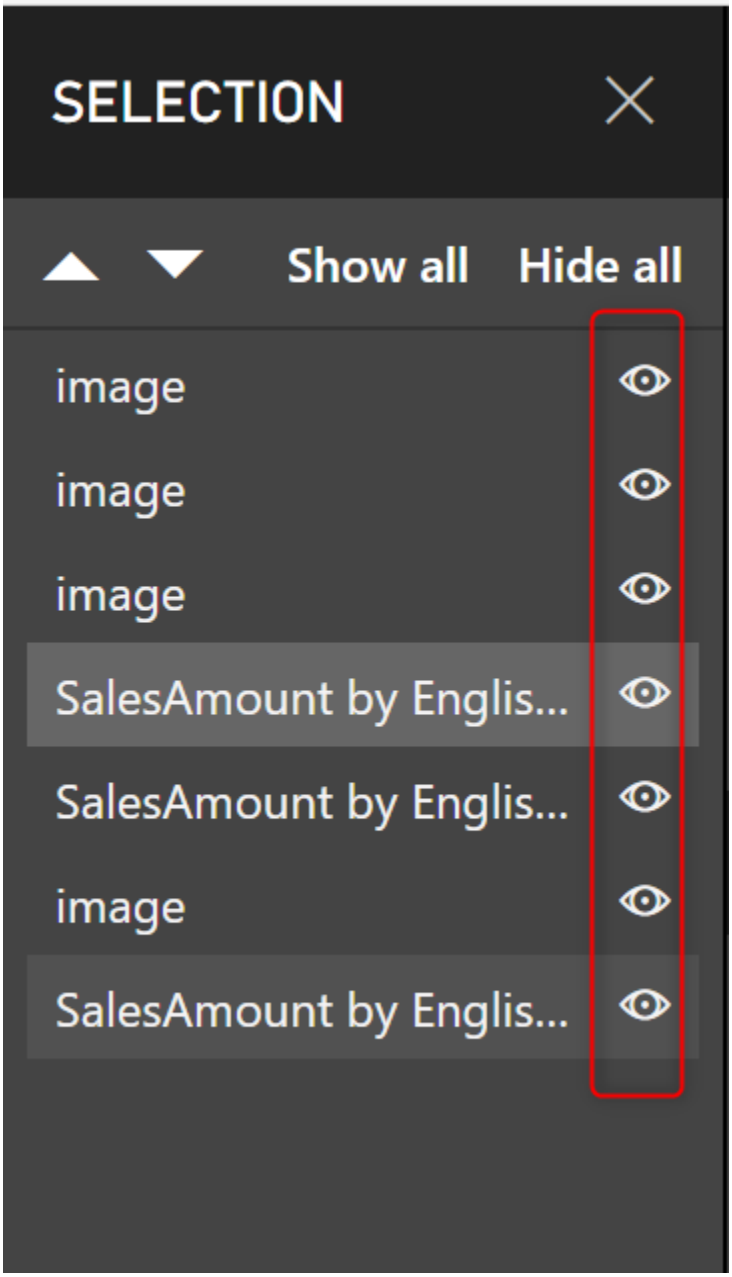
The first step is to create multiple visuals on top of each other. Create a copy of this chart, and convert it to Bar chart, then create another copy of this, and convert it to a line chart. Here are all charts on top of each other.

Step 2: Selection Pane

Now click on the selection Pane in the View tab.

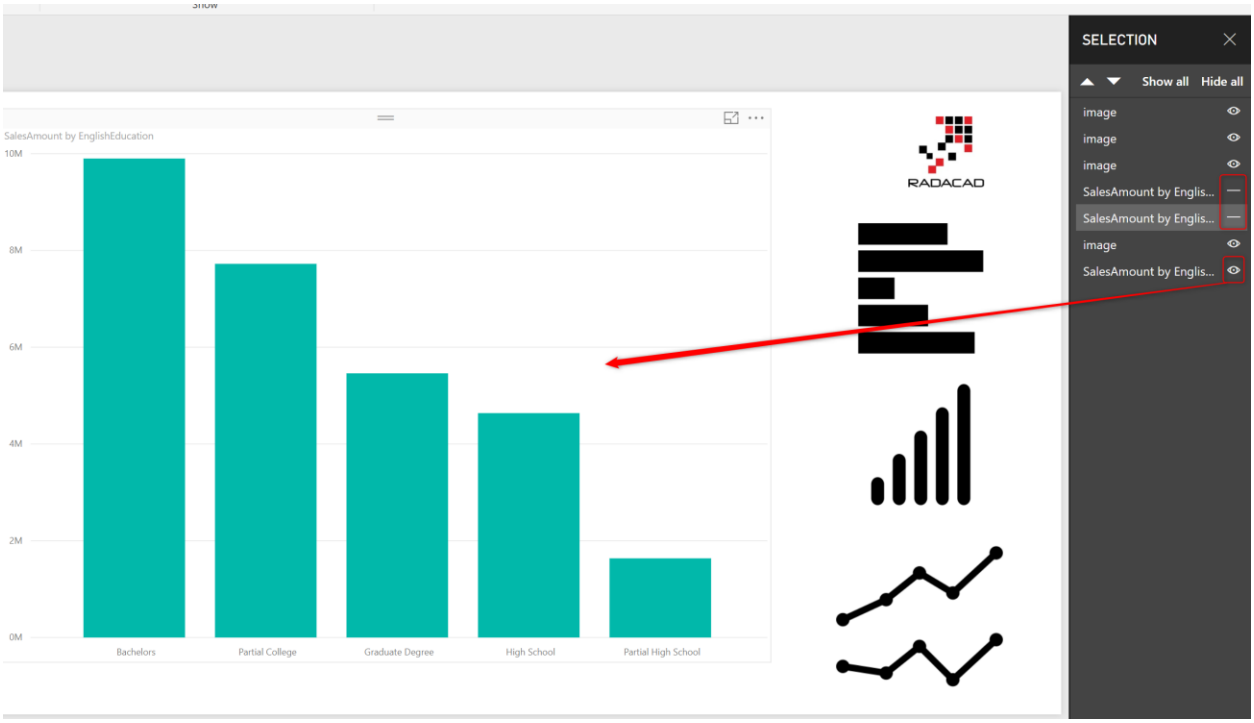


After selecting this item, you will see the selection panel, with the list of all visuals. Notice that there is an eye icon beside every visual. That is the setting for hiding/unhides the visual in the page.



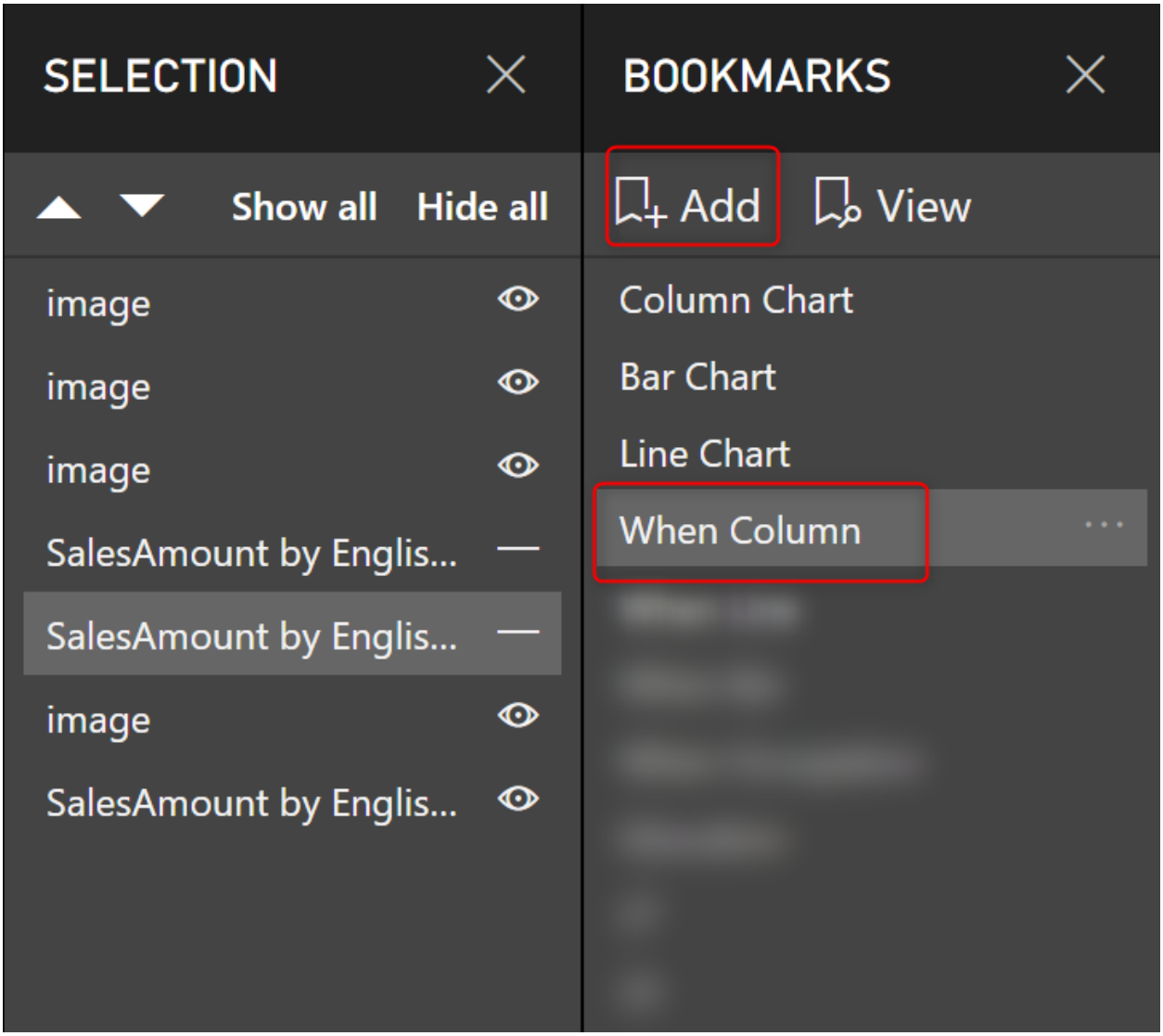
Step 3: Unhide other visuals

From the list of three charts on the page, unhide two of those. In the screenshot below, then one which is not hidden is the column chart.



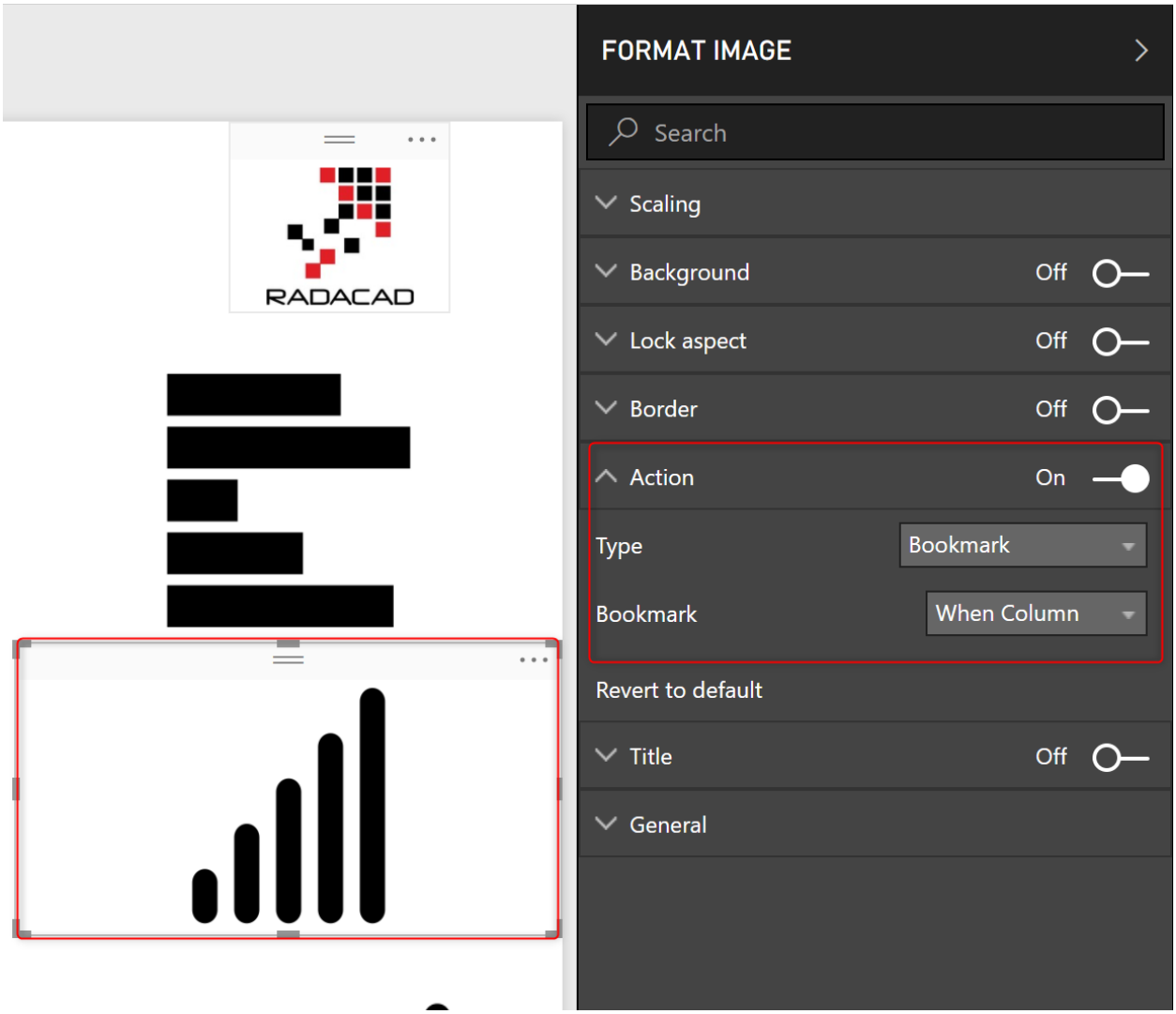
Step 4: Create a bookmark

Now to save the state of the page as is, create a bookmark (you have to select the bookmark pane in the View tab first). I called this new bookmark as “When Column”



Step 5: Connect button to the bookmark

Now that you have created the bookmark. Click on the button (in this case image boxes of charts in the right-hand side), and set the action of those to bookmark, and choose the right bookmark for it.

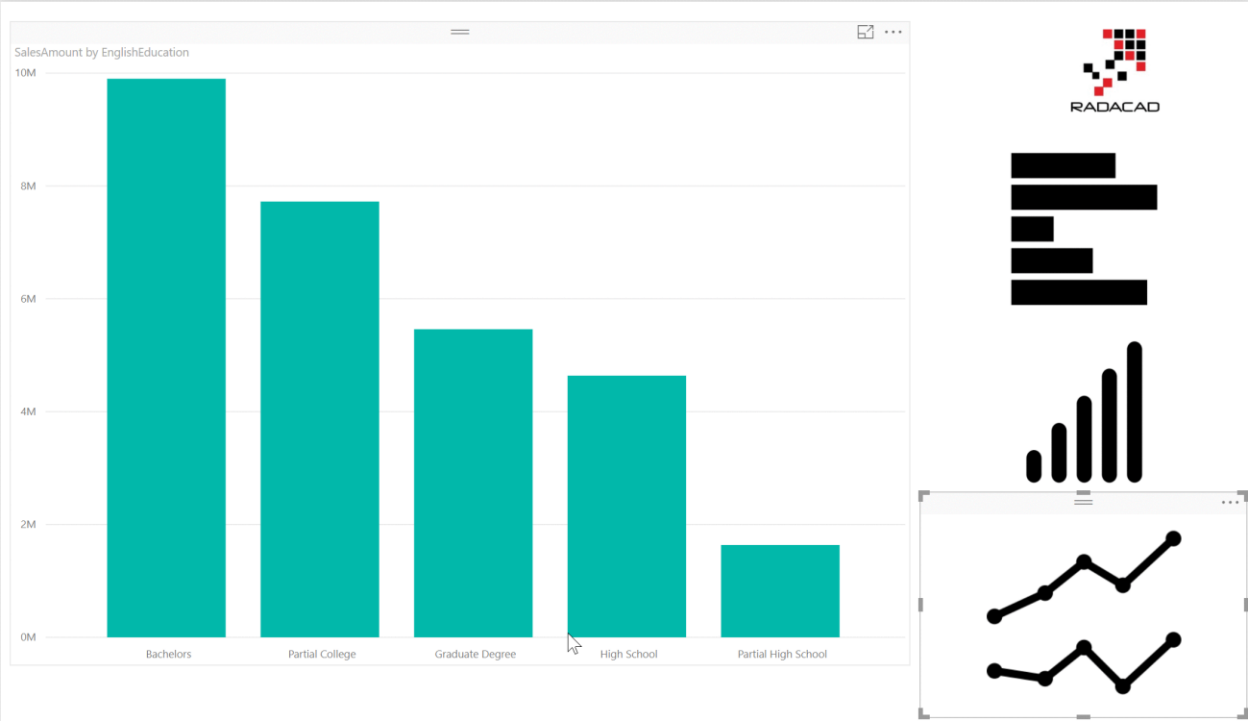


Step 6: Repeat this process for the other two types of charts.

Create two other bookmarks when you have selected the other two charts individually, and then assign their buttons to those bookmarks.

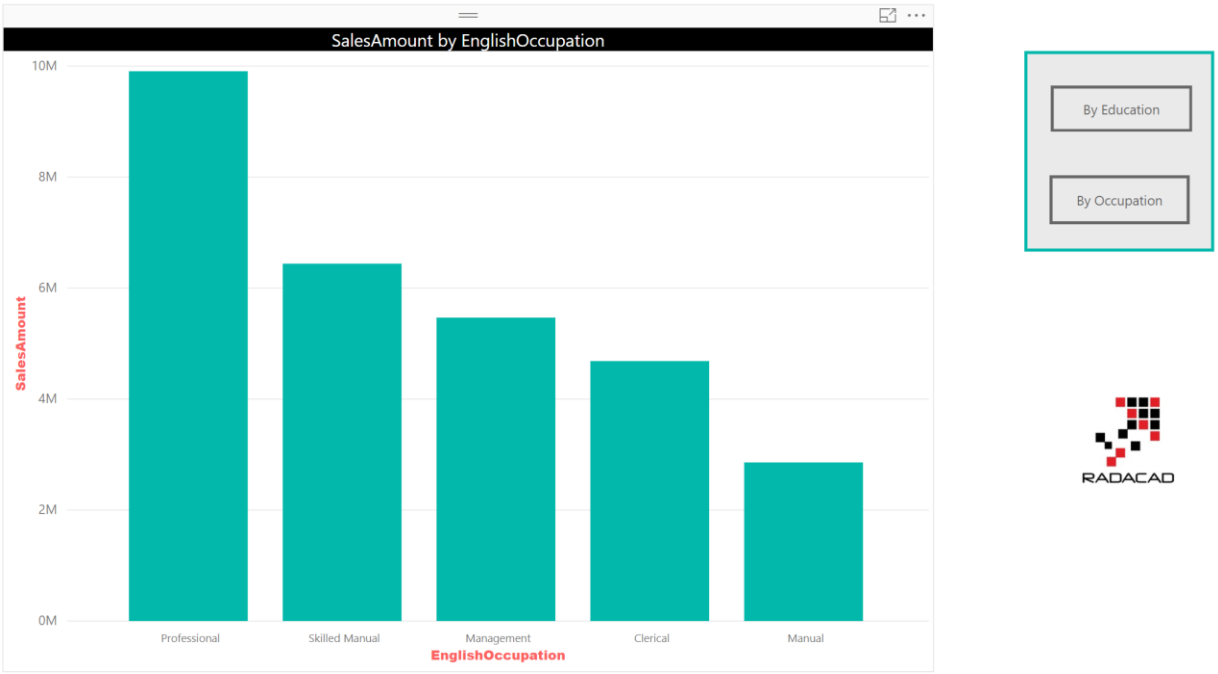
Testing the result

Now is the time to test the result, here you go; you can change the chart type dynamically in a Power BI report page.



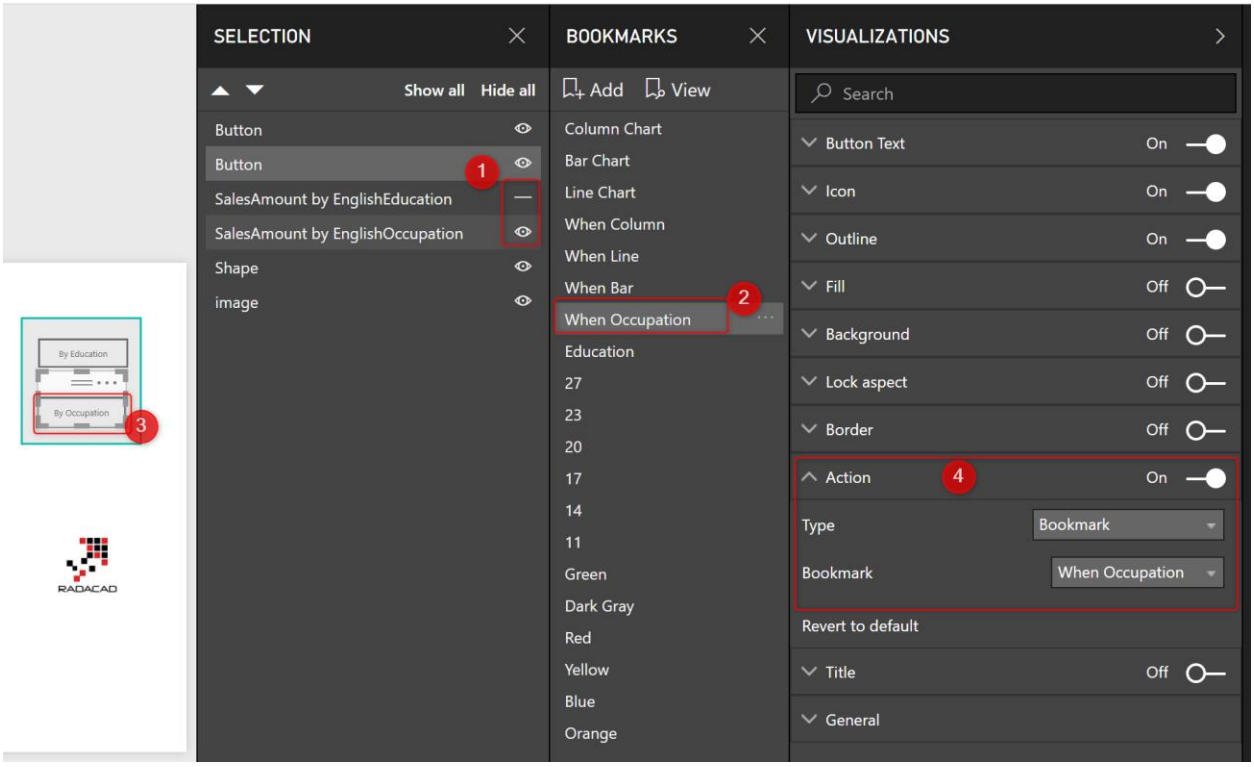
Changing the Axis of Chart Dynamically

Another example of the magic combination (bookmarks, buttons, and selection pane); is to change the axis of the chart dynamically. Here is the report below;

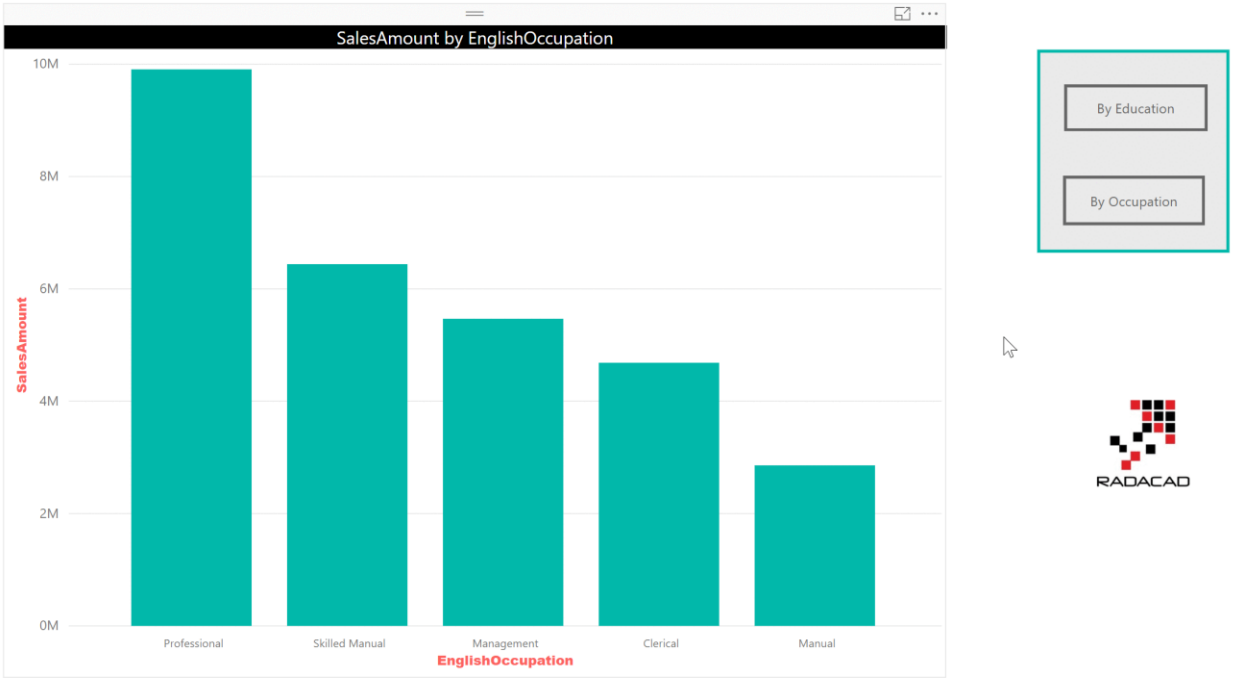


As you can see in the screenshot above, the buttons provided are for two fields; By Education, and By Occupation. I want to change the X-Axis of the chart to the Education or Occupation field by choosing the buttons respectively.

The way I implemented this feature, is by creating two charts overlayed on top of each other; first chart by Education, second chart by Occupation. Then hiding one, creating a bookmark, and doing the same for the other one. Then mapping the action of buttons to these bookmarks. Screenshot below shows how these steps are done.

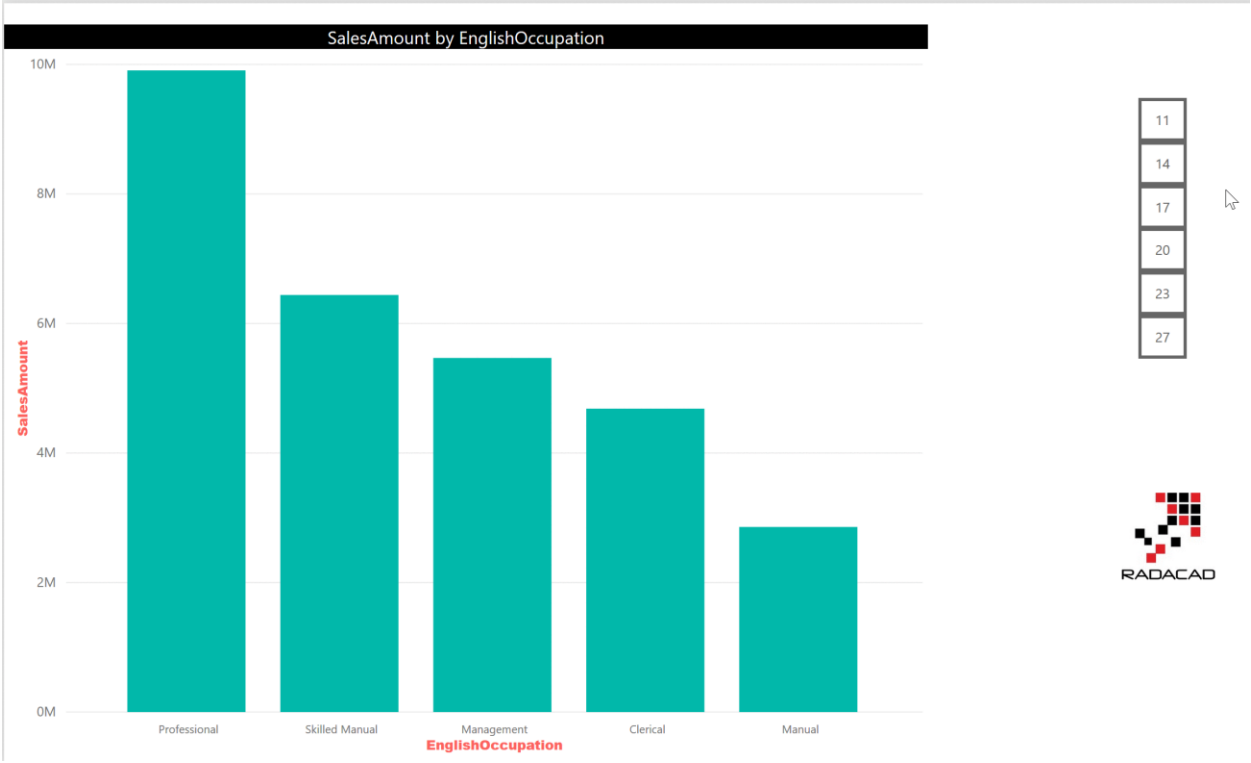


And here is the result;



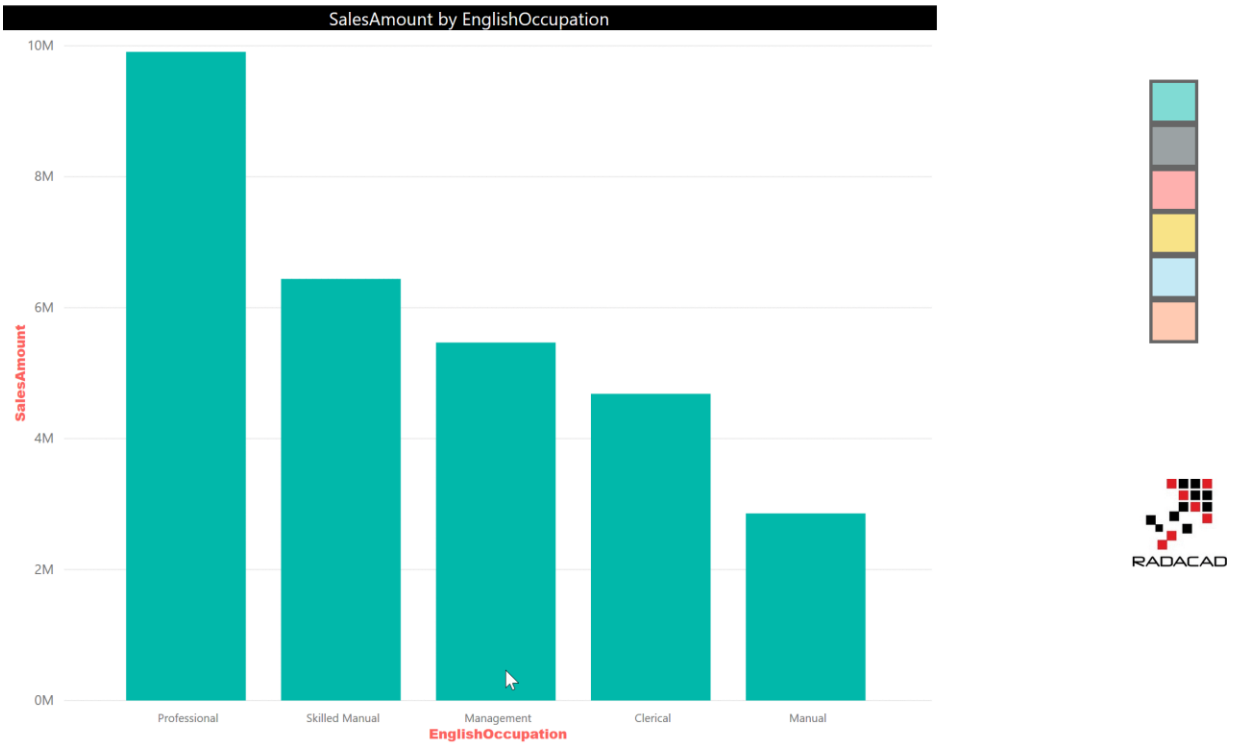
Changing the Font Size Dynamically

We can use the same approach to change the font size. This time you have to create one chart with each different font size you want and create buttons and bookmarks respective to that. Here is an example video:



Changing the Color of Chart Dynamically

Another example is to change the data color in a chart dynamically. This time, buttons represent different colors, and you have the chart copied but with different color. Each bookmark saves the state of the chart when that color is selected in the button. The result would be similar to below;

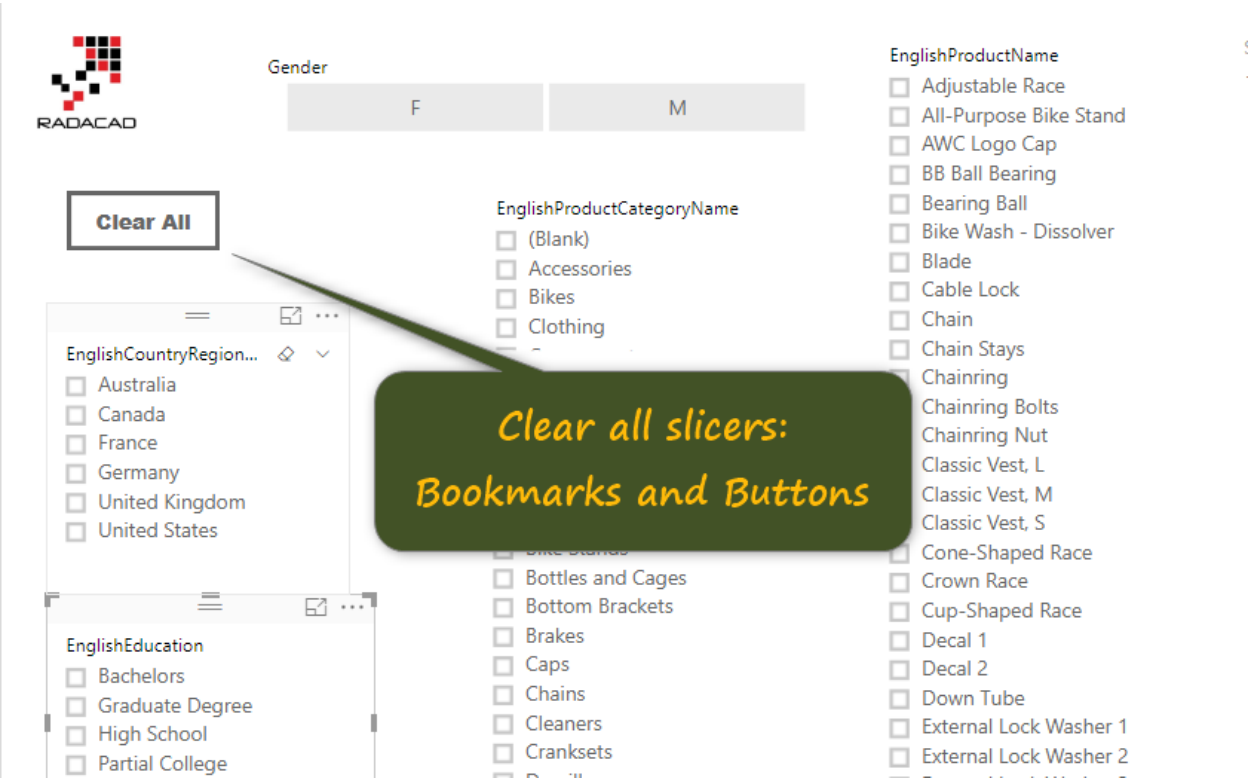


The Magic Three: Bookmark, Button, and Selection Pane

With the magic triangle of bookmarks, buttons, and the selection panel, you are only limited to your creativity. You can do many things that look impossible in Power BI dynamically and give the power of extra features to the users. I have written another post, that explains how you can clear all slicers with bookmarks and buttons. There are heaps of other examples you can do with this magic triangle. Do you have a scenario that you have used these or want to use these? Feel free to share it in the comments below.

Clear All Slicers in Power BI; A Bookmark Story

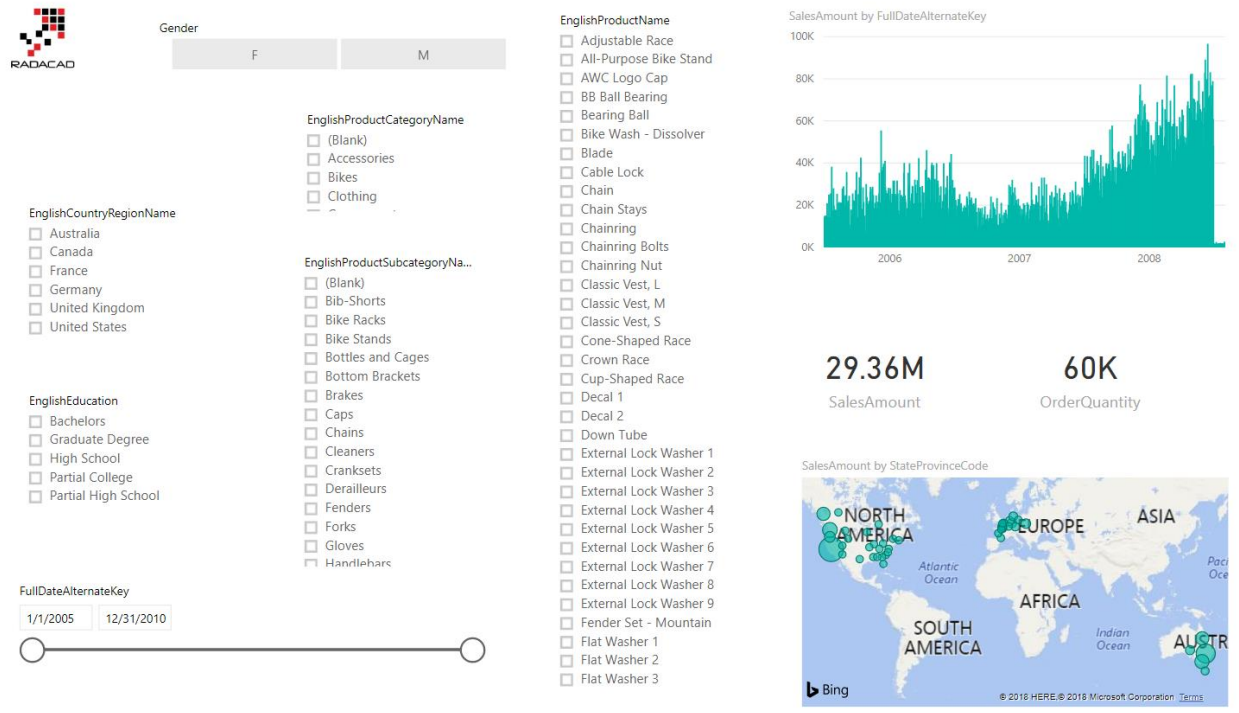
Published Date: May 11, 2018



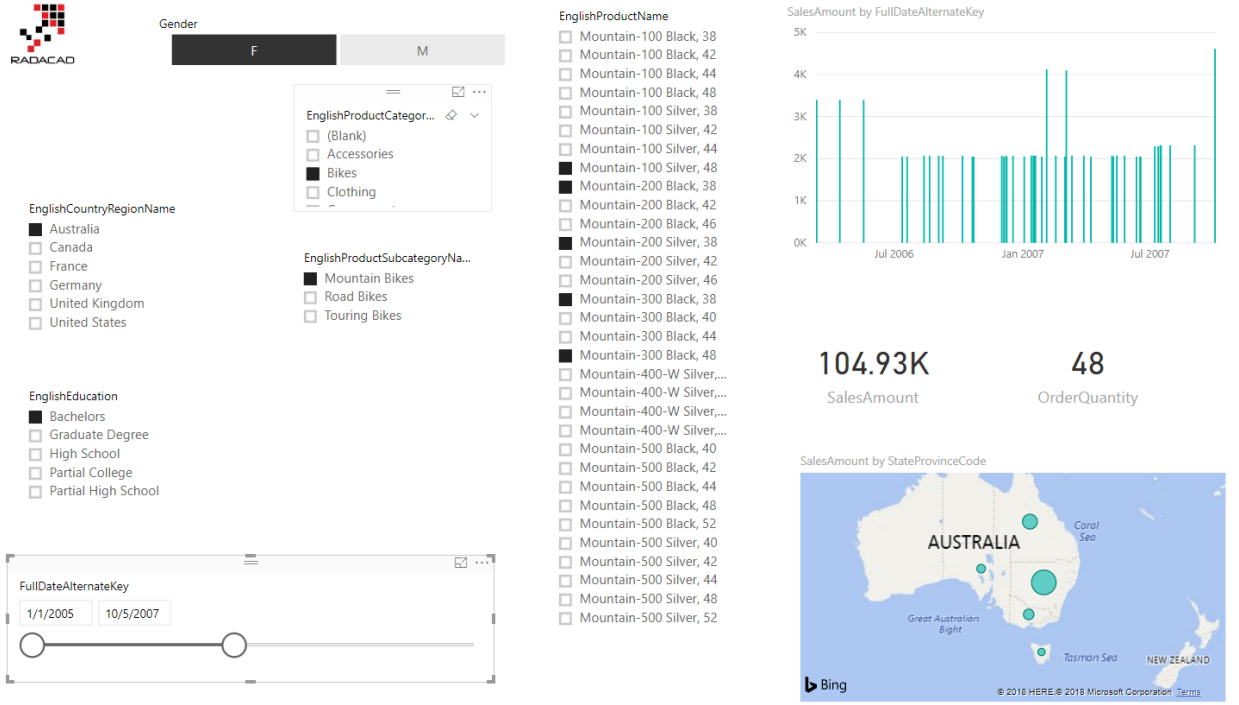
Using bookmarks for clearing all slicers in Power BI is not a new function, I have been using it for many months, and advised many people to do it that way. However, I still get a lot of questions in my presentations about how to do that. That is why I ended up writing this post. This post shows you a very quick trick of having a button to clear all slicers, and the magic is all happening with bookmarks. Bookmarks store the state of a Power BI page and can be used in many scenarios, in this post, I only show you the ability to clear all slicers in a page. To learn more about Power BI; read Power BI book from Rookie to Rock Star.

Sample Report Page

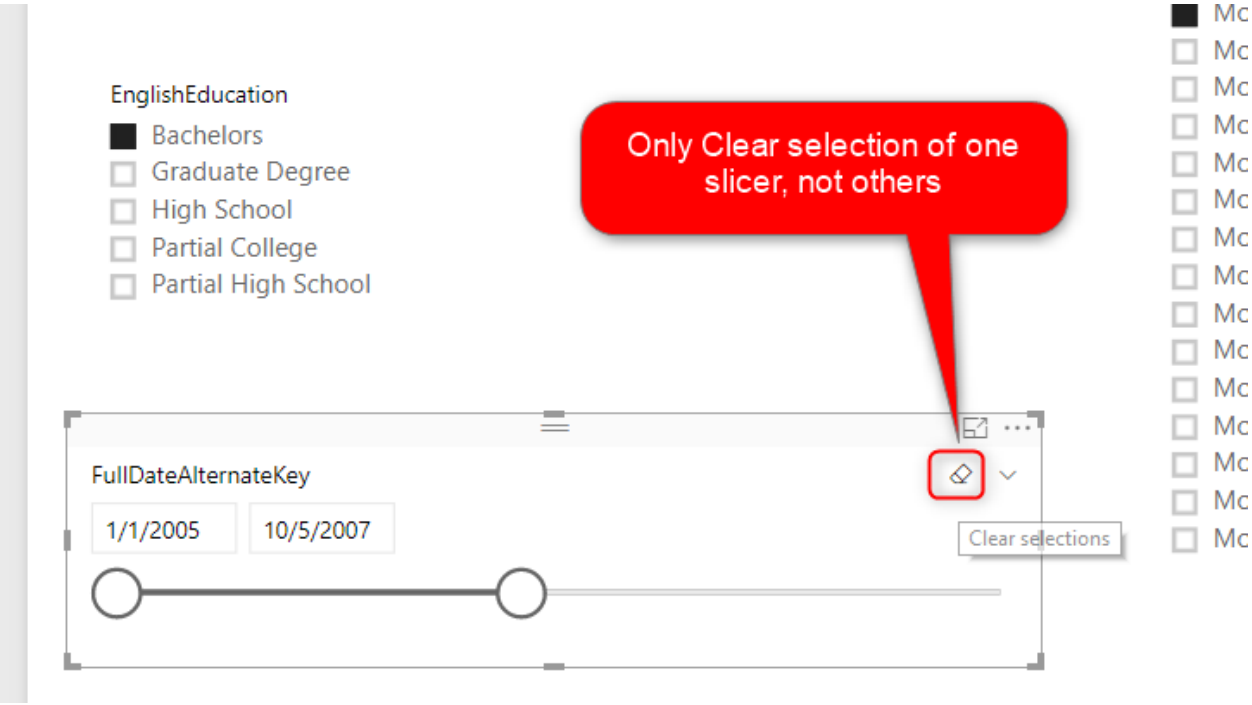
Here is a sample Power BI report page with some slicers:



The screenshot below shows a selected state of items;



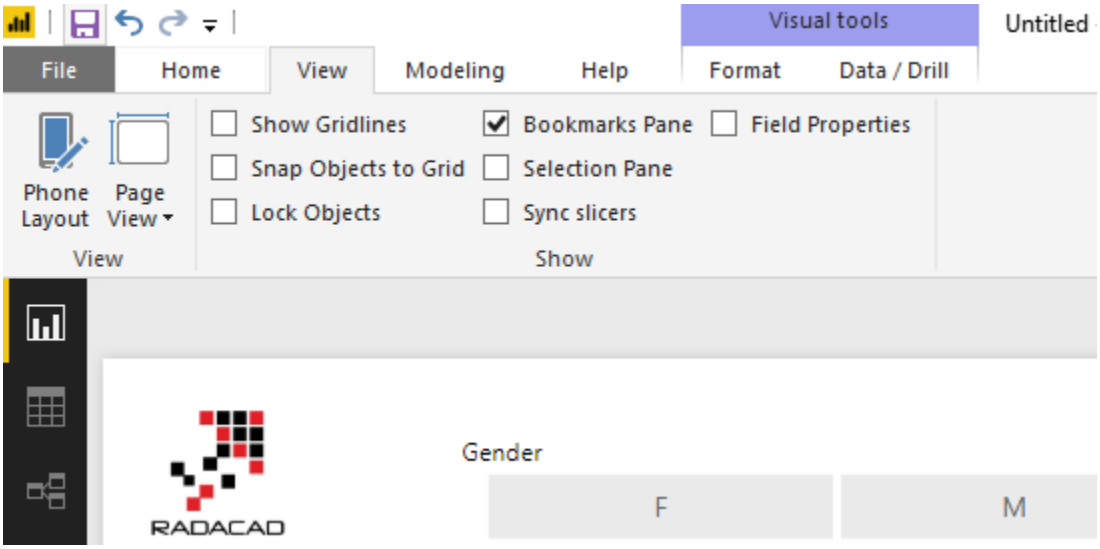
If you want to clear every slicer; usually, there is a clear button on the slice header. Or you can even enable Select All in the slicer format options. However, there is no Clear All for all the slicers on the page.



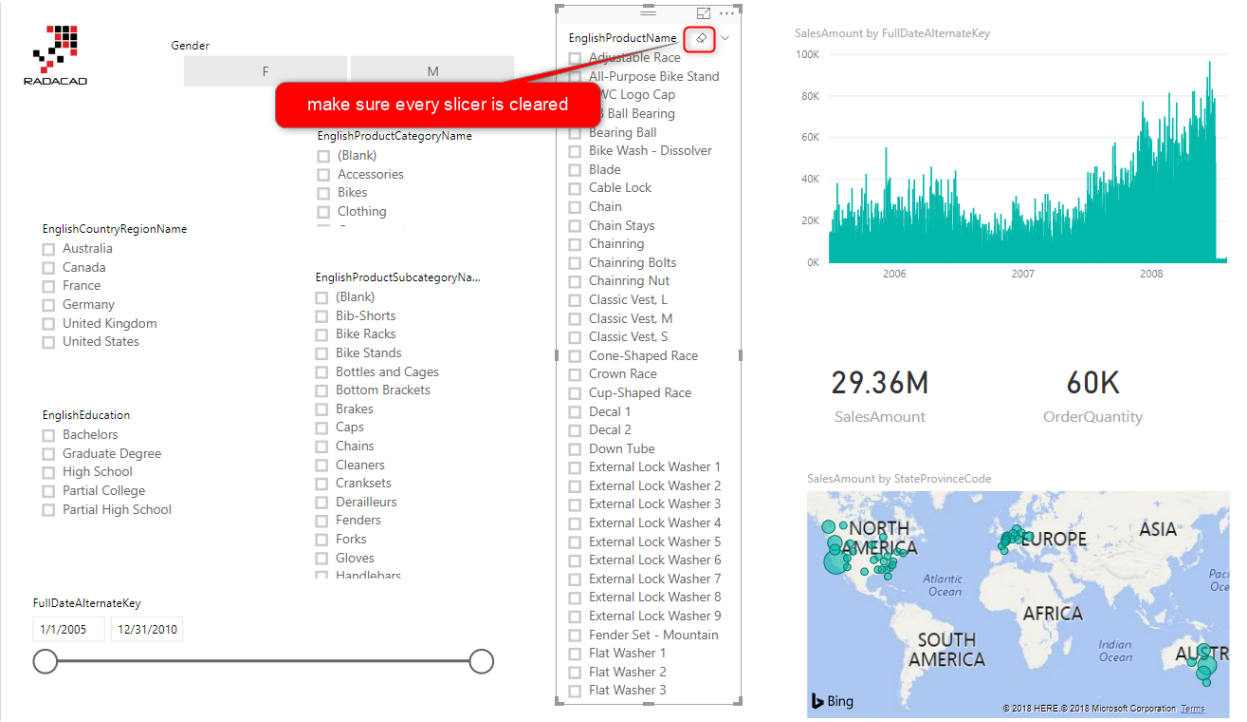
Solution: Bookmarks and Buttons

Solution is to use bookmarks. Here are steps:

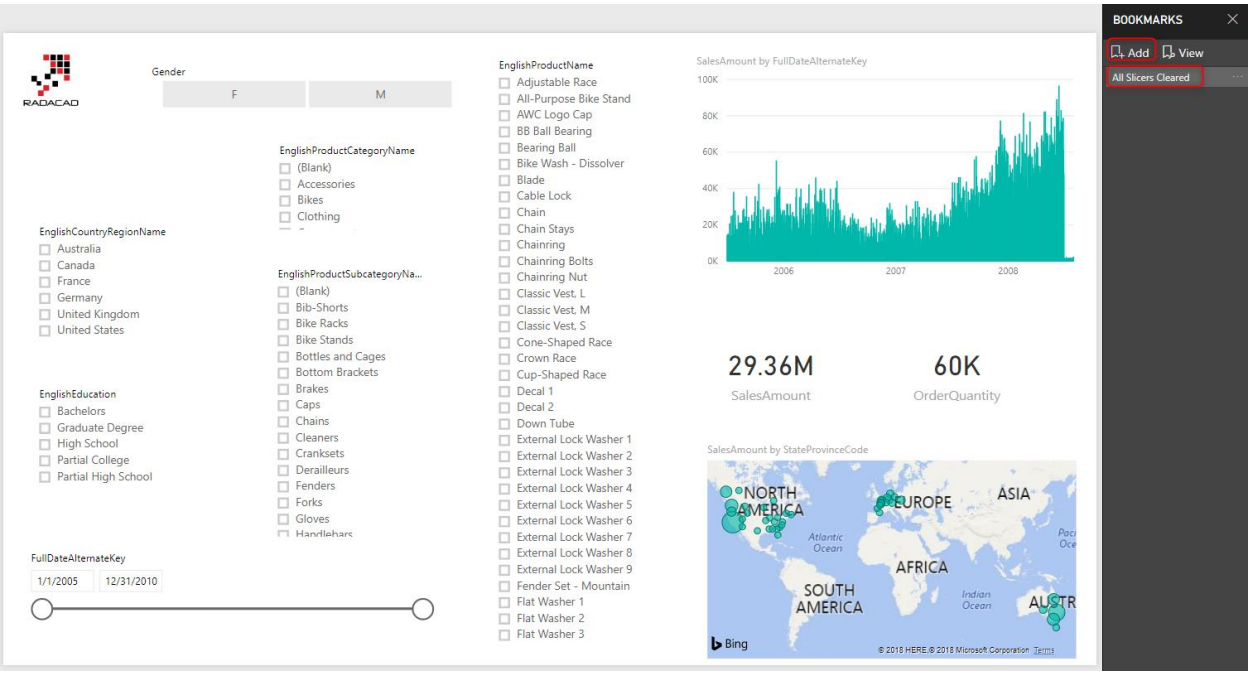
Step 1: Open Bookmarks pane;



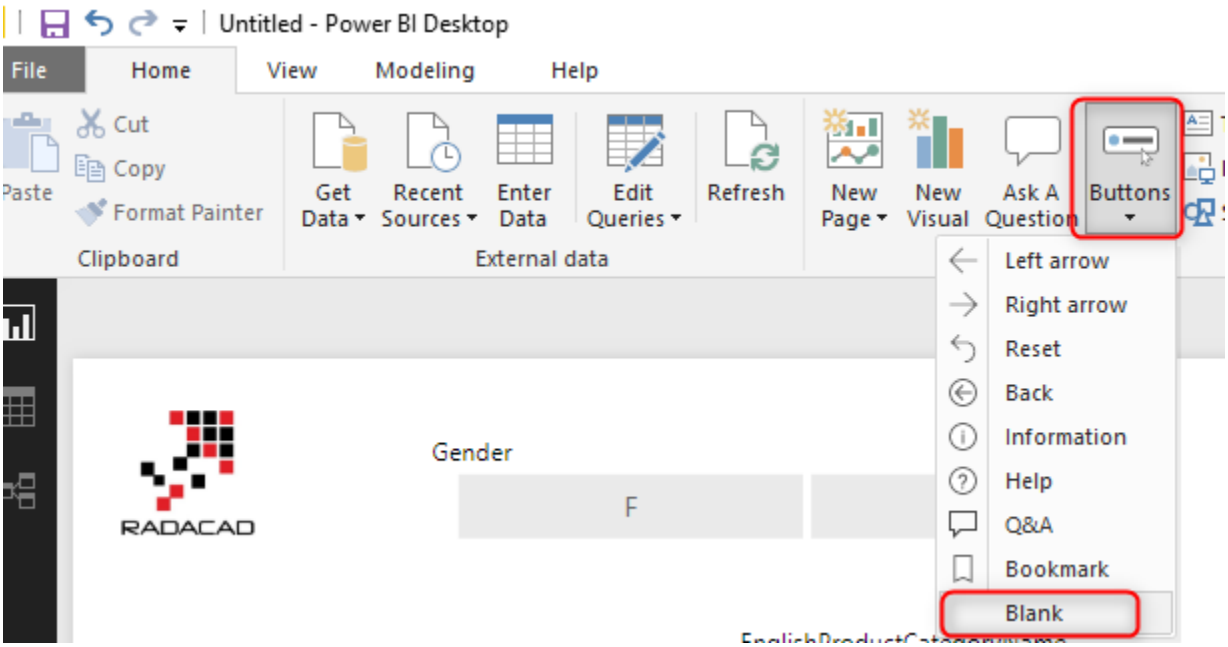
Step 2: Use the clear button on the header of every slicer. Do this for all slicers.



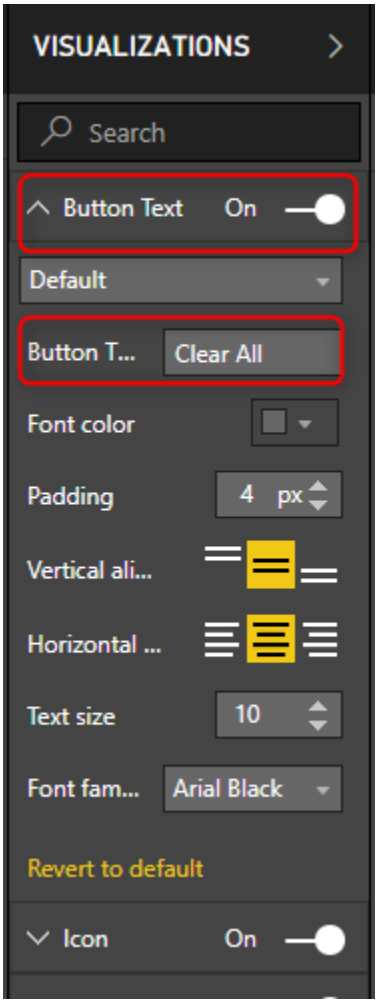
Step 3: Create a bookmark of the page, when none of the slicers are selected.



Step 4: Create a Button for user interaction; This button would be clear all button. You can even use Images with logos if you want to.

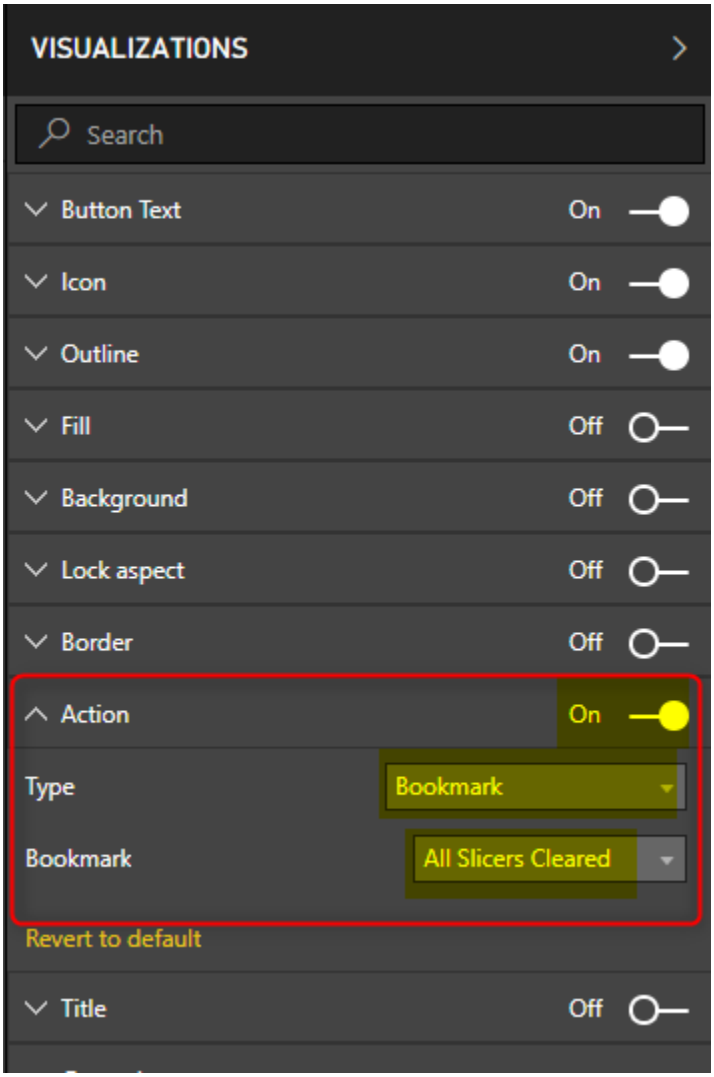


You can then configure the button to show a different text, with some formattings



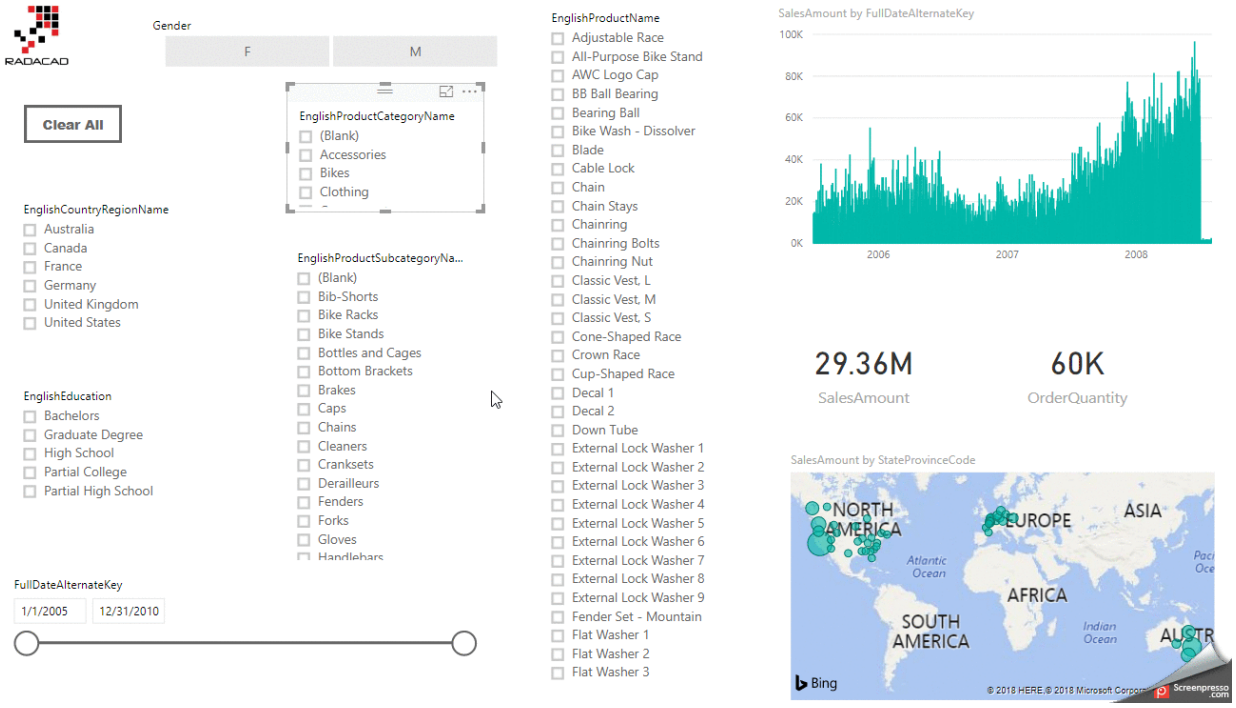
Step 5: Bind the button to bookmark

Now that you have the clear all button, the last step is to set the Action property of that to bookmark and select the “clear all slicers” bookmark for it.



Testing the solution

To test the solution, use Ctrl+Click on the desktop, or click on it on the website;

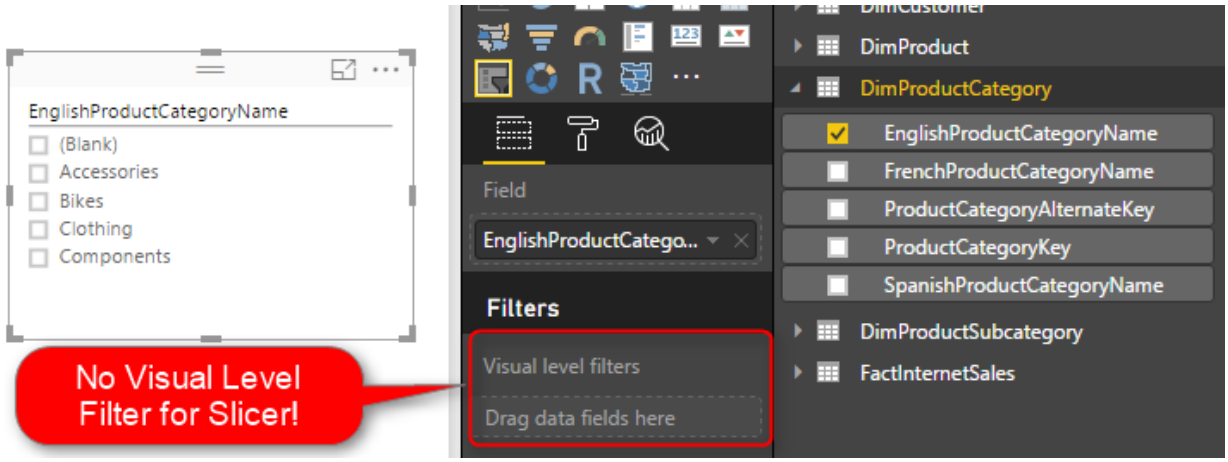


Summary

Using buttons and bookmarks for clearing all slicers is only one of the multiple creative ways you can use bookmarks. I will write more about other usages of buttons and bookmarks together. Do you have some use cases yourself; don't hesitate to write in the comment below.

Filtering Slicer Resolved in Power BI

Published Date: September 26, 2016



You can filter all visuals in Power BI except Slicer! In fact slicer itself is a type of filter. However, there are sometimes that some items in a slicer are too many. So this is normal that we want to filter the items in the slicer itself. Unfortunately, the current version of Power BI Desktop doesn't support visual level filter on the slicer, and I'm sure this feature will come soon. However in the meantime here is a workaround for filtering slicers using calculated tables. If you want to learn more about Power BI, read Power BI online book; from Rookie to Rock Star.

Defining the Problem

The idea of this blog post came from a question that one of the students in my Power BI course asked to me, and I've found this as high demand on the internet as well. So I've decided to write about it.

You might have too many items to show in a slicer. A slicer for customer name when you have 10,000 customers isn't meaningful! You might be only interested in the top 20 customers. Or you might want to pick a few items to show in the slicer. With all other visual types (Such as Bar chart, Column chart, line chart….) you can simply define a visual level filter on the chart itself. Unfortunately, this feature isn't supported at the time of writing this post for Slicers. However, the demand for this feature is already high! you can see the idea published here in Power BI user voice, so feel free to vote for such feature ☺

The workaround in this post might get dated very soon because I expect the Power BI team to fix this soon, however, in the meantime, this workaround will help some people I believe.

There are some workarounds for this challenge;

- One can be defining the filter in the page level or report level. But then other elements in the report will be filtered based on predefined items. This might not be what you want.
- Using some specific visuals as slicer can be the other option, such as a stacked column chart or bar chart. However, this won't be the same feature as a slicer. Because with clicking on another visual the selection on slicer remains but not the selection of an item in another visual.
- Using custom visuals. As always custom visuals can be helpful. However, some of you might prefer built-in visuals because some of the custom visuals are not designed for mobile-friendly reports.
- Using Calculated tables; Calculated tables can be used to generate filtered views of other tables in the model. Hence this can be used as a workaround. In this blog post, I'll explain to you how to leverage calculated table as a filter for Slicer.

Calculated Tables

I have written a blog post about what Calculated tables are and how to use them for features such as role-playing dimensions in Power BI, and fetching filtered views such as top 20 customers. I strongly encourage you to read that post to learn about the usages of calculated tables. In summary calculated tables are DAX generated tables, these tables will be part of the model and can have a relationship with other tables in the model.

Calculated Tables to Filter Data

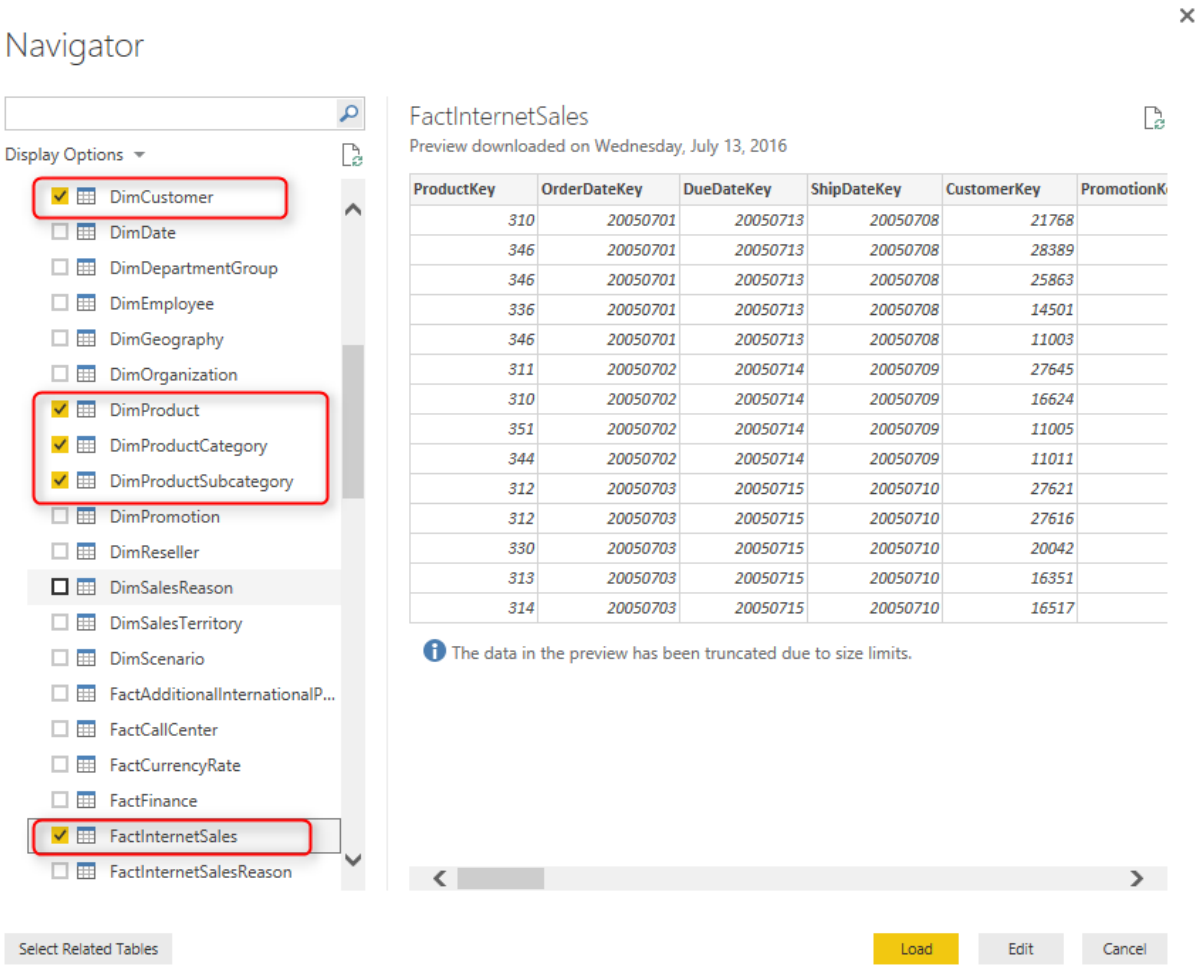
For filtering data in a slicer, I thought using calculated tables for such filtering. I know it won't be that easy filtering. And I would need to write a bit of DAX instead of picking items from a list, but at least I have full DAX features to use and create whatever filter I want. Once we create the filtered view as a calculated table, then we can create the relationship between that table and other tables, and use it in the slicer. Let's go through that with an example.

Prerequisite

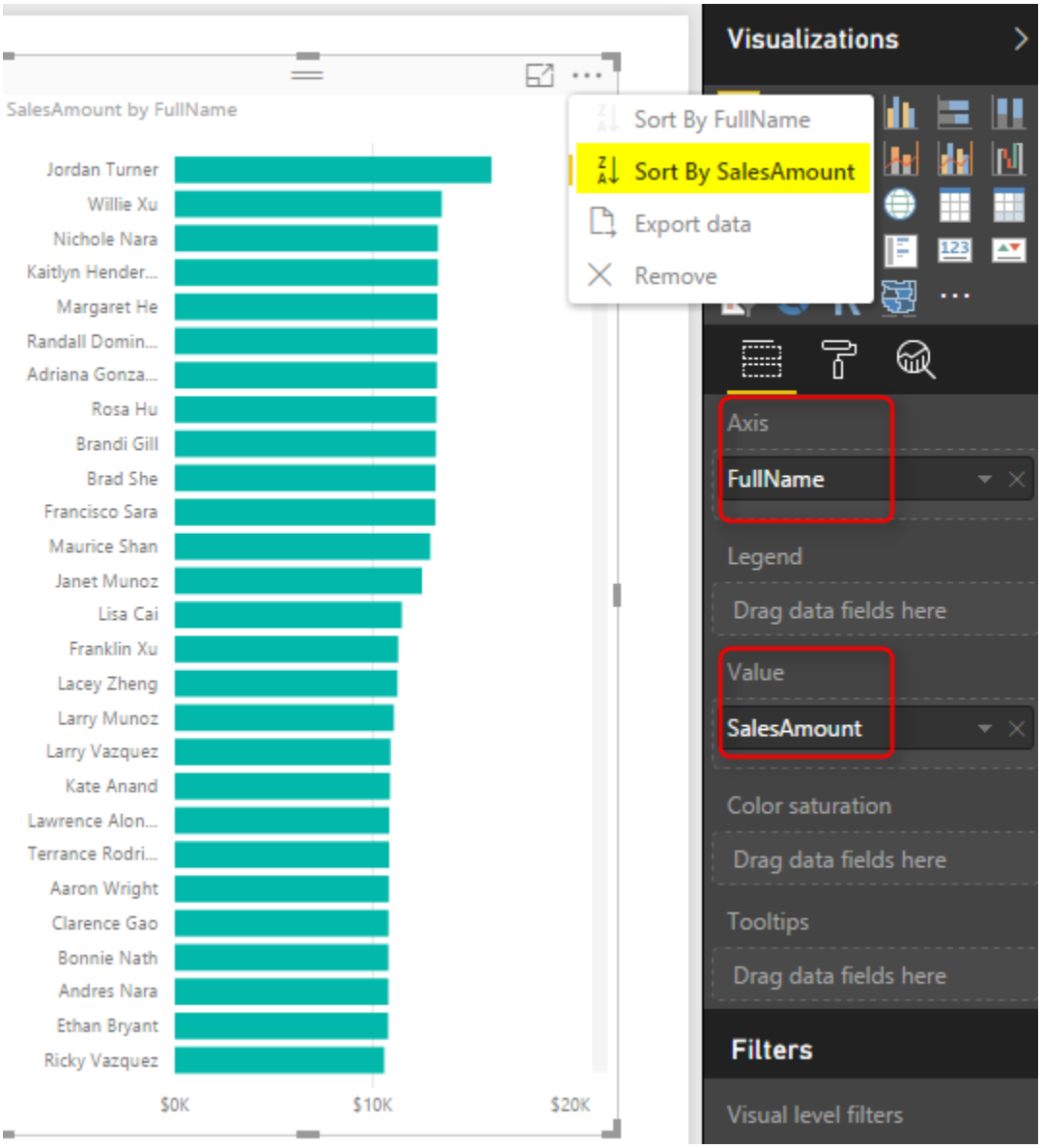
For running this example, you need to download and install AdventureWorksDW database from here.

Sample Scenario

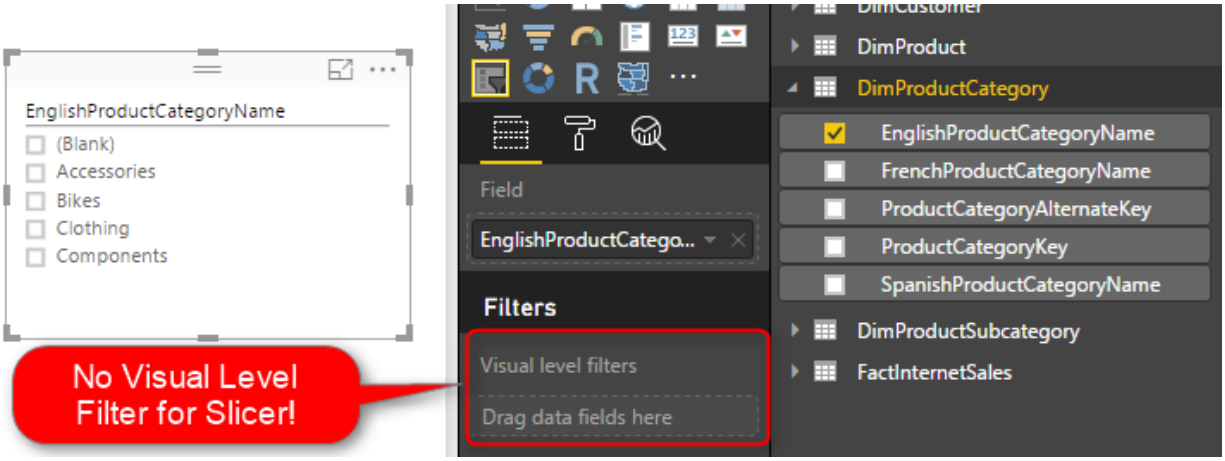
Start with getting Data from the AdventureWorksDW database, and choose these tables to import: FactInternetSales, DimProduct, DimProductSubCategory, DimProductCategory, and DimCustomer.



Click on Load, and then build a bar chart with Full Name from DimCustomer as Axis, and SalesAmount from FactInternetSales as Value. Also, sort the chart by SalesAmount in descending order.

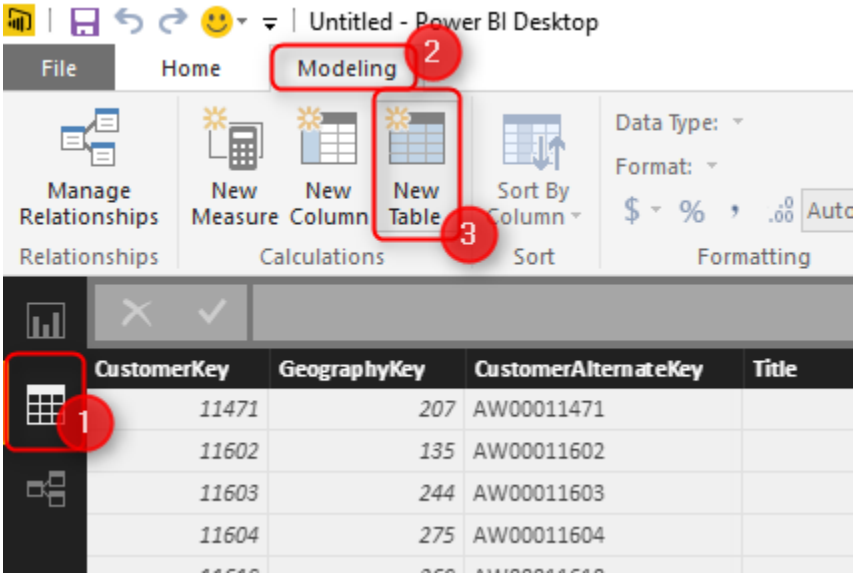


Then Create a Slicer with EnglishProducctCategoryName from DimProductCategory. Note that if you drag and drop something into the visual level filter, it won't be placed there! In this version of Power BI Desktop, Visual Level Filters are not supported for slicer! But don't worry we will solve it with calculated tables.

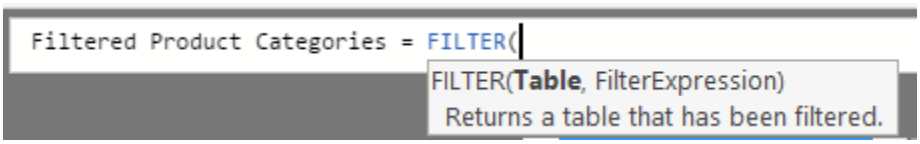


Create Calculated Table for Filtered View

Go to Data Tab, and from Modeling tab, choose to Create Calculated Table



Let's create a table for the filtered list of product categories. As a simple example, let's show everything except Bikes. I use the FILTER function of DAX which gets a table to filter as the first parameter and the expression as the second parameter.



Now set DimProductCategory as the table, and everything except Bikes as the expression as below;

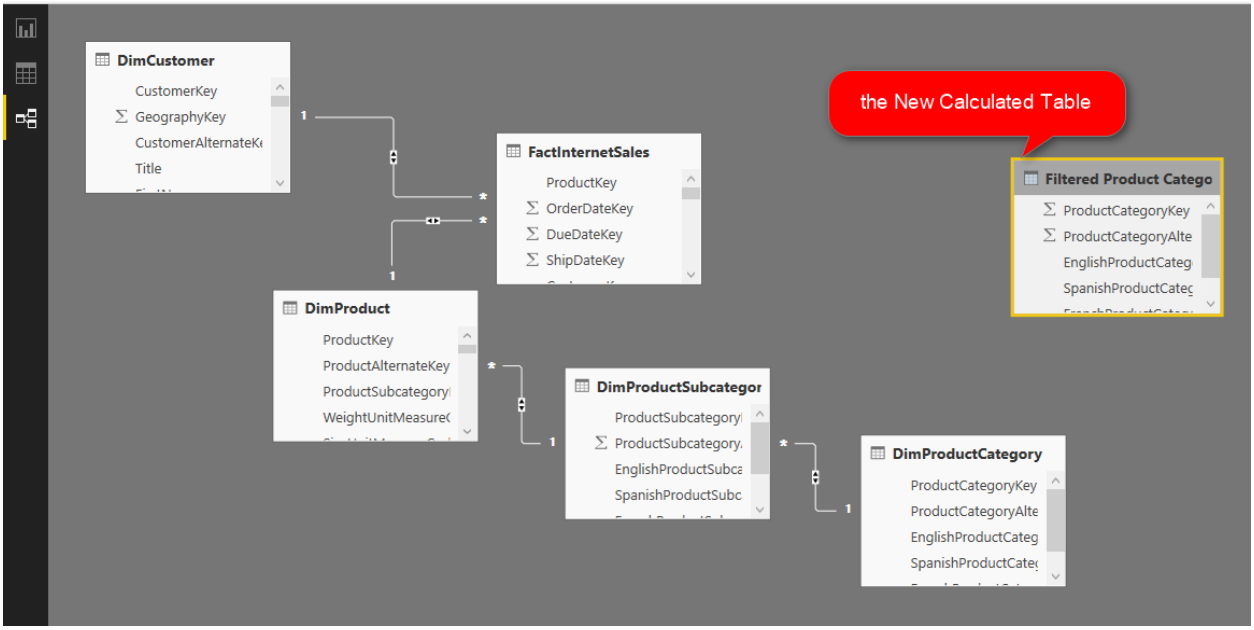
```
Filtered Product Categories = FILTER(DimProductCategory,DimProductCategory[EnglishProductCategoryName]<>"Bikes")
```

ProductCategoryKey	ProductCategoryAlternateKey	EnglishProductCategoryName	SpanishProductCategoryName	FrenchProductCategoryName
2	2	Components	Componente	Composant
3	3	Clothing	Prenda	Vêtements
4	4	Accessories	Accesorio	Accessoire

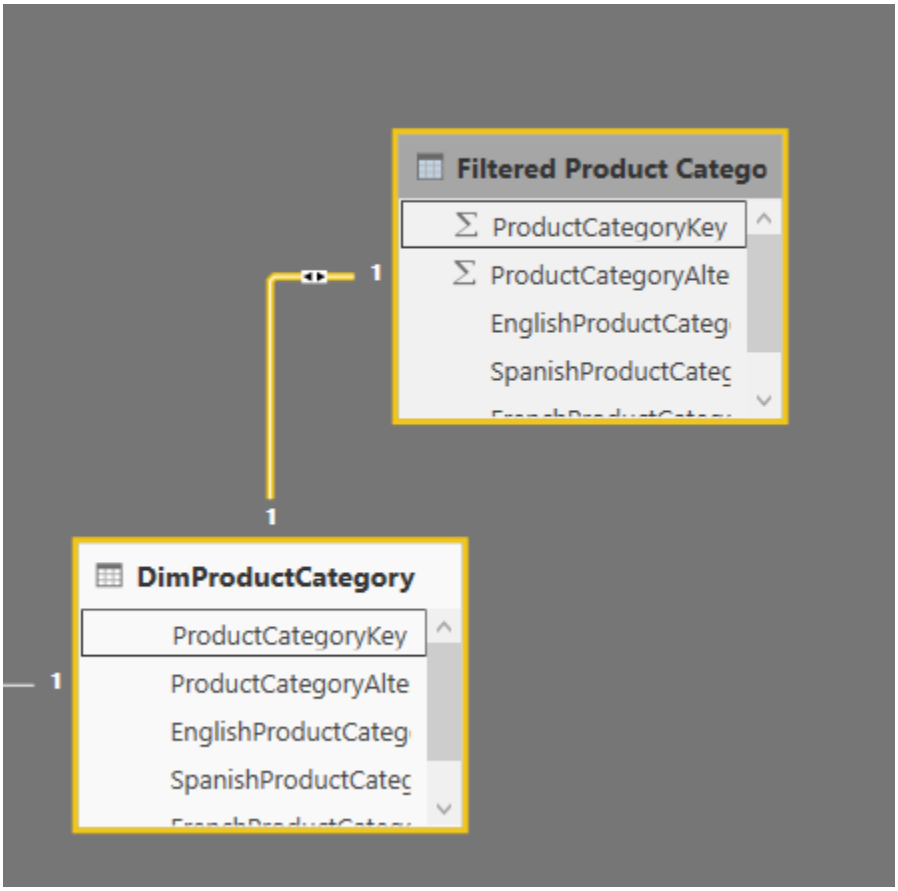
Here is the DAX code;

Filtered Product Categories =
FILTER(DimProductCategory,DimProductCategory[EnglishProductCategoryName]<>"Bikes")

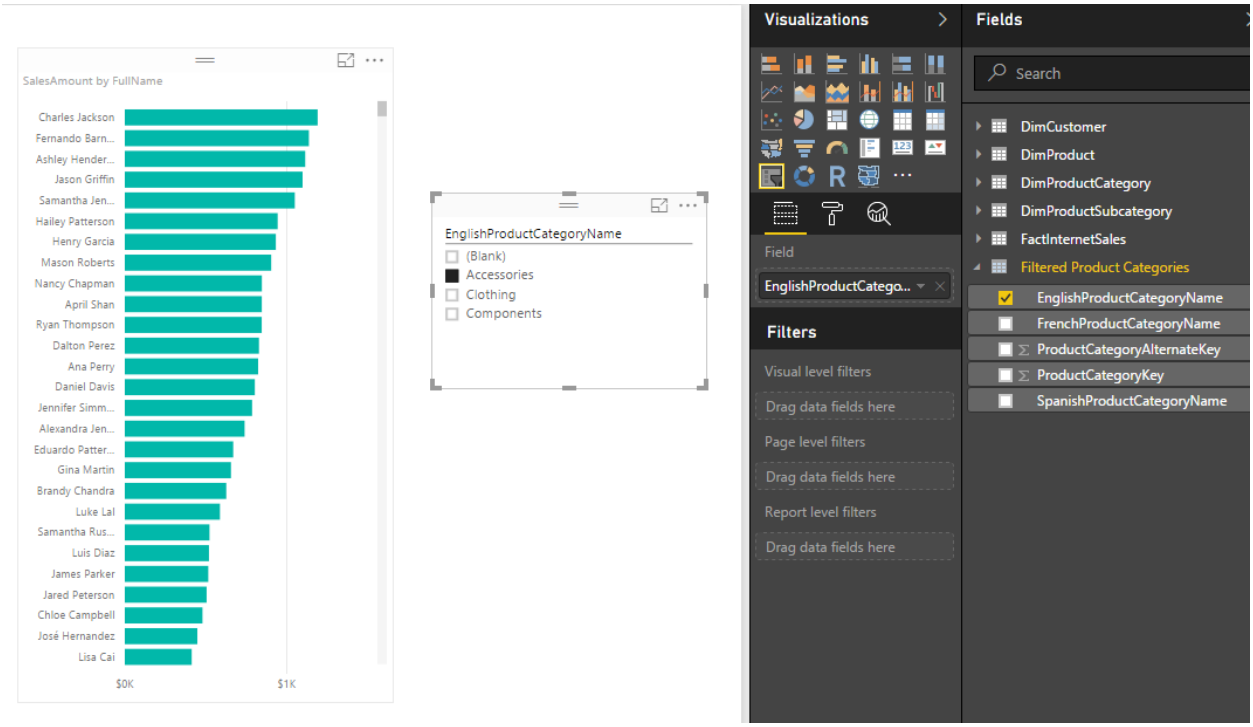
As you can see the filter selects everything but Bikes. After creating the table, go to the Relationship tab



Create a relationship between DimProductCategory, and Filtered Product Category based on ProductCategoryKey.



Now go back to the Report tab and in the slicer use EnglishProductCategoryName from Filtered Product Category.



You can see that the slicer is now showing everything but Bikes. Other elements in the report will show everything if slicer hasn't filtered them yet. If slicer filters their data, then they will show only filtered data.

Expand the Possibilities

The example I've shown you above was a very basic example of a filter. DAX is fully featured language. You can define a very complex filter as well. Think about all possible filters you can create with calculated tables. Things like top 10 customers, or any other filters that you cannot simply achieve with visual level filters are possible here.

Limitations

Calculated tables can be created only if you use Import Data into Power BI. These are generated based on DAX functions and are not available as DirectQuery.

Calculated tables consume memory, but you can reduce it by selecting a minimum number of columns in calculated tables, and some DAX performance tuning considerations.

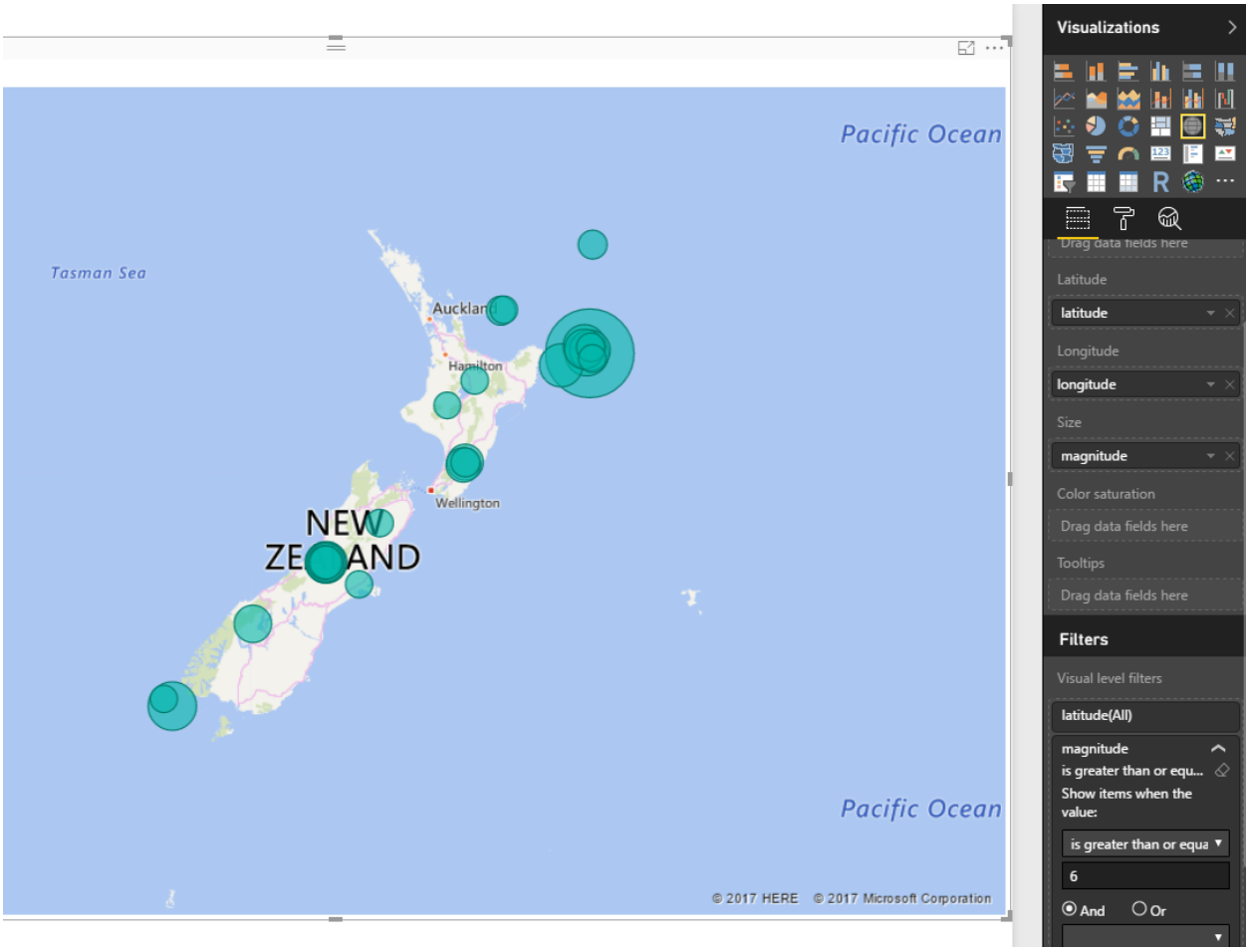
Summary

In summary, I explained to you how to create a visual level filter on a slicer using calculated tables. This method might not be as easy as picking some items from a list in a visual level filter section of the report, but it is very powerful because it uses DAX filtering for generating calculated tables. Creating filters such as top 10 customers are possible here with DAX expressions. There are some limitation though, DAX is only supported if you import data into Power BI. The DirectQuery don't support calculated tables.

Part III: Map Visualization

How to Do Power BI Mapping With Latitude and Longitude Only

Published Date: September 24, 2015



You may have seen many videos or blog posts so far that Power BI Desktop showed the data on the map visualization based on address, suburb, city, state, and country. Fortunately, Bing Map helps a lot to search the point on the map based on address fields. However sometimes you don't have address fields, actually, in some types of data, there is no address field. As an example an earthquake most of the time happens somewhere deep in the ocean where there is no street address! All you have is latitude and longitude as the Geographical data. However, latitude and longitude are precise enough for any GPS device to point out the exact location. Unfortunately to your surprise, at this point of the time, the map in the Power BI Desktop doesn't support

visualization only based on latitude and longitude! So this post is about how to visualize it with Power BI Desktop map easily.

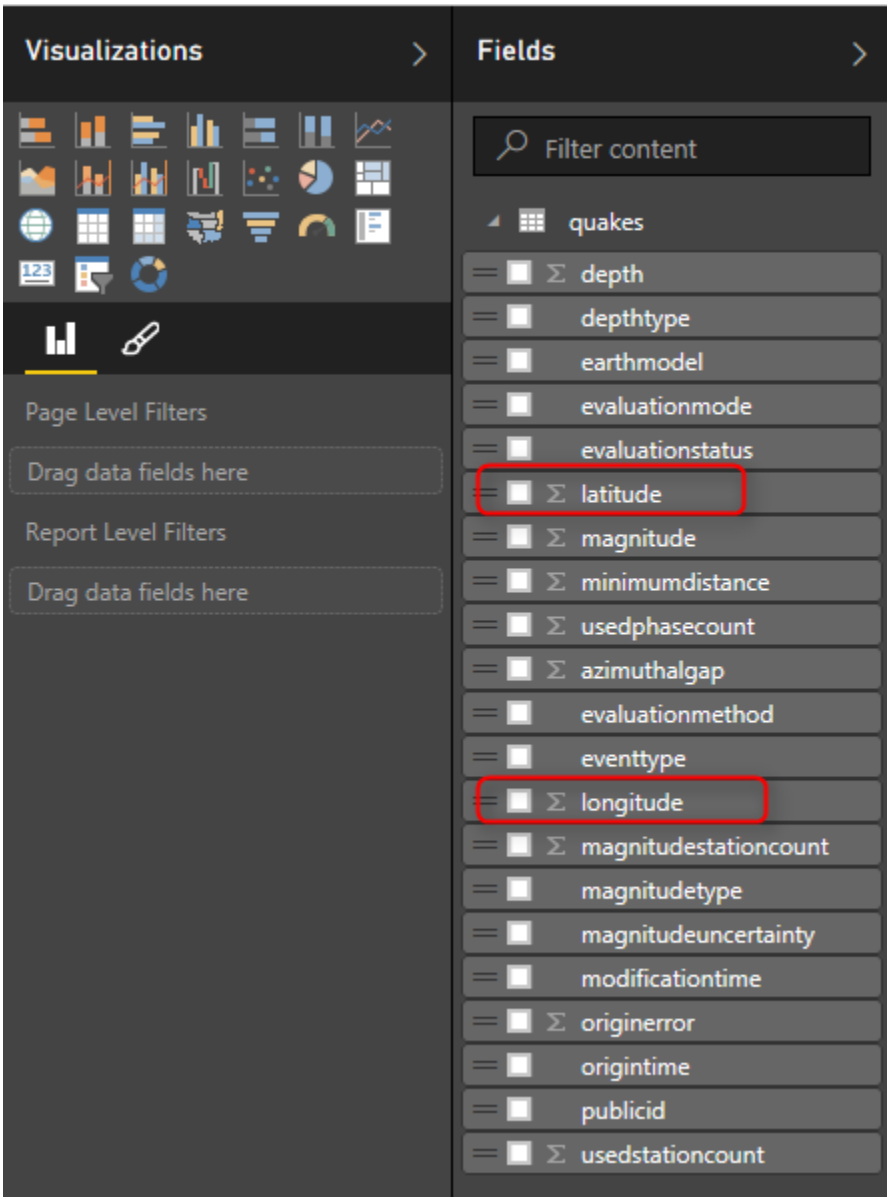
Problem Definition

As I've mentioned there are sometimes that you have no address information but only latitude and longitude, an earthquake data is one of the most common examples of that. Here is example earthquake data that I've fetched from Quake Search service of GeoNet website. This website search through all earthquakes happened in New Zealand. It can also export the data as CSV file, which is the file that I've used. The screenshot below shows part of the data set as an example;

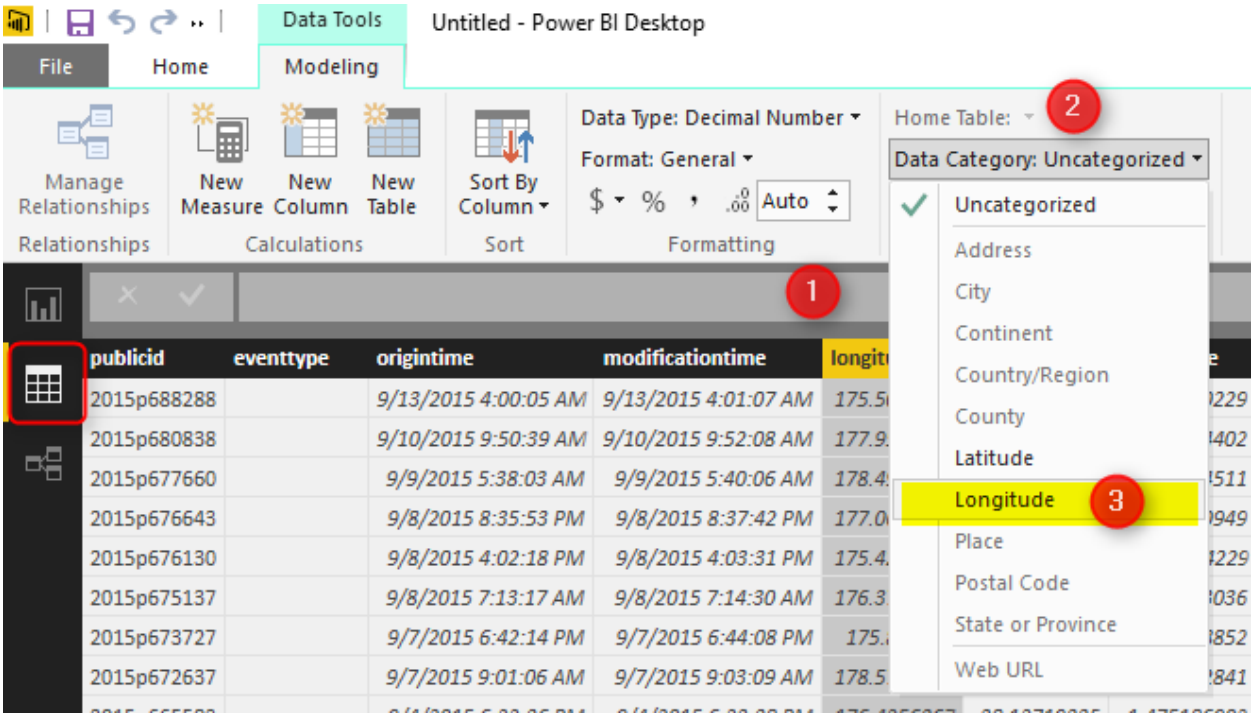
publicid	eventtype	origintime	modificati	longitude	latitude	magnitude	depth	magnitud	depthtyp	evaluatio	ev
2015p717507		2015-09-2	2015-09-2	176.0944492	-38.50245621	2.459332875	149.375	M		NonLinLoc	
2015p717354		2015-09-2	2015-09-2	178.4734322	-38.25412784	1.987484953	28.90625	M		NonLinLoc	
2015p717280		2015-09-2	2015-09-2	176.1695696	-38.46475897	2.456398653	153.125	M		NonLinLoc	
2015p717262		2015-09-2	2015-09-2	177.4477559	-37.69434544	2.172615393	52.8125	M		NonLinLoc	
2015p717174		2015-09-2	2015-09-2	172.4038845	-43.61736644	2.221402972	9.921875	M		NonLinLoc	
2015p717142		2015-09-2	2015-09-2	176.5673243	-37.85364822	2.381214887	90.3125	M		NonLinLoc	
2015p7171	earthquak	2015-09-2	2015-09-2	175.6586602	-39.26602063	0.784917104	67.8125	M		NonLinLo	co
2015p717090		2015-09-2	2015-09-2	174.8915884	-41.11647523	2.882207598	30.07813	M		NonLinLoc	
2015p717068		2015-09-2	2015-09-2	176.0801814	-39.96313712	1.609327328	24.45313	M		NonLinLoc	
2015p717018		2015-09-2	2015-09-2	175.7615368	-38.67061338	3.457217946	142.3438	M		NonLinLoc	
2015p716785		2015-09-2	2015-09-2	174.6997467	-39.30605315	2.33739074	24.92188	M		NonLinLoc	
2015p716768		2015-09-2	2015-09-2	174.6949536	-39.29756737	2.807979919	24.92188	M		NonLinLoc	
2015p716752		2015-09-2	2015-09-2	174.773634	-39.17986966	2.502129961	27.73438	M		NonLinLoc	
2015p716720		2015-09-2	2015-09-2	174.8950946	-41.11324348	2.818673726	29.60938	M		NonLinLoc	
2015p716649		2015-09-2	2015-09-2	176.9622346	-39.76140542	1.781550321	8.515625	M		NonLinLoc	
2015p716596		2015-09-2	2015-09-2	174.7270089	-41.17664948	1.834855653	27.26563	M		NonLinLoc	
2015p7165	earthquak	2015-09-2	2015-09-2	175.9976775	-39.27133327	1.024882054	43.90625	M		NonLinLo	co
2015p716366		2015-09-2	2015-09-2	176.1486309	-39.05088715	1.315958386	48.125	M		NonLinLoc	
2015p7162	earthquak	2015-09-2	2015-09-2	176.0763517	-38.63151112	1.911692052	5.820313	M		NonLinLo	co
2015p716257		2015-09-2	2015-09-2	170.3621829	-45.28312548	2.628057845	6.40625	M		NonLinLoc	

As you see in the screenshot, there are two highlighted columns for latitude and longitude and also a column for magnitude. The file is for a year earthquake data (from September 2014 to September 2015), and it has 19K records. Wow, that's a lot of earthquakes. But don't worry most of them are on the minor magnitude, this file contains records with even 0.7 as magnitude! Such an awesome recording of events.

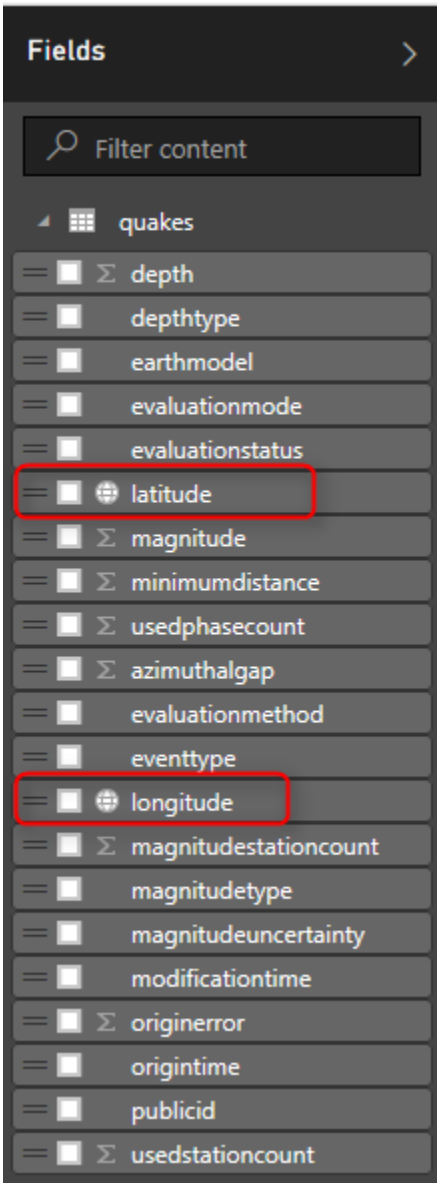
Now I want to visualize this data on the Power BI Desktop Map to see whereabouts most of the earthquakes are happening! If I fetch that data into Power BI through getting Data and then from CSV experience, and load it without any change in the Power BI Desktop I'll see then in the fields section like this:



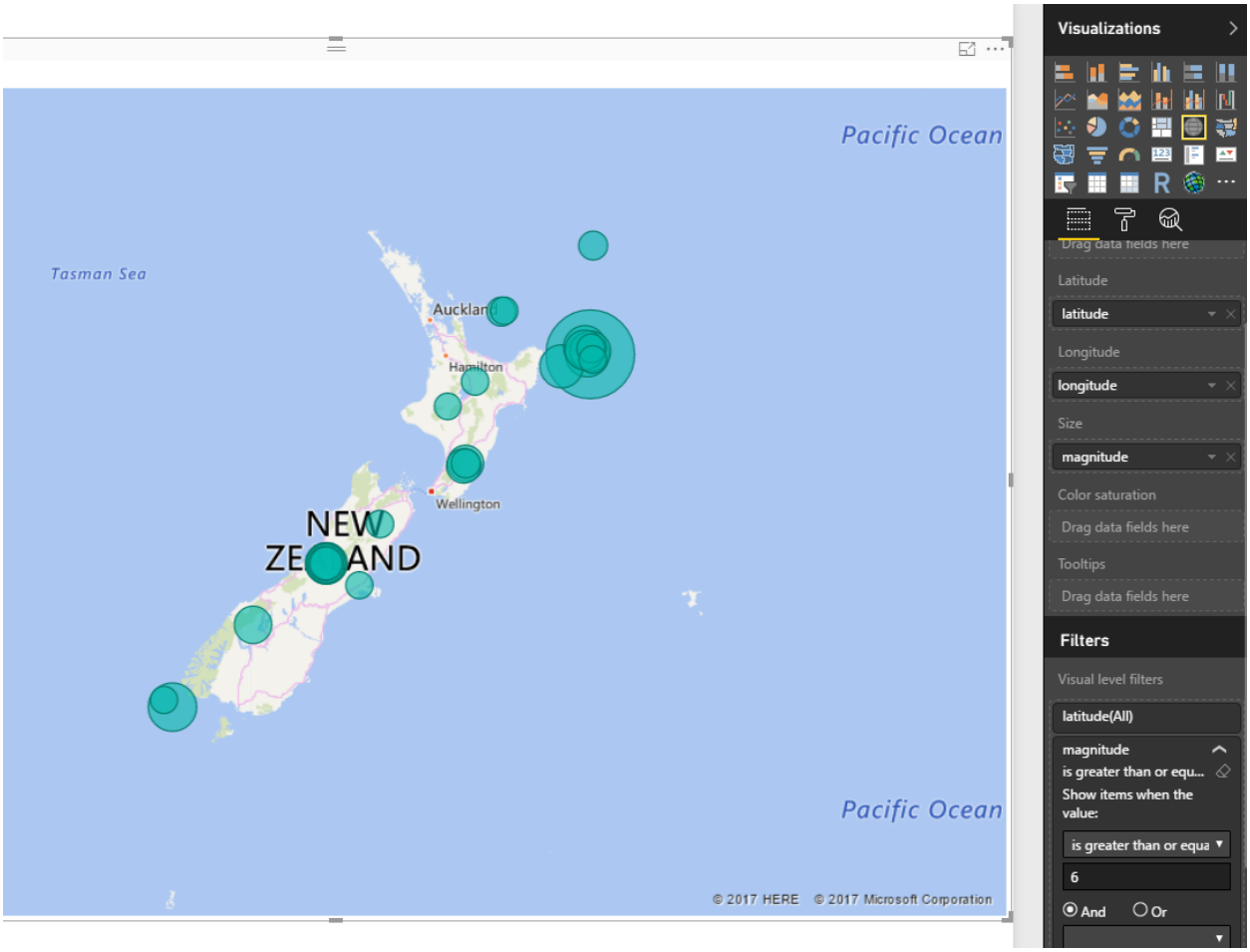
As you see Power BI considered these fields as numeric fields and summarized them in the view (you can see sigma icon beside them in the screenshot above). This can be easily changed in the data tab. Select the Column and then change the Data Category under the Modeling menu to the respective field (latitude or longitude).



Now go back to the Report tab. This time you will see these two fields with map icons beside them.



Now let's create a Map. Map works with Latitude and Longitude (which we have, fortunately), I also add magnitude as values. For the chart below, I've also shown magnitude in values and color-saturated it based on the depth of the earthquake. As the data rows were too many (19K quakes), I've filtered to show only those that have a magnitude greater than 6. Here is the result;



The map still might seem scary for you to see that many earthquakes with more than six magnitudes in only one year, But if you want to live in a magnificent country you should take some risk 😉

Power BI Filled Map; the Good, the Bad, and the Ugly

Published Date: March 23, 2016

Power BI utilizes two built-in map charts; Map and Filled Map. Filled Map is a map that shows data points as Geospatial areas rather than points on the map. Areas can be continent, country, region, state, city, or county. Working with Filled Map however isn't as easy and convenient as the map chart is. You need to set the data category of fields in the data model appropriately to get the Filled Map working correctly. There are also

some limitations in the filled map with countries that address hierarchy is different from State, City, County. In this post, I'll get you through some tips of using the filled map in your Power BI solution. I also show you some existing issues in the current version of the filled map and things that you need to be aware of when you work with this visualization element.

The Good: How to Use Filled Map

As I mentioned earlier working with filled map requires a bit more steps than the regular map. Let's go through that with a real example; This Wikipedia page includes a list of all regions in New Zealand with their population. So let's create a filled map for this data to show areas with their population.

	Region	Regional council	Chair	Council seat	Island	Area (km²)[19]	Population[20]	ISO 3166-2 Code
1	Northland	Northland Regional Council	Bill Shepherd[21]	Whangarei	North	12,498	168,300	NZ-NTL
2	Auckland (1)	Auckland Council	Len Brown	Auckland	North	4,940	1,570,500	NZ-AUK
3	Waikato	Waikato Regional Council	Paula Southgate	Hamilton	North	23,900	439,200	NZ-WKO
4	Bay of Plenty	Bay of Plenty Regional Council	John Cronin	Whakatāne	North	12,071	287,100	NZ-BOP
5	Gisborne (1)(2)	Gisborne District Council	Meng Foon	Gisborne	North	8,386	47,400	NZ-GIS
6	Hawke's Bay	Hawke's Bay Regional Council	Fenton Wilson	Napier	North	14,137	160,100	NZ-HKB
7	Taranaki	Taranaki Regional Council	David MacLeod	Stratford	North	7,254	115,800	NZ-TKI

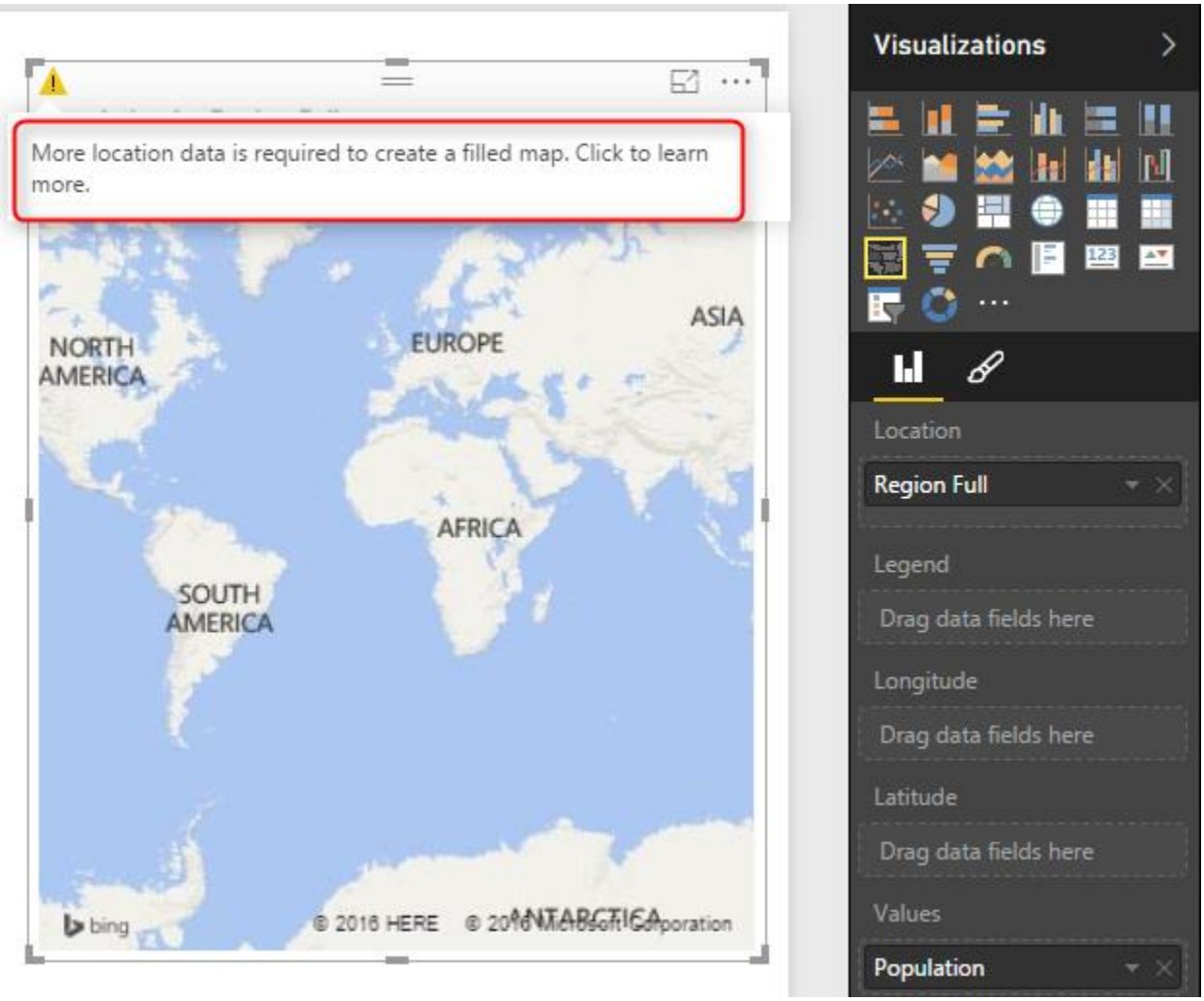
I can use Get Data -> From the Web and use the URL of the Wikipedia page to explore the dataset. I can remove some extra columns and rows in Query Editor window easily (If you don't know how to work with Query Editor read the Power Query introduction part of this Power BI series). I also add a custom column called Full Region with the country name attached to the end of region name (because there might be another Auckland in another country which is not what I want to show in my map). So here is what I have at my query at the end:

```
= Table.AddColumn(#"Changed Type1", "Region Full", each [Region]&", New Zealand")
```

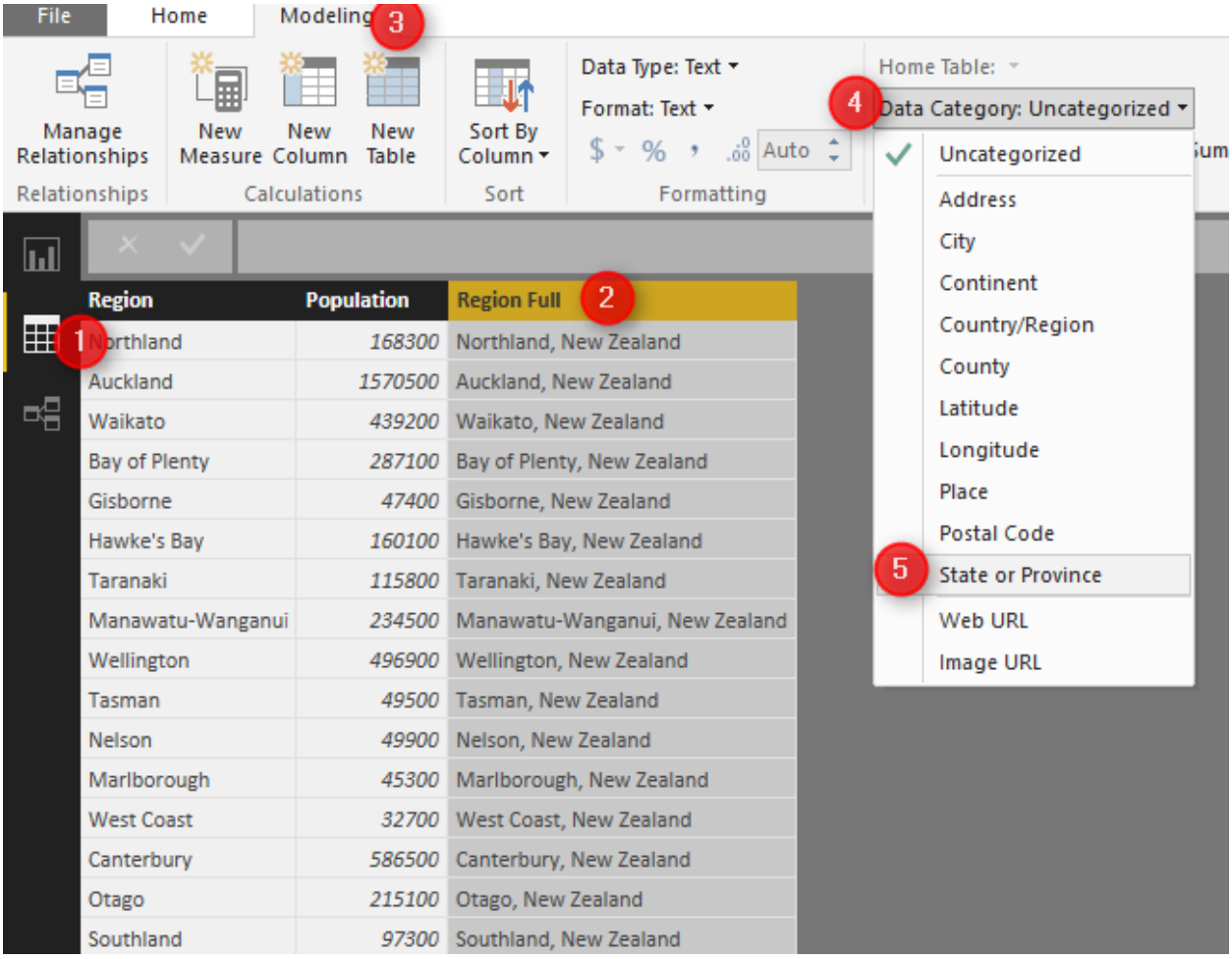
	Region	Population	Region Full
1	Northland	168300	Northland, New Zealand
2	Auckland	1570500	Auckland, New Zealand
3	Waikato	439200	Waikato, New Zealand
4	Bay of Plenty	287100	Bay of Plenty, New Zealand
5	Gisborne	47400	Gisborne, New Zealand
6	Hawke's Bay	160100	Hawke's Bay, New Zealand
7	Taranaki	115800	Taranaki, New Zealand
8	Manawatu-Wanganui	234500	Manawatu-Wanganui, New Zealand
9	Wellington	496900	Wellington, New Zealand
10	Tasman	49500	Tasman, New Zealand
11	Nelson	49900	Nelson, New Zealand
12	Marlborough	45300	Marlborough, New Zealand
13	West Coast	32700	West Coast, New Zealand
14	Canterbury	586500	Canterbury, New Zealand
15	Otago	215100	Otago, New Zealand
16	Southland	97300	Southland, New Zealand

Now if I directly use Region Full in a Filled Map, I'll see an error message that says; More location data is required to create a filled map. Click to learn more.

Details: To create a filled map, the location data should include Bing Map-supported geographic data, such as country/region, state/province, or postal code.



Configuring a data field as a geographic field is easy; All I need to do is to go to Data Tab. Click on my query, and then on my data field. Then from the Modeling tab under the Properties pane set Data Category to State or Province.



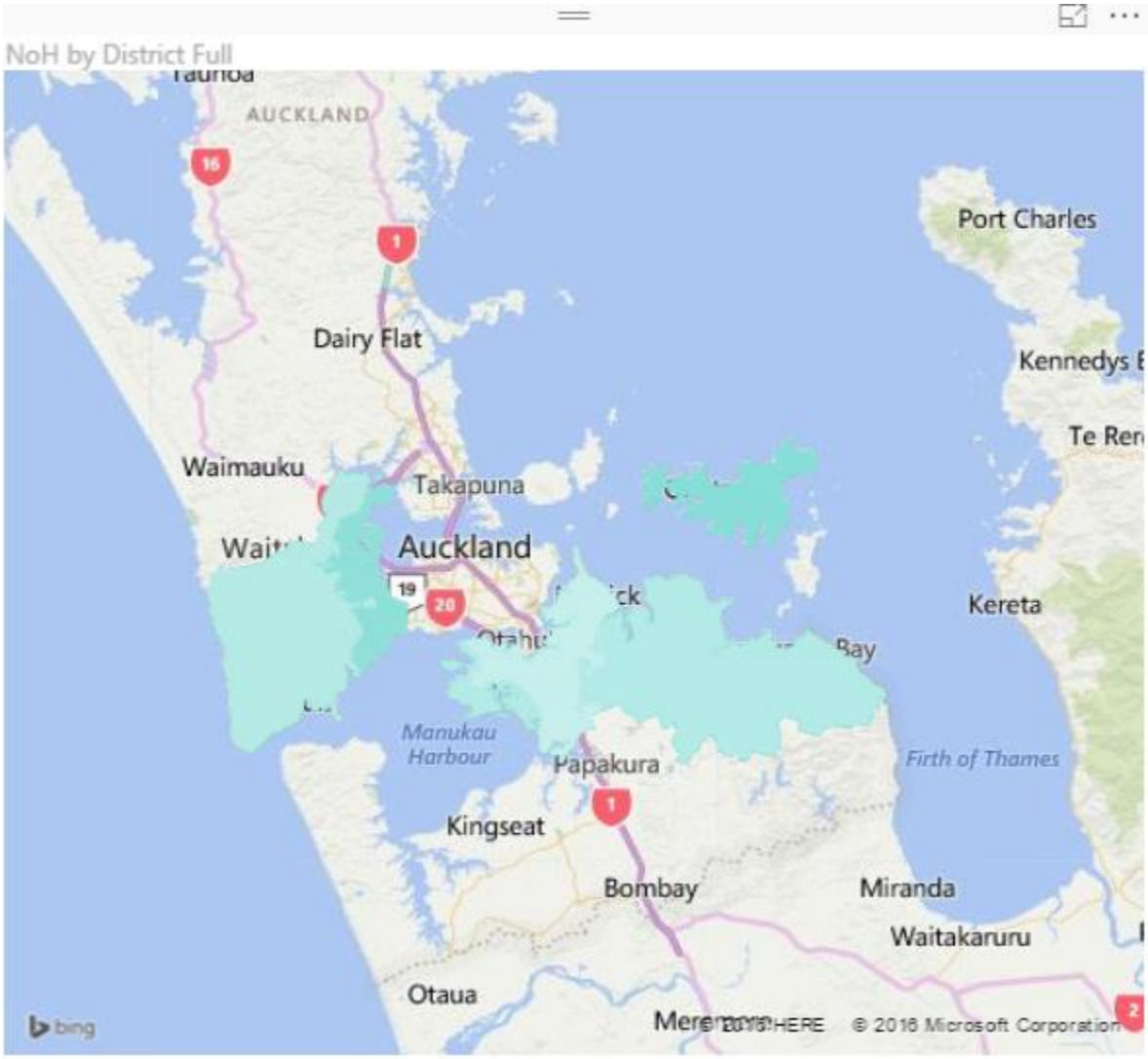
After the change when I get back to the Filled map, I can see that it illustrates regions on the map nicely.

As you see in the Data Category options, you can set the field to be Continent, Country/Region, State or Province, City, County, Post Code…. If you have the geographic values in your dataset, then you can easily map them to these data categories, and the filled map will draw them nicely for you.

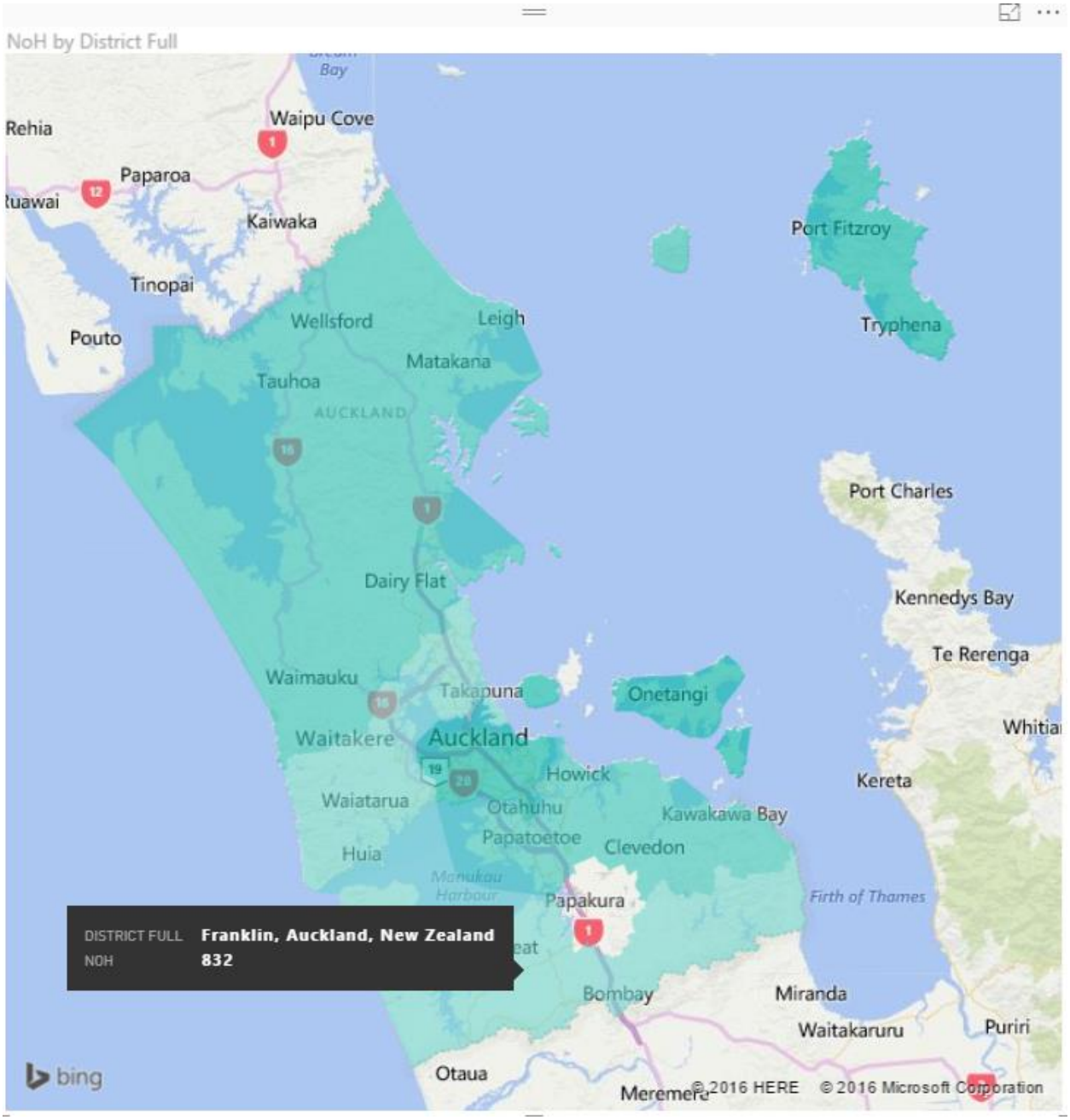
The Ugly: When Geographic Structure is Different

I'm living in New Zealand (if you don't know it already ;)) and the geographic structure here is different from State, City, County. What we have is more like Country, Region, District, Suburb. For example, Country= New Zealand, Region= Auckland, District =Franklin, Suburb= Pukekohe. You've seen in the example above that I used State or Province data category for Region, and it worked fine. So I could map District to the City

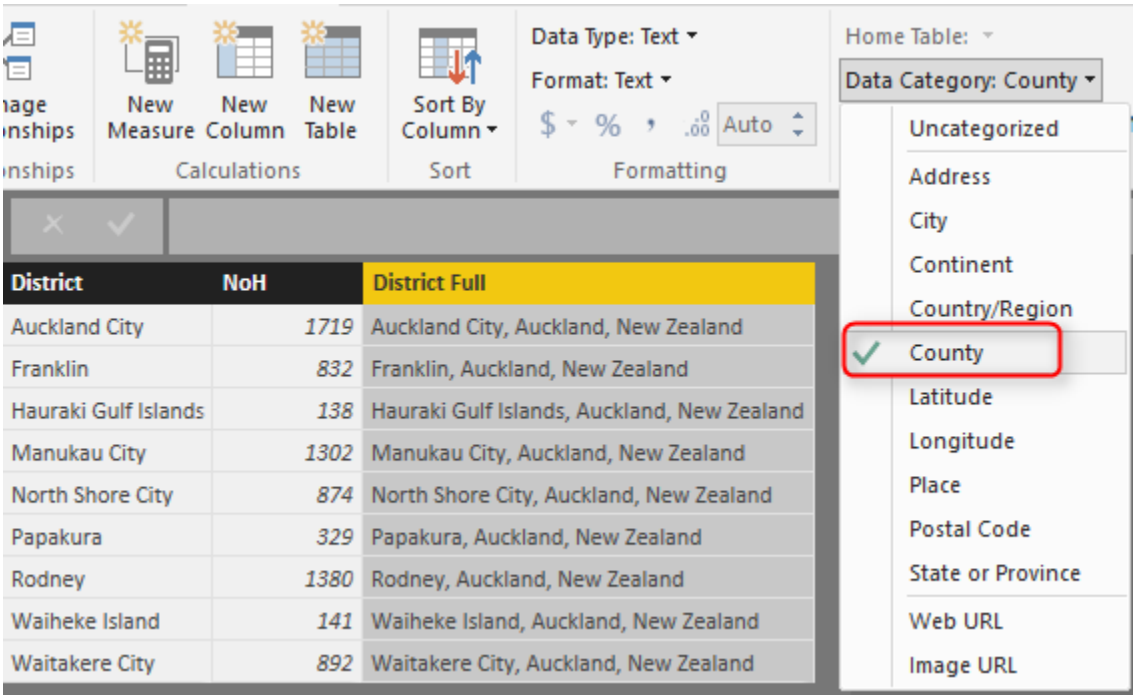
data category as well, but Here is what I get when I map cities in Auckland to a City data category:



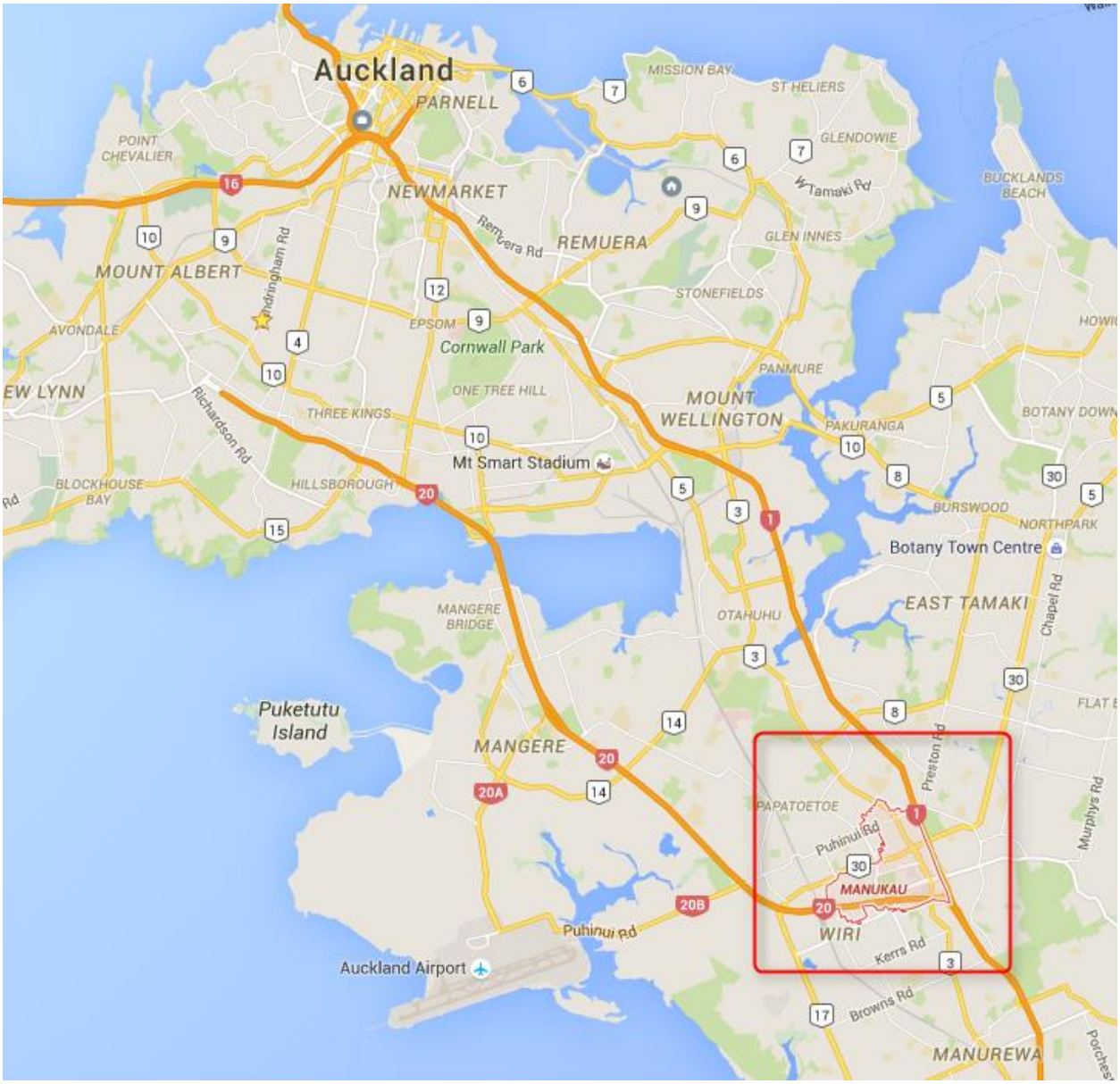
However, when I change the data category to County I get it working (not perfect though! there are some white spots in the map!);



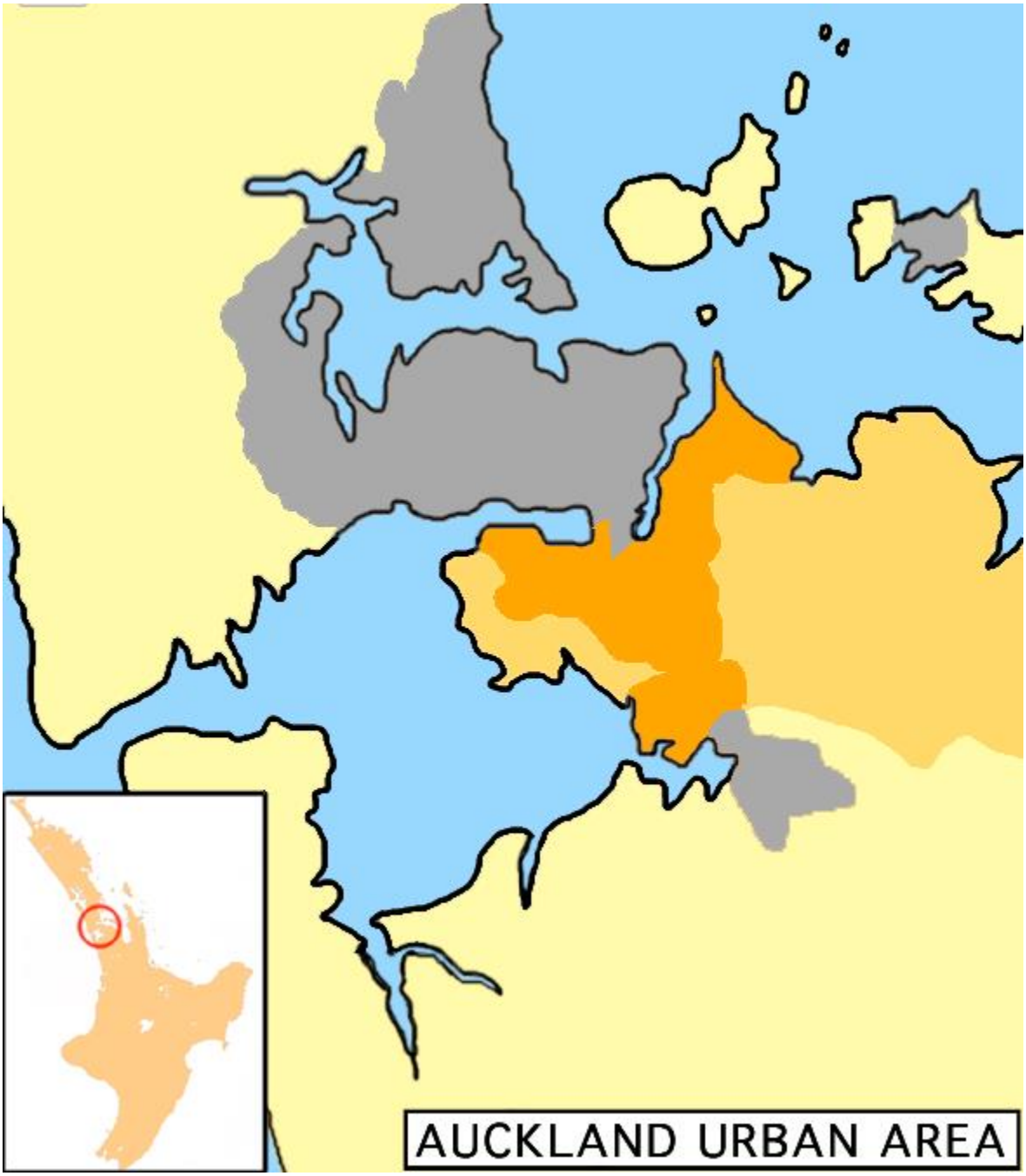
and Here is the category I choose for it:



So as you see, I have to play with to map my data fields to a data category which generates a result close to what it is. And as you see, I don't get a clean result. I see an area (Papakura) in the map above which is white (no data points) which should be drawn as part of one of the Districts (Manukau City). I searched Google Map and Bing Map to see if they can show me boundaries of districts and found out that they can't. Here is what Google Map shows me:



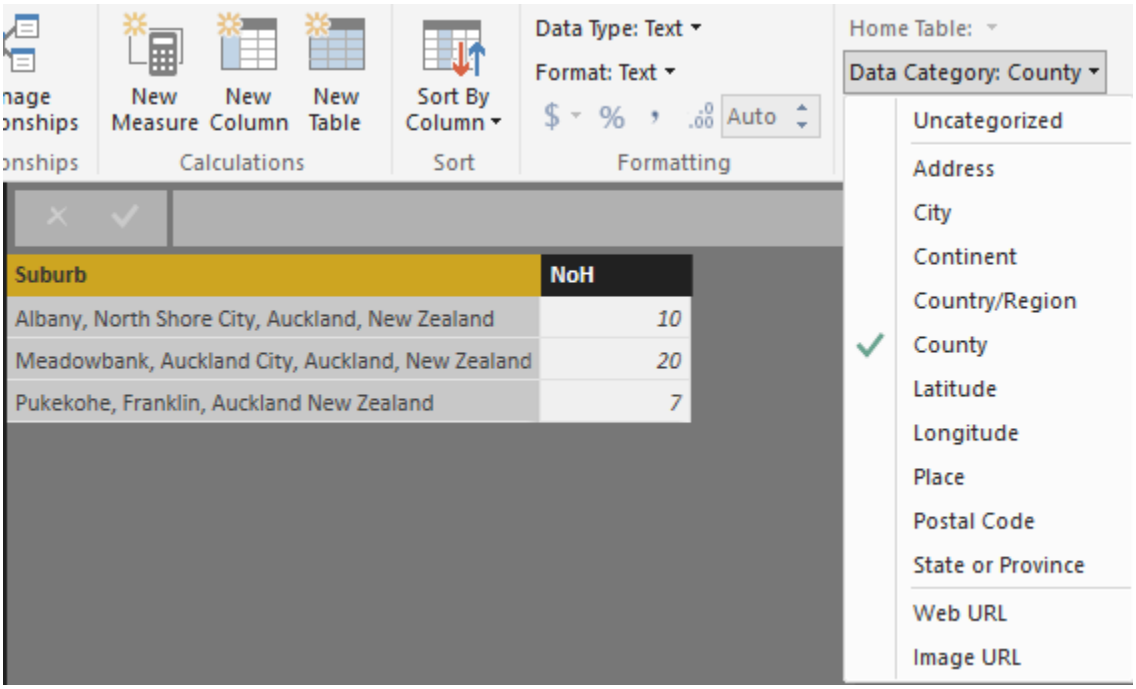
And here is what the actual boundaries should be (from Wikipedia)



The orange area in the map above is much bigger than the area mentioned in Google Map. So no wonder why Power BI shows some areas blank. So I can't blame Power BI, because it seems to be related to the boundaries defined in Bing maps which is not up-to-date. However, at the end of the day, this won't give me the result I'm looking for.

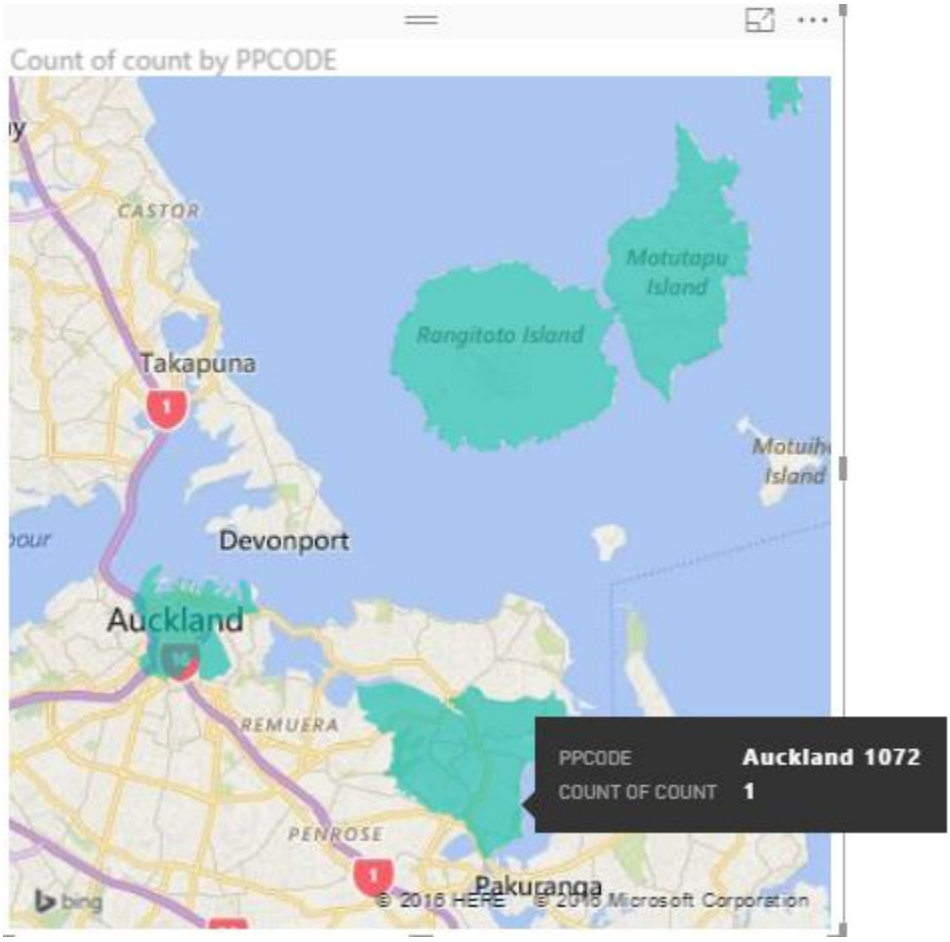
The Bad: When Data Category is Useless

Believe it or not, there are some situations that you can't find any appropriate data categories to map to your geographic data field. This might not happen in USA geographic information, but I found it when I tried to go one level down to the Suburb level. The sad fact is that I couldn't find a data category that maps to suburbs in some areas in New Zealand! Here is what I've done;

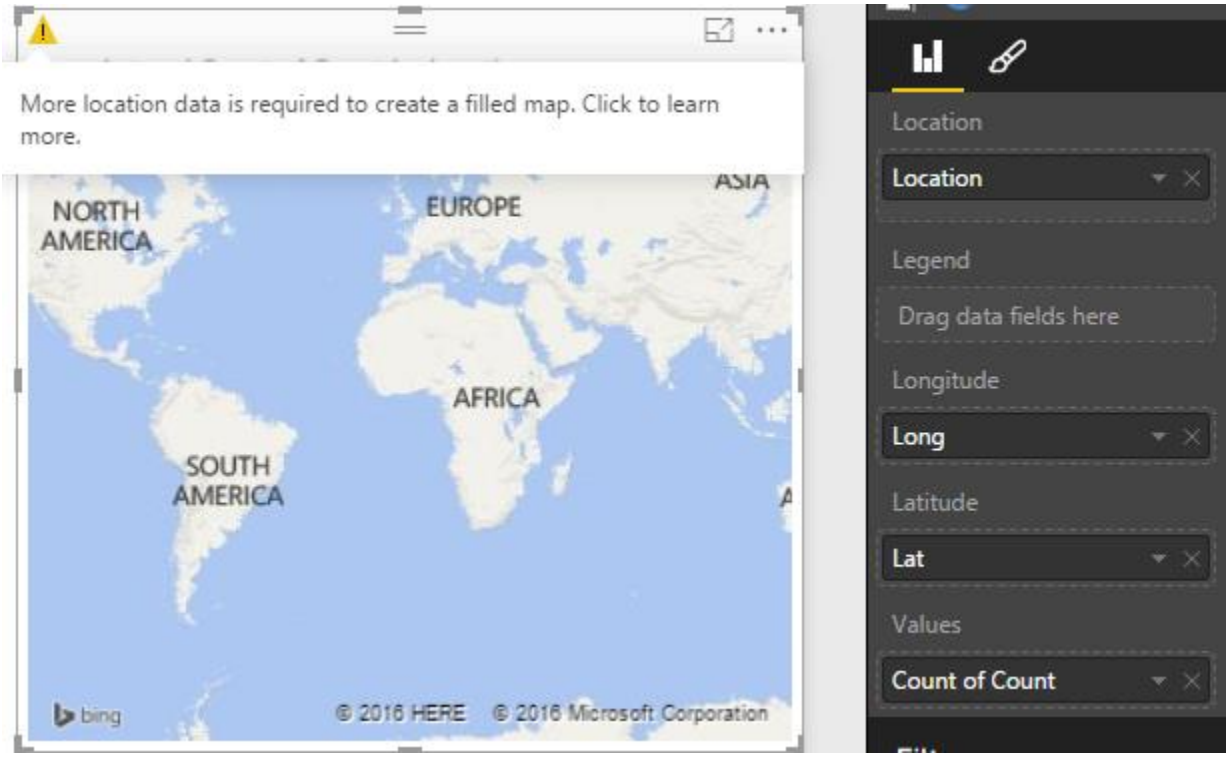


I've mapped suburbs to County because that was the lowest level I've found in data category for geographic information. (Place and Address cannot be used for Filled Map at the time or writing this post). And I got Nothing! Not even a small area on the map. I've tried then removing the district and putting suburb, region, country format with County as the data category which didn't help again.

I've found that I can map some locations based on Postal Code as you see below. However not Postal Code is not always a good distinguishing field for a region, as multiple regions might have a postal code shared.



Then I tried to find Latitude and Longitude of each suburb in Bing Maps and use that for Filled Map, but I've found that Lat and Long fields in Filled Map aren't working in the way they supposed to work!



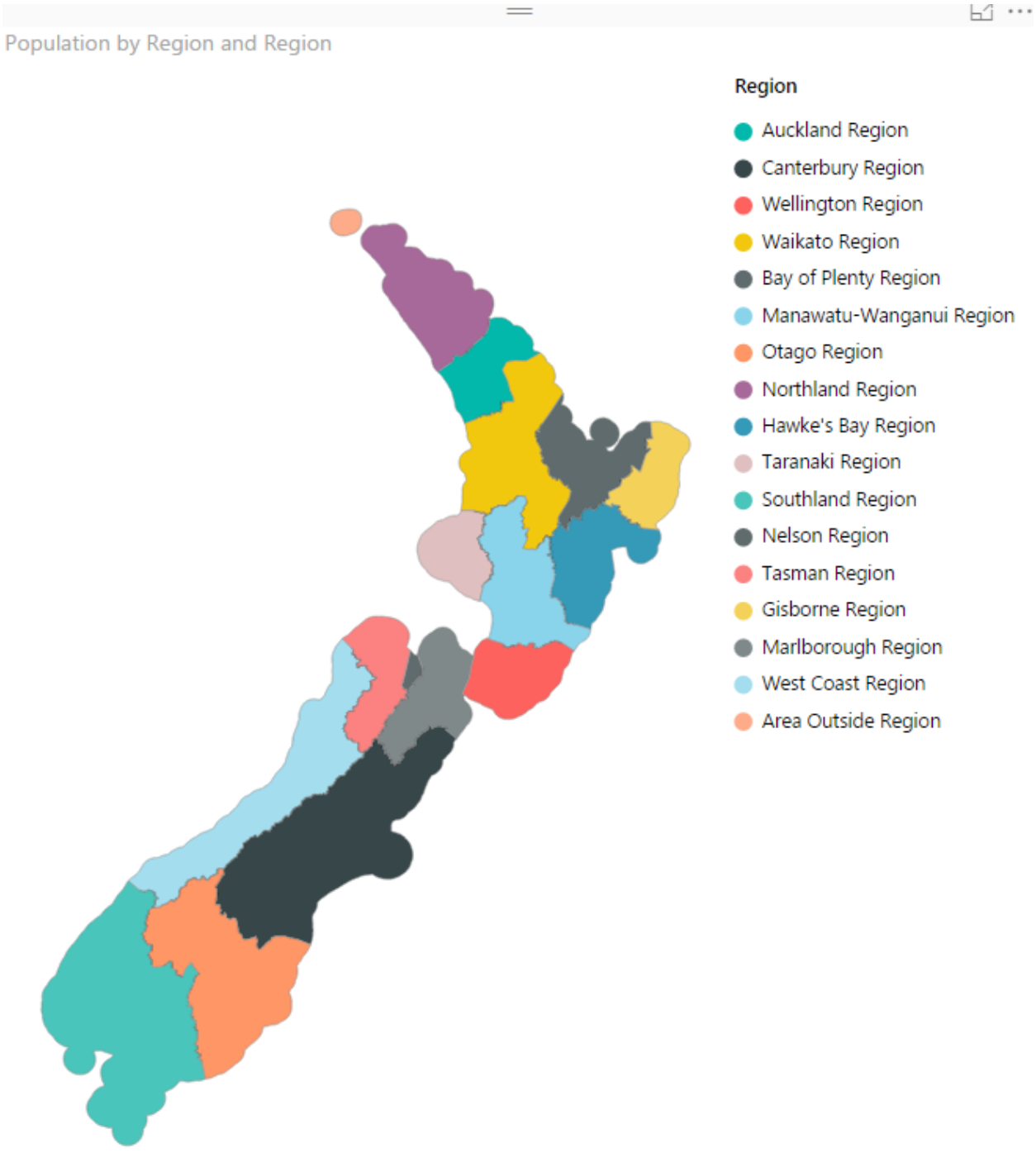
There was no other method I could try to map suburbs with Filled Map, unfortunately. So the sad end of this experiment is that with the current version of Filled Map I cannot show some suburbs with Filled Map.

Summary

Filled Map is good visualization element, but it has some limitations. You can use it for areas which their boundaries are clear, such as Country, Region, States. However when the geographic structure is different from the built-in structure in Data Category types, then you might face some difficulties and won't be able to generate the visualization you want. I hope Microsoft BI team fix issues related to this graph soon (And I believe they will because they did a really good job in Power BI extensive improvement through past months). If you want to learn more about Power BI feel free to read the rest of [Power BI online book from Rookie to Rock Star](#).

Shape Map Better than the Filled Map

Published Date: March 7, 2017



I have previously written some blog posts about Map visuals in Power BI. One of them was specifically about Filled Map, titled as Filled Map; the Good, the Bad, the Ugly! Why? You need to read that post to find the reason. In this post, I want to explain the power of Shape Map which is one of the visuals Power BI team published recently. This visual is still a preview mode at the time of writing this post. This visual is much more powerful than what it looks. The actual power behind it is that you can have your map added to it. Let's take a closer look at this visual with an example. If you want to learn more about Power BI; read Power BI from Rookie to Rock Star.

Maps in Power BI

There are many ways to visualize something on Map in Power BI, some of it is as below;

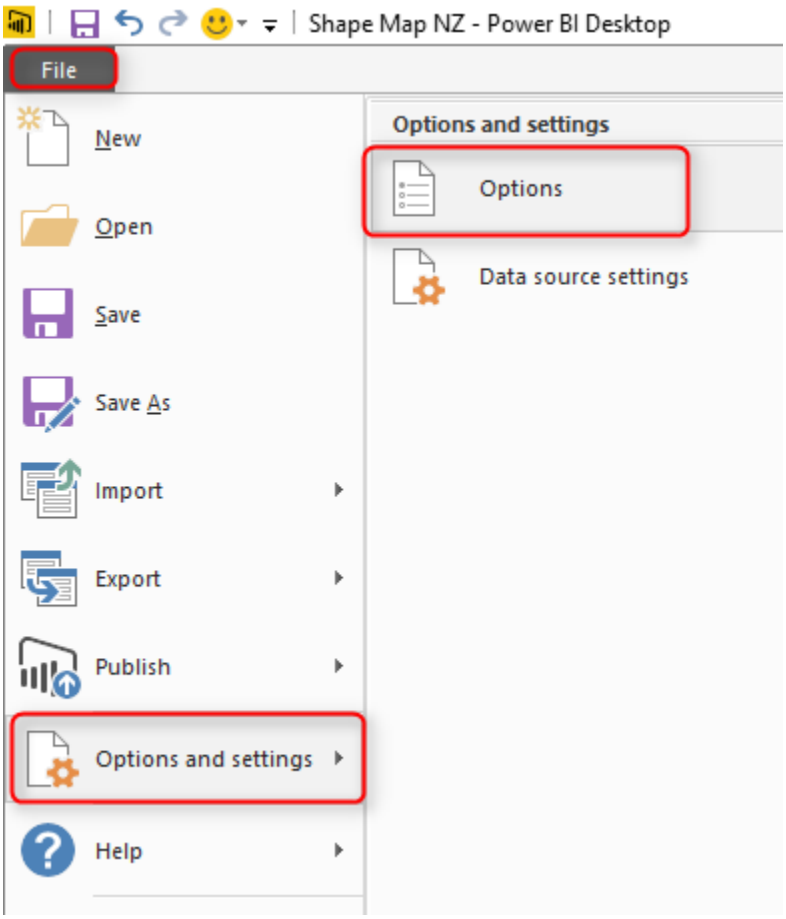
- Map Visual
- Filled Map Visual
- Custom Visuals – Synoptic Panel by OKviz
- Custom Visuals – GlobeMap by Microsoft
- Shape Map Visual – Preview
- ArcGIS Map Visual – Preview

I have written about them all except last two. This post focus is on Shape Map, and in another post, I'll explain ArcGIS visual. Hopefully, in the end, I will write a post about the comparison.

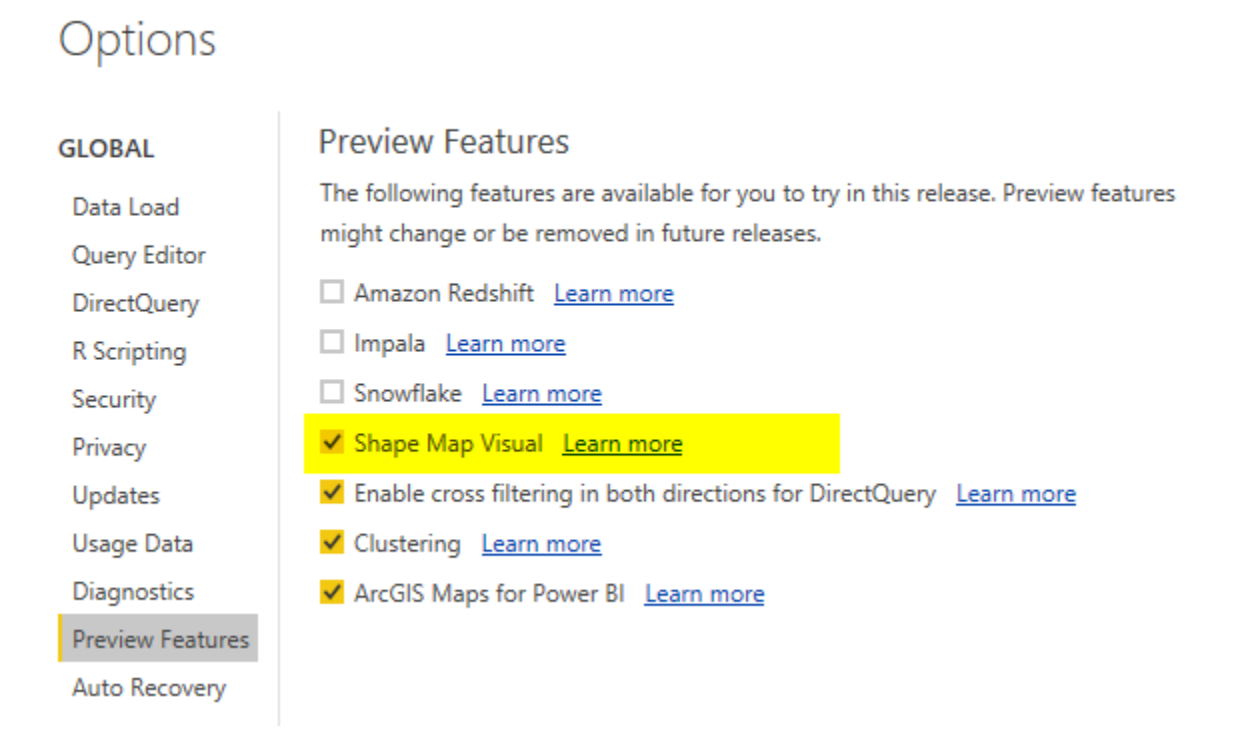
Shape Map

Shape Map is a visual first introduced a few months ago with the ability to highlight regions (similar to Filled Map), and the power of adding your map file to it. This feature makes it different from Filled Map because the normal filled map visualizes anything on a Bing map layer, and if for some reason it can't find that geolocation information result won't be great with that. If you want to see an example of that, read this post; Filled Map, the good, the bad, the ugly! Don't get me wrong; Filled Map is good at some stage, but there are better ways some other times.

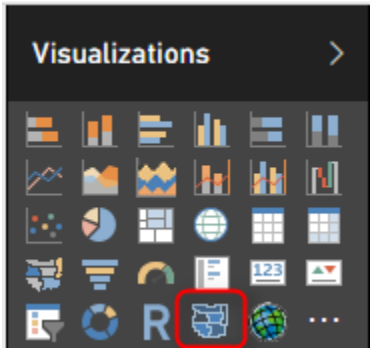
Because Shape Map is still in preview mode (at least at the time of writing this post), you need to enable it in Options section of Power BI Desktop; From File Menu -> Options and Settings -> Options.



You need to select Shape Map in the list of the Preview Features tab;



After clicking OK. You need to close your Power BI Desktop and re-open it again. You should be able to see Shape Map visual in the list of your visuals now.



Sample Data Set and Demo Files

For this example, I will be using an Excel file including all New Zealand regions and a population of each region. Why New Zealand? Regions of New Zealand can't fit great into the filled map (I've explained it here), so it can be a very good example for Shape Map then. You can download all files for this demo here;

Enter Your Email to download the file (required)

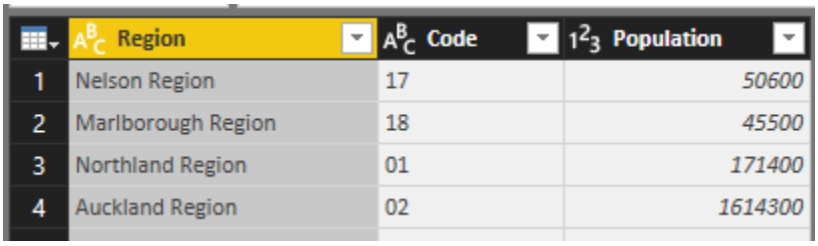
[Download]

How Shape Map Works?

After enabling the preview feature of Shape Map, get the data from Regions Excel file, which includes dataset as below;

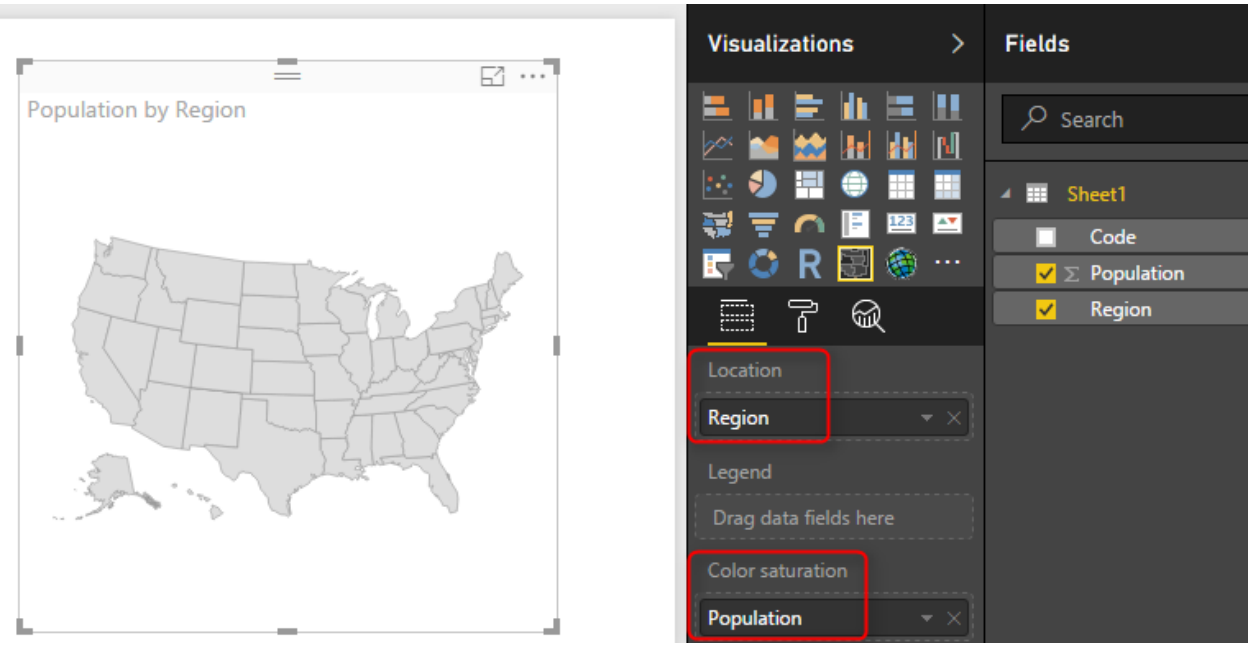
Region	Code	Population
Nelson Region	17	50600
Marlborough Region	18	45500
Northland Region	01	171400
Auckland Region	02	1614300
Waikato Region	03	449200
Bay of Plenty Region	04	293500
Gisborne Region	05	47900
Hawke's Bay Region	06	161500
Taranaki Region	07	116600
Manawatu-Wanganui Region	08	234500
Wellington Region	09	504900
West Coast Region	12	32600
Canterbury Region	13	600100
Otago Region	14	219200
Southland Region	15	98000
Tasman Region	16	50300
Area Outside Region	99	0

When you get data from Power BI Desktop from the above data set, Power BI automatically change the data types to preferred data types. Make sure that you get correct data types; Region and Code should be Text, and Population should be the Whole number;

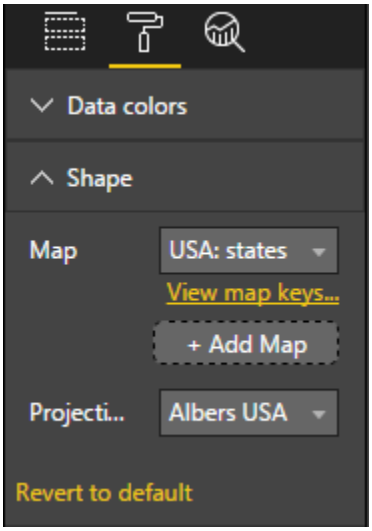


	Region	Code	Population
1	Nelson Region	17	50600
2	Marlborough Region	18	45500
3	Northland Region	01	171400
4	Auckland Region	02	1614300

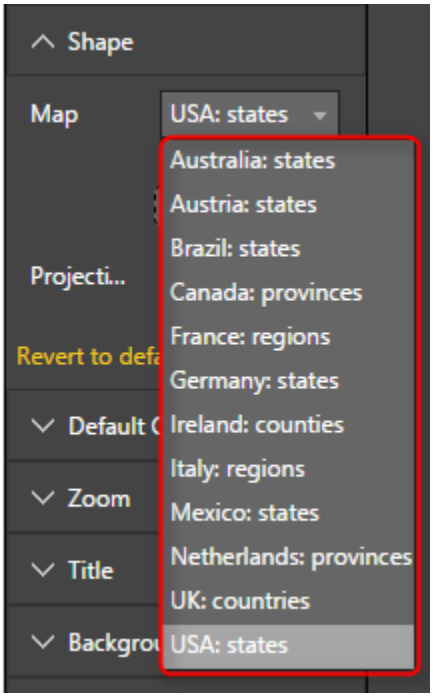
Close and Apply query editor, and drag and drop a Shape Map visual in the report page. To get the first view of this visual, you need to drag and drop a field into it. Start with using Region as the Location, and Use Population as Color Saturation.



As you can see in the above image, the first view would be States in the USA, which is not exactly what we are looking for. The reason is that Shape Map works based on a predefined map. To select to map, go to Format of this visual, and expand Shape section.



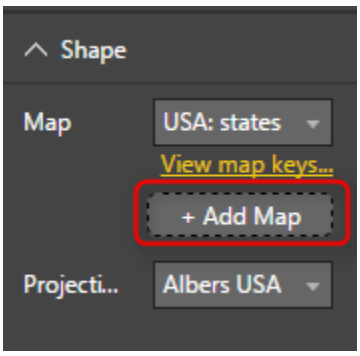
Now you can see that the default Map view is USA: States. You can change it to other maps in the list;



There are few maps/shapes in this list, but obviously, many options are missing. For example; New Zealand regional map is missing. Even if you want to use USA Cities Map or Cities of a specific state in the USA, you can't find it here. Don't turn around with seeing that, Shape Map allows you to add your Map. If your data set is dealing with any of existing maps, then you don't need to add a custom map for it. Just use the related map, and you are good to go. If your map is not there, here is the guide to add it;

Add a Custom Map

Shape Map allows you to add your custom map! For using this option, you need to click on Add Map in Shape section of Format of this visual.



The map should be a TOPO JSON file. TOPO JSON is a standard for defining geolocation information. In this type of file, information such as the boundaries of each region and name/id can be stored. Here is an example of TOPO JSON content;

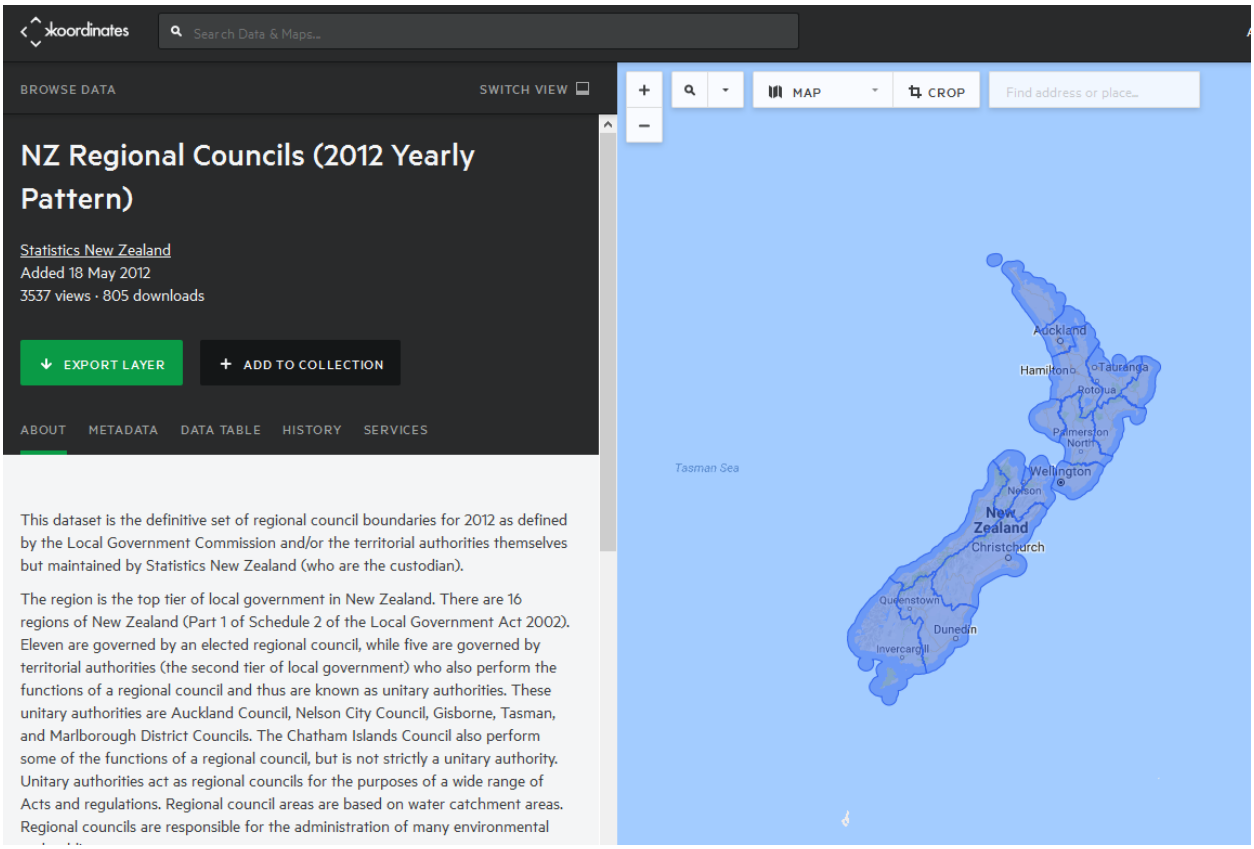

```
{ "objects": { "05720e46d7d482ca89887573389a5d41": { "crs": { "type": "name", "properties": { "name": "urn:ogc:def:crs:OGC:1.3:CRS84" } },
 "type": "GeometryCollection", "geometries": [ { "type": "Polygon", "properties": { "REGC12": "17", "NAME": "Nelson Region" }, "arcs": [ [
 0, 1, 2, 3, 4, 5, 6 ] ] }, { "type": "Polygon", "properties": { "REGC12": "18", "NAME": "Marlborough Region" }, "arcs": [ [ 7, 8, 9, 10,
11, 12, 13, -14, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, -28, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40,
41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, -4, 2, -2, 62, 63 ] ] }, { "type": "Polygon",
"properties": { "REGC12": "01", "NAME": "Northland Region" }, "arcs": [ [ 64, 65 ] ] }, { "type": "Polygon", "properties": { "REGC12":
"02", "NAME": "Auckland Region" }, "arcs": [ [ 66, 67, 68, 69, -70, 69, 70, 71, -72, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83,
84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, -65, 95 ] ] }, { "type": "Polygon", "properties": { "REGC12": "03", "NAME": "Waikato Region"
}, "arcs": [ [ 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120,
```


As you can see in the above screenshot, information such as the boundaries of each region plus region information listed in the file with JSON format. Don't panic! You don't need to write JSON to create this file; there are much easier ways;

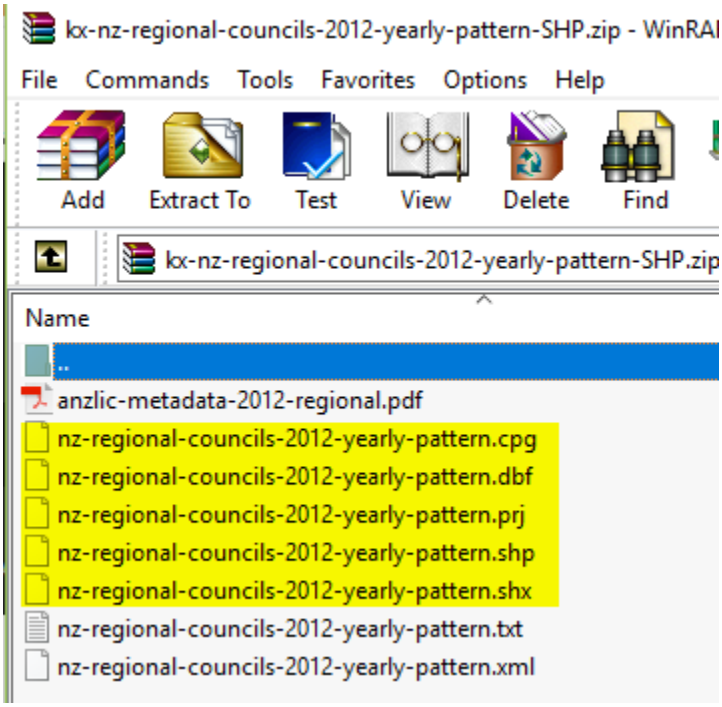
Where to Find Map?

Normally you can easily find Shapefiles of every map over the internet. For example, here is where I have found Shapefiles for New Zealand Region map;

https://koordinates.com/layer/4240-nz-regional-councils-2012-yearly-pattern/download/



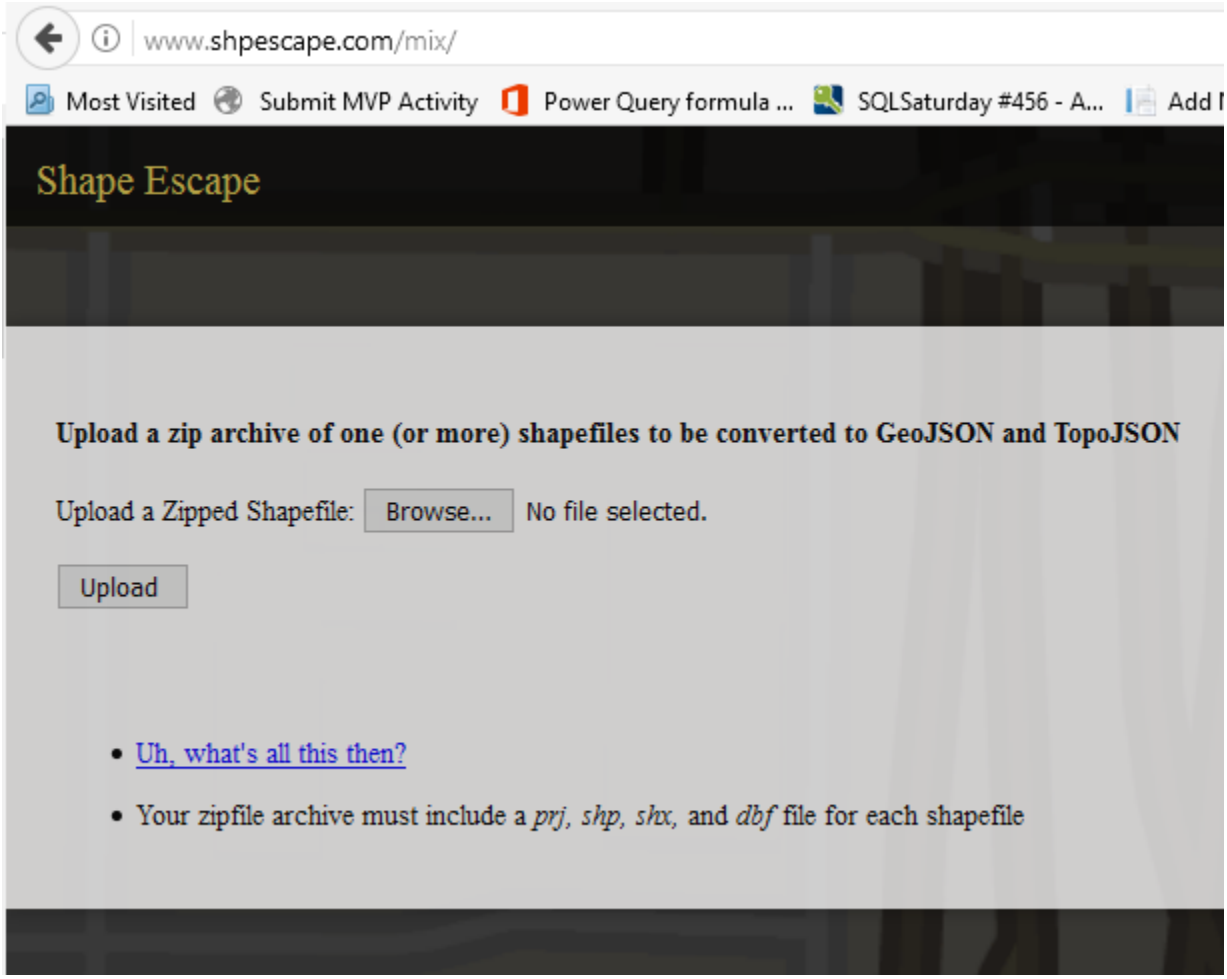
In the Koordinates.com website, you can find many other maps, and there are also heaps of other websites that give you Shapefile for the map. Shapefiles cannot be used directly with Shape Map. Shapefiles are normally a zip file including a bunch of files;



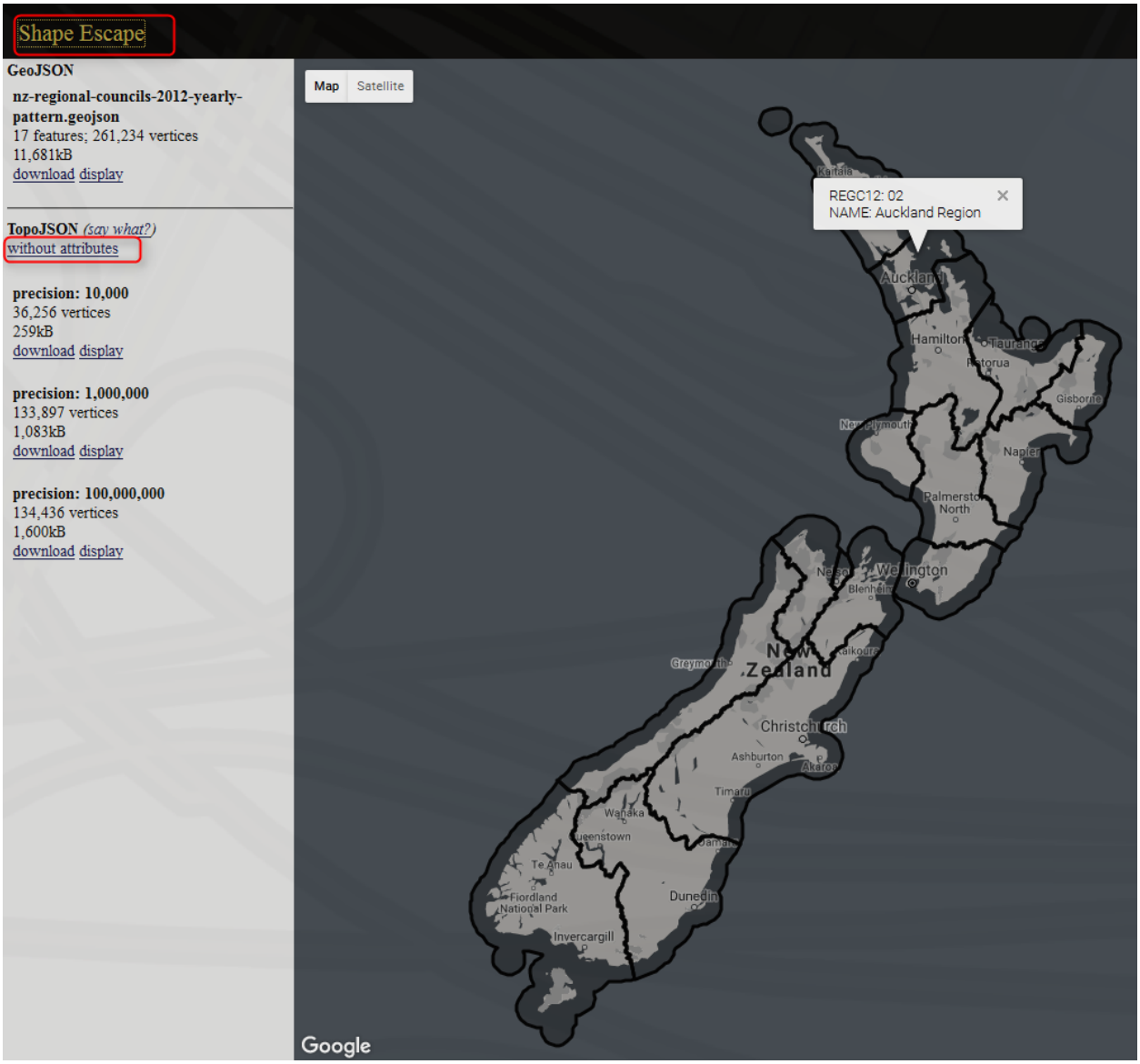
Not all files above are normally part of Shapefile zipped directory, but normally .shp, .shx, and .dbf are. Once you have the shapefile, you can easily convert it to TOPO JSON. There are heaps of converters for it. Here is one of them which one of the students in my courses found it and works perfectly;

Convert Shape File to JSON

Many websites do the conversion of Shape File to TOPO JSON. As an example **ShapeEscape** does that perfectly;

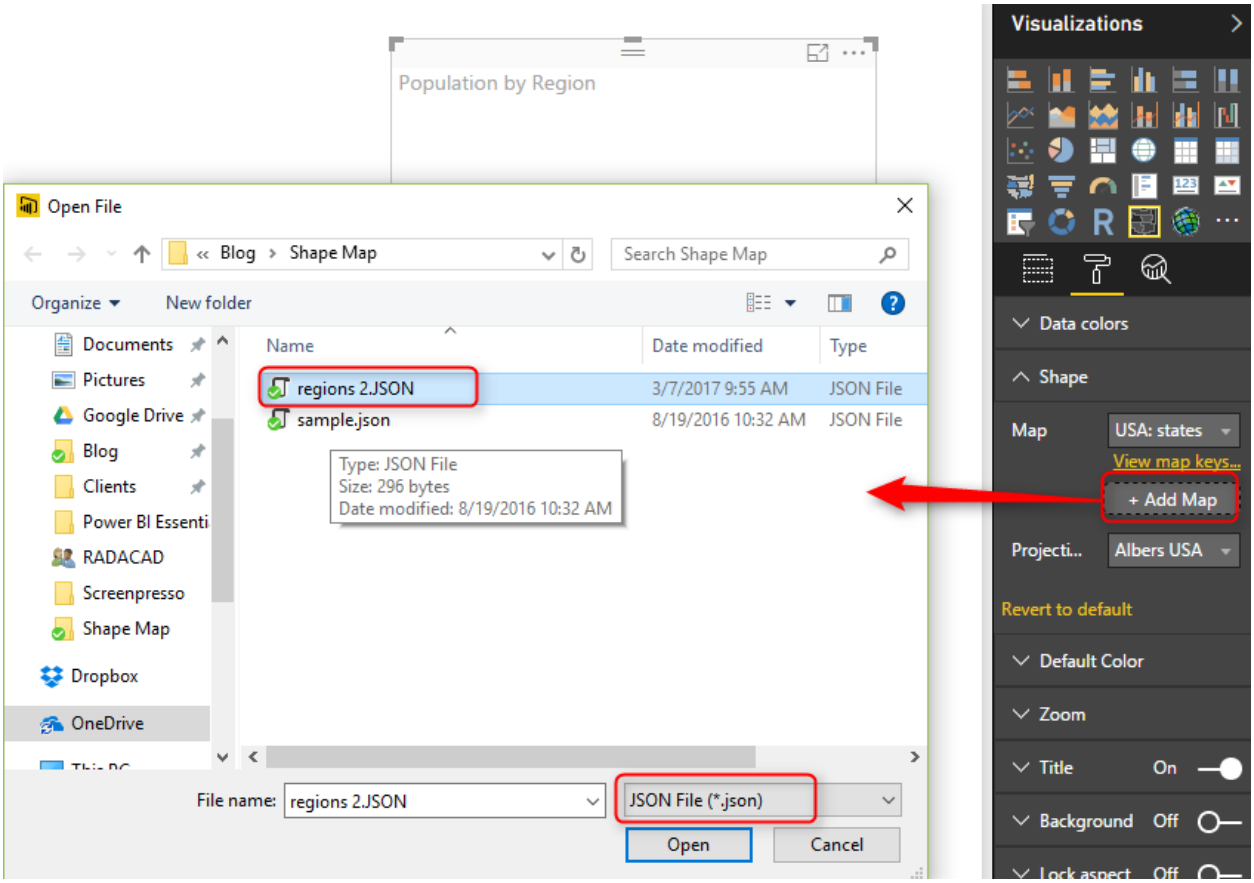


All you need to do is to upload shapefile (the zip file including everything) into the website, and it will simply show you the map. Make sure that you have selected TopoJSON map WITH attributes. To verify it; when you click on a region, you should see a pop-up text section showing name and id of that region (like the screenshot below).

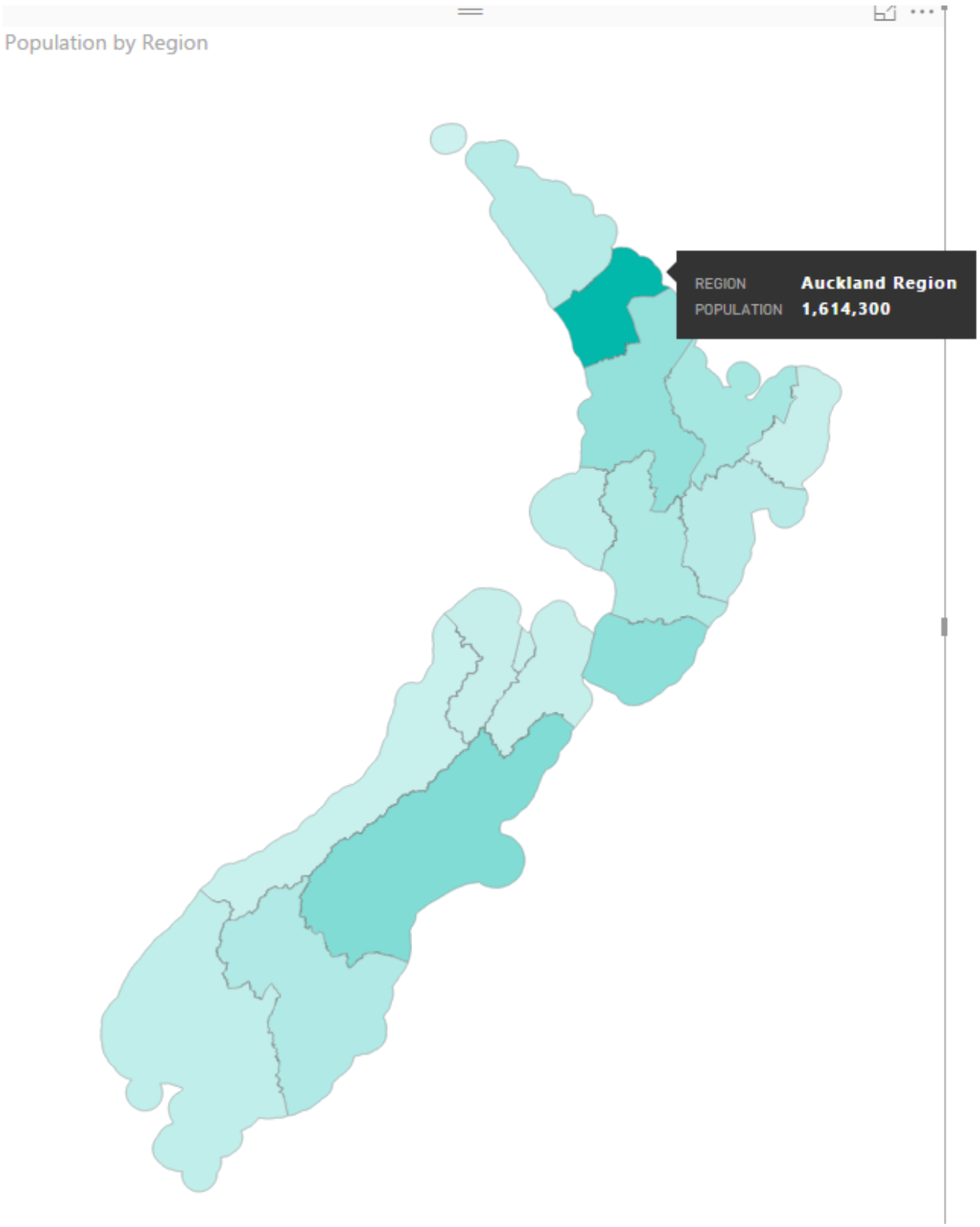


Maps can have a variety of details and depend on that the file size changes; you can select whatever details level you want. For this example, I took the most basic one with the precision of 10,000. When you click on download, you can copy the entire JSON code into a text file, and put a JSON extension for it.

Now you can add the custom map to Shape Map visual;

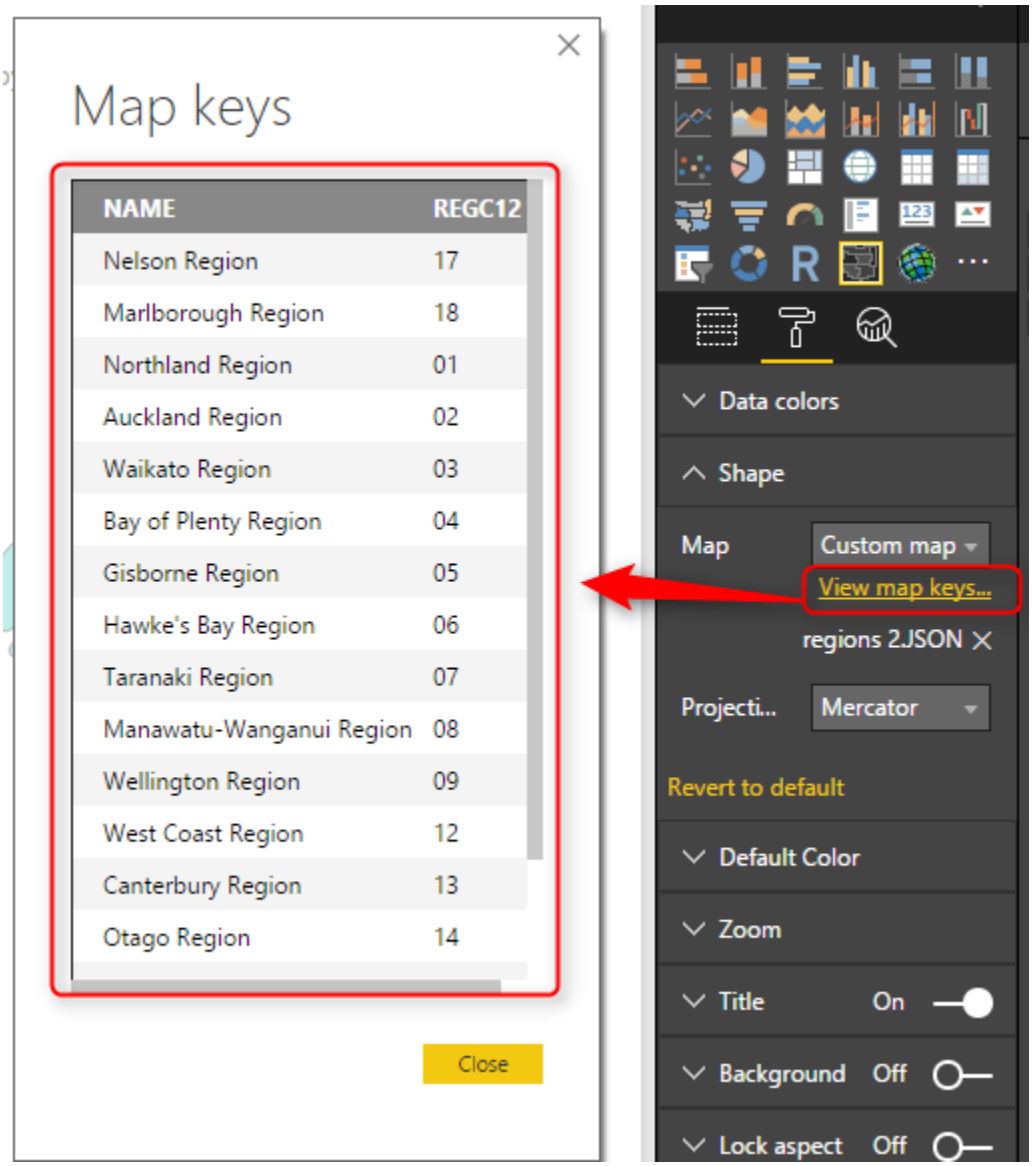


It will take a few seconds for the map to load, and then you will see your regional map visualized:



If you cannot see regions color-coded, probably the attributes part of the map file is missing. Verify that in Format -> Shape section with clicking on “View Map Keys” You

should see region names and their keys. If you see nothing, or names are not correctly populated, then try to convert shape file again (make sure that you get the converted file WITH attributes);



Pros and Cons of Shape Map

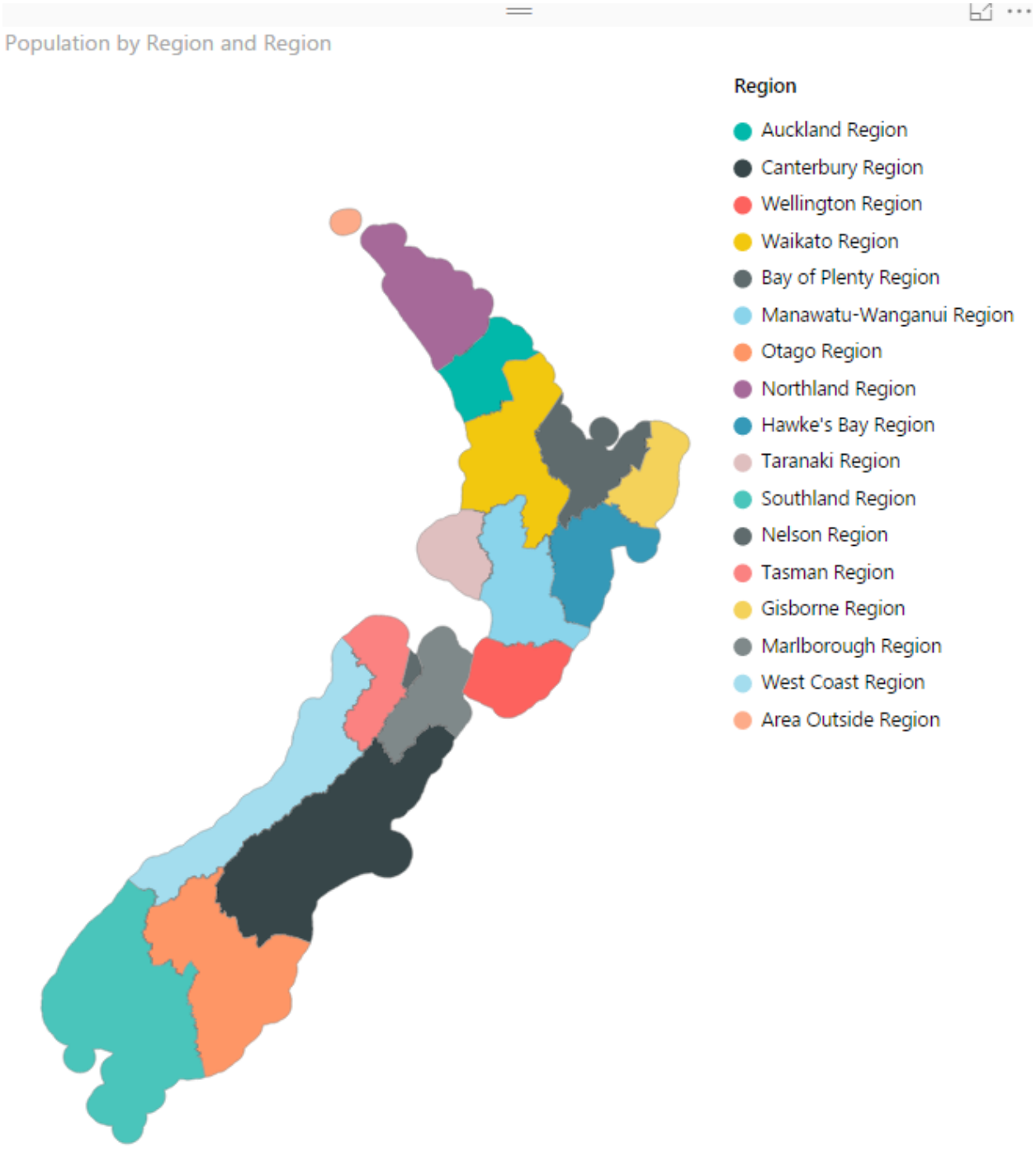
Shape Map despite its simplicity is very powerful. Think about the ability to add your map, and that means no limit! All you need is just some tools to build your map and convert it to Topo JSON format. There are many free or paid tools for it. There are however some limitations for this visual, which I hope get fixed before the general availability ☺ Here are pros and cons in nutshell;

Advantage: Add any Map!

It is not a common feature in Power BI map visuals that you can add your map. I have previously explained about SynopticPanel visual by OKviz which allows you to do that. However that is a custom visual, and this one is a built-in visual. And this one works with the Topo JSON standard of geolocation.

Limitation: General Map Features

This visual is still in preview mode, and it lacks many features that can be available for map visuals. For example, you can specify different colors for every region through Legend. However, drill down/up is not possible. You cannot add other layers of the map to it (for example if you want to add a heat map or bubbles to it).



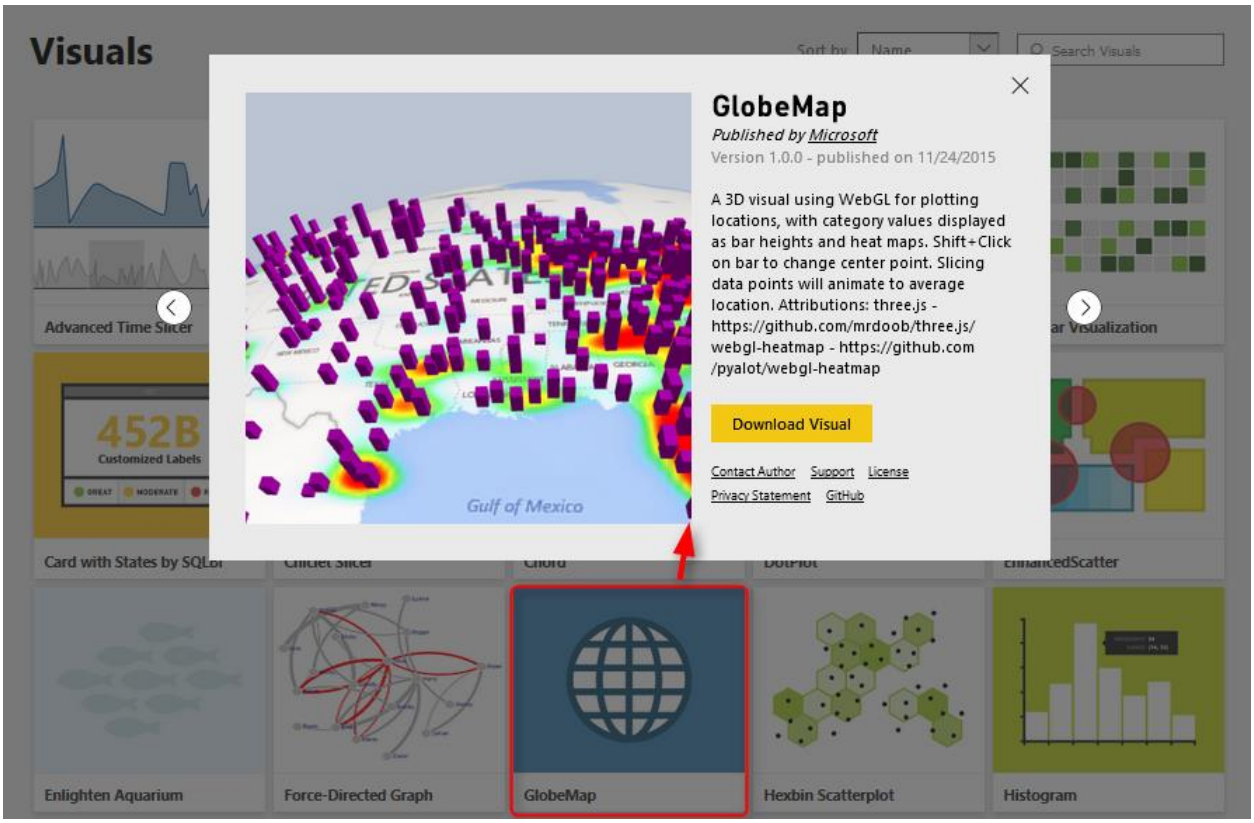
Summary

In summary Shape map in my point of view is a powerful map visual for Power BI especially because of the feature to add your map. Finding a map isn't easy with the help of Google and websites that do the conversion (such as ShapeEscape). This visual

still has some limitations due to the preview mode of it, which I believe will be sorted in the next few months.

Power BI Says Hi to 3D Maps

Published Date: November 25, 2015



If you've read my previous articles about Power BI, you know that Power BI has five main components: Power Query, Power Pivot, Power View, Power Q&A, and Power Map. So far all of these components were now supported in PowerBI.com website as part of your Power BI solution except Power Map! Power Map was the only component that you could use in Excel for Office 365 subscription, and it allowed you great 3D Geospatial visualization with the ability to tell stories with videos based on animated tours. The great news today is that Power BI Desktop now supports 3D map visualization, but is that visualization same as what Power Map exactly does? Let's find out.

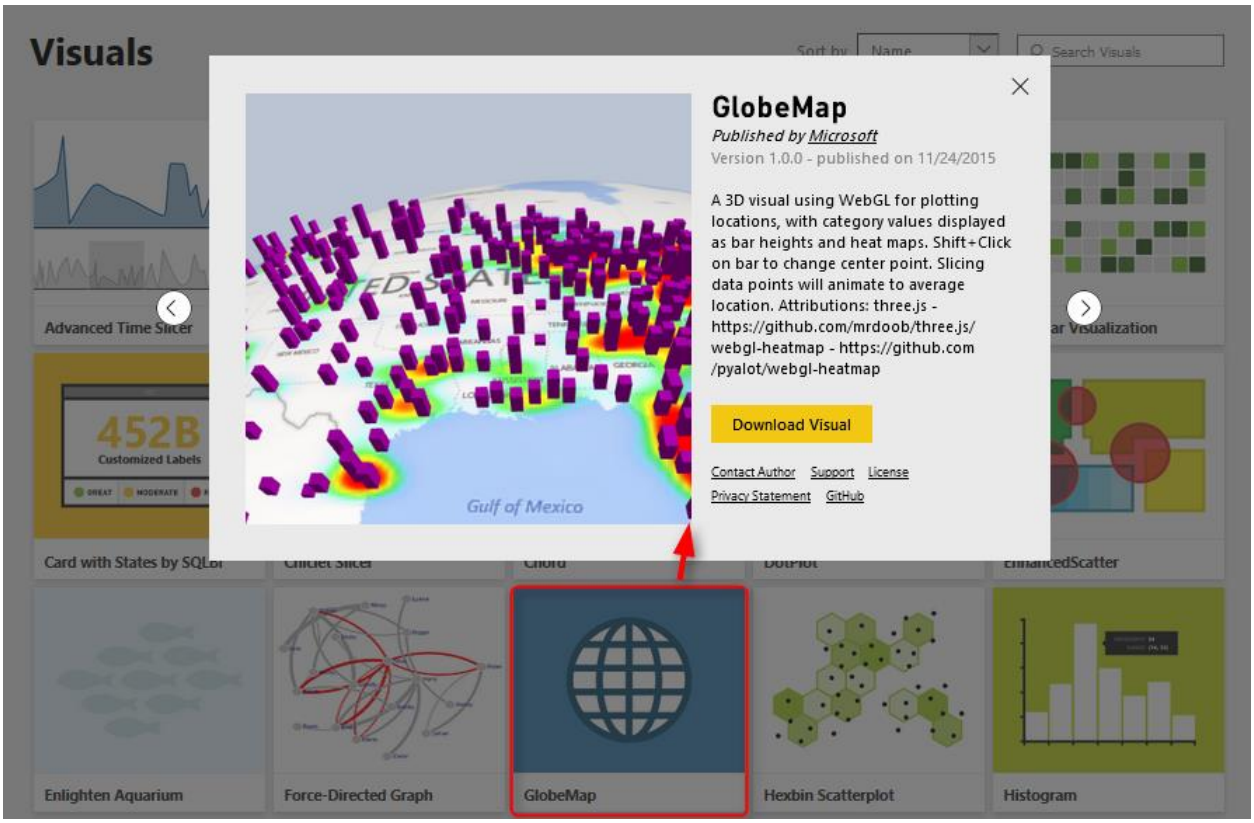
3D Visualization in Power BI Desktop

I've heard of these features first in a session at PASS Summit 2015, and I was looking forward to seeing the feature be available to run some tests on it. My Particular interest

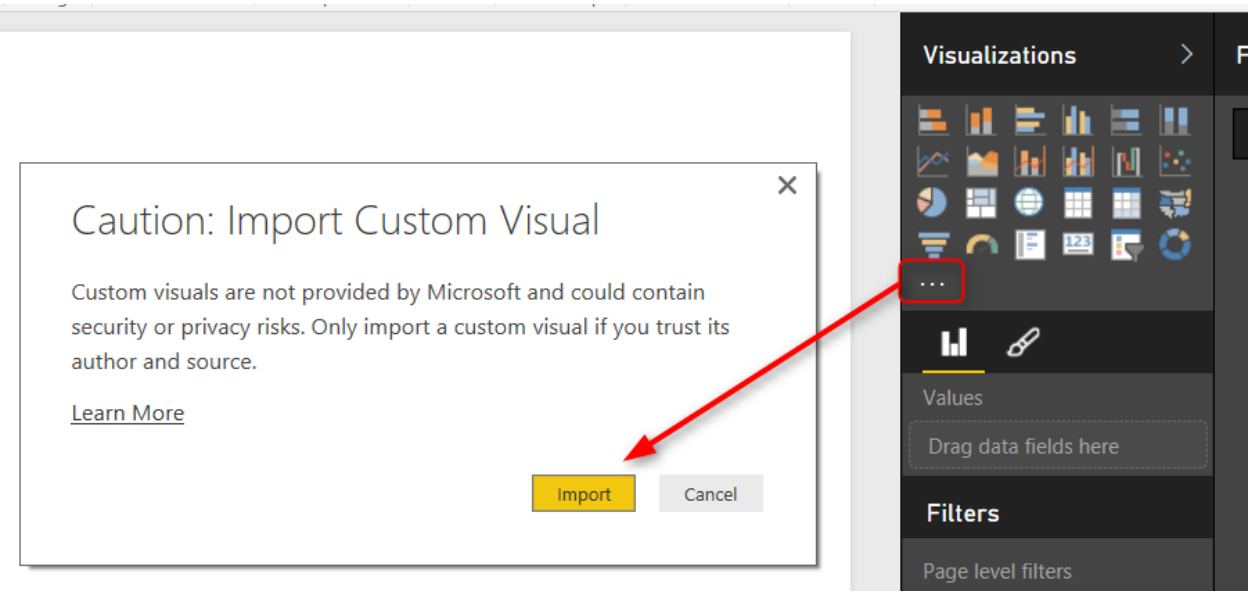
was because I've done some interesting projects on Geospatial data visualization with Power Map for different clients, and I know what their requirements in that area are.

Fortunately today Microsoft Power BI team announced that 3D map feature added to Power BI through Custom Visuals. So let's see how it looks like. For using this visual, you have to download it first from Power BI Visuals Gallery:

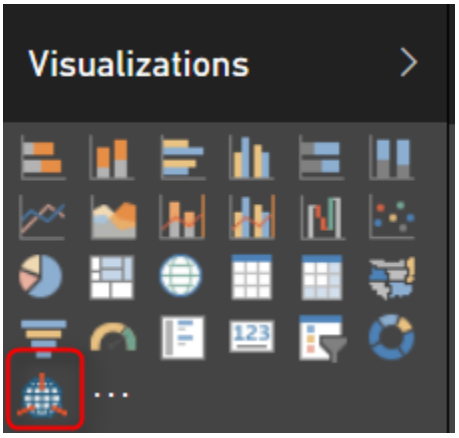
https://app.powerbi.com/visuals



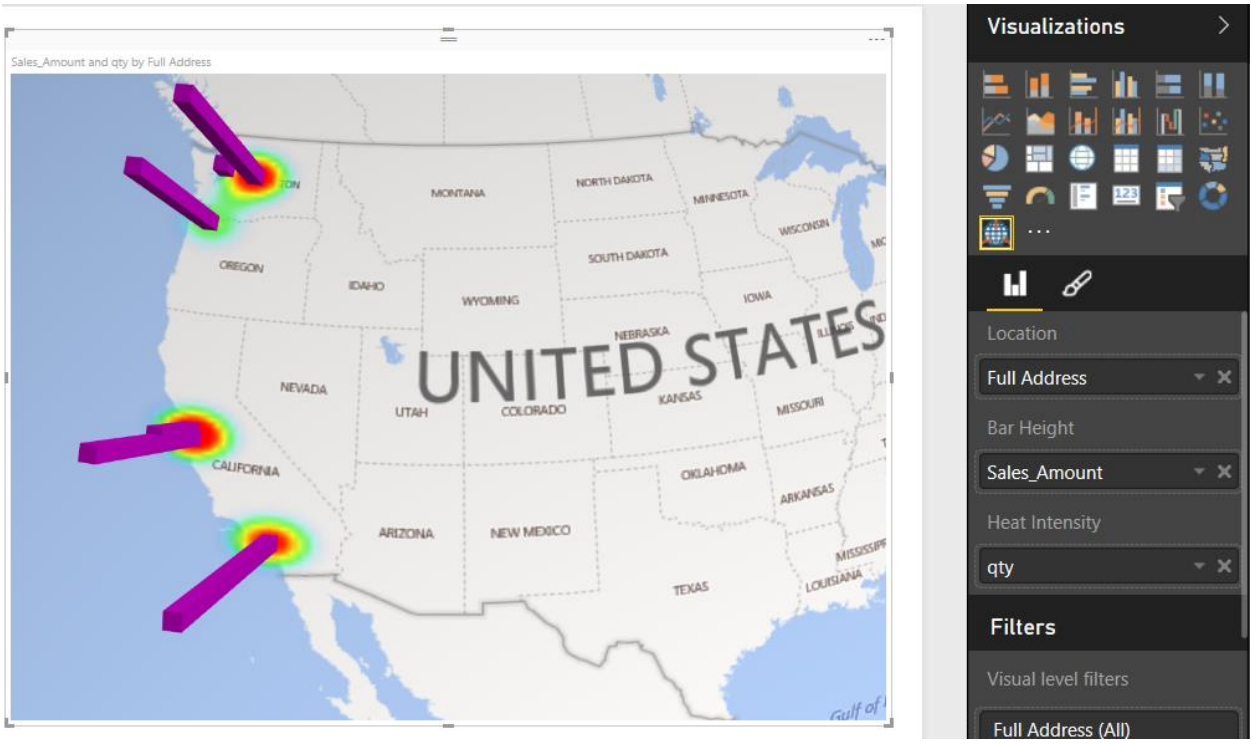
After downloading this visual, you can import it into Power BI desktop



Now you see Globe Map visual added to the visualization pane



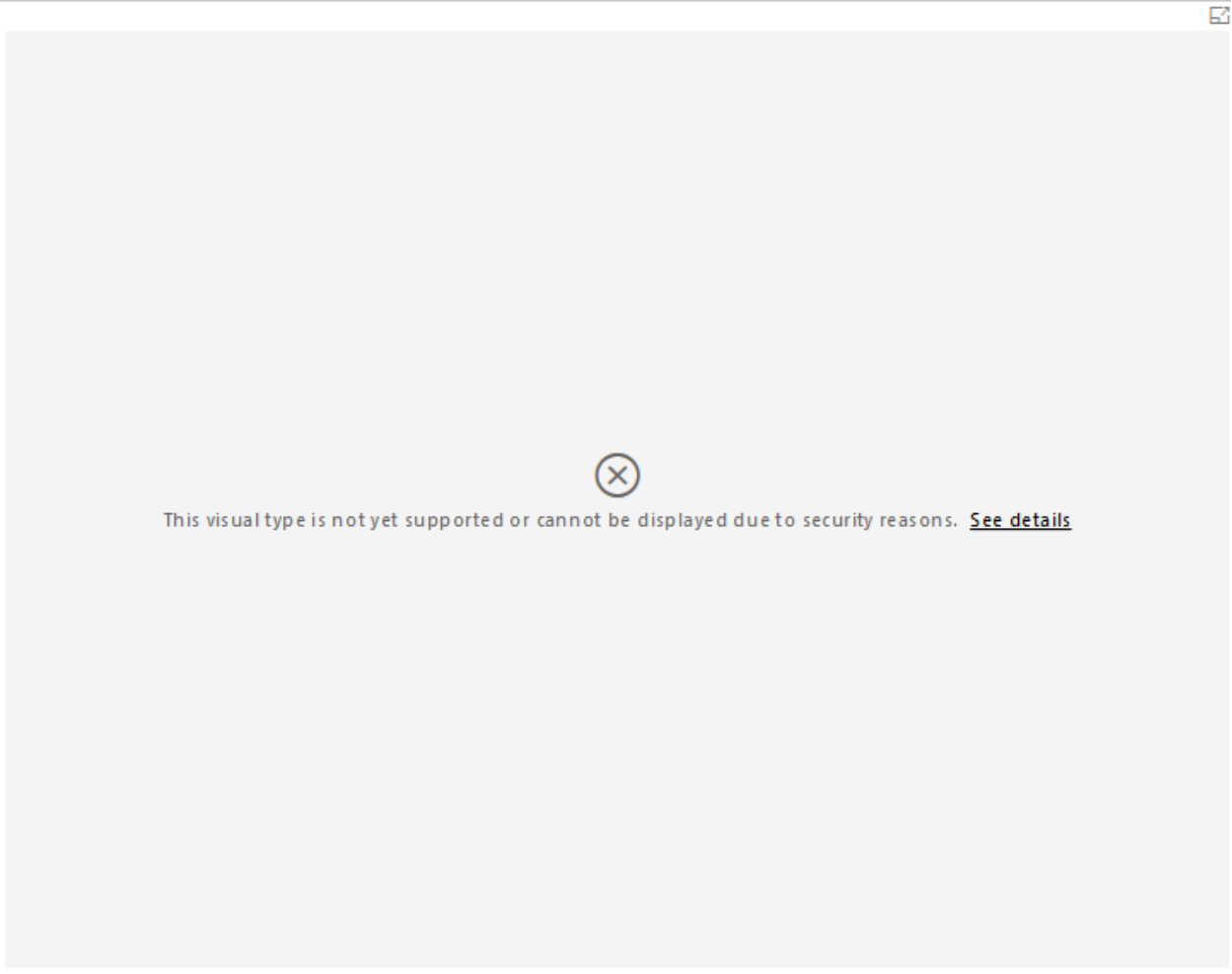
I show my sample [Pubs map demo of Power BI] here with Globe, and here it is;



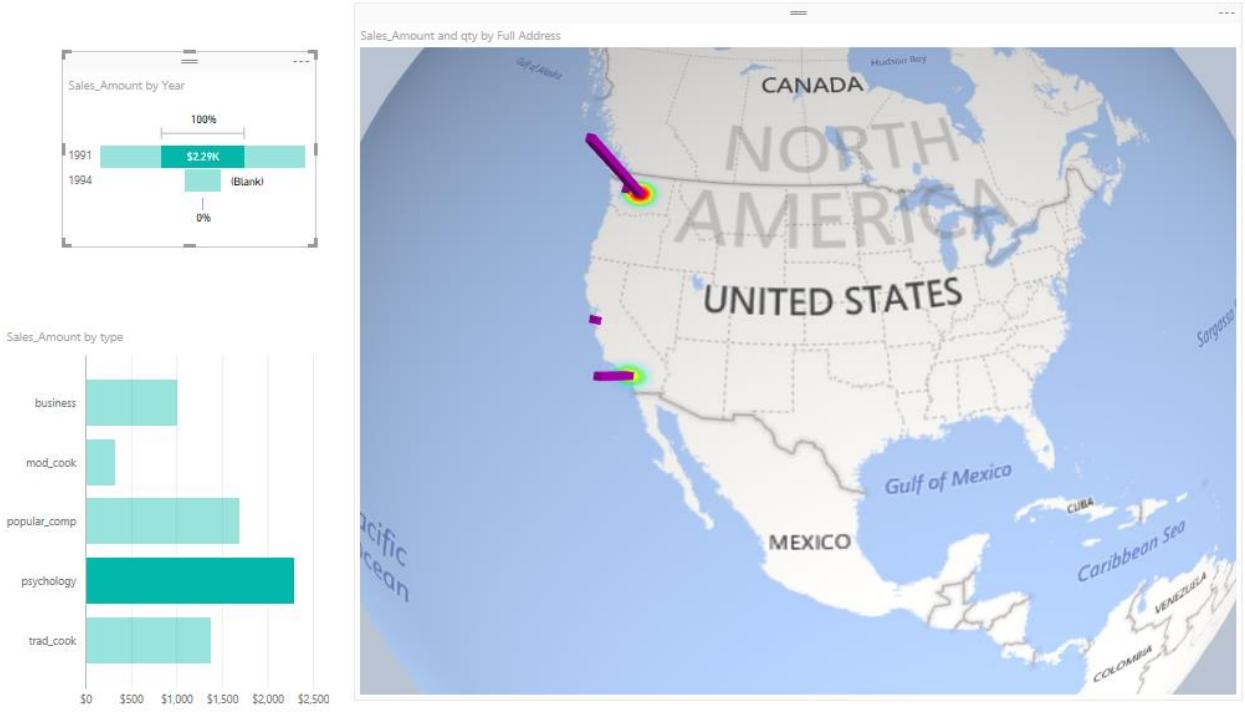
As you see a nice 3D map showed here easily. However, there are no particular options for it. It is just a 3D map! If I wanted to zoom into a part of the map on a particular angle, I could not do that.

The map, however, can show two measures; one as the height of the bar chart, and another one as a heat map. You can see that the above map shows sales amount as height and quantity of sales as a heat map.

You can not yet see Globe visual in PowerBI website; I reckon that would come very soon. But for now if you publish your report you will see this;

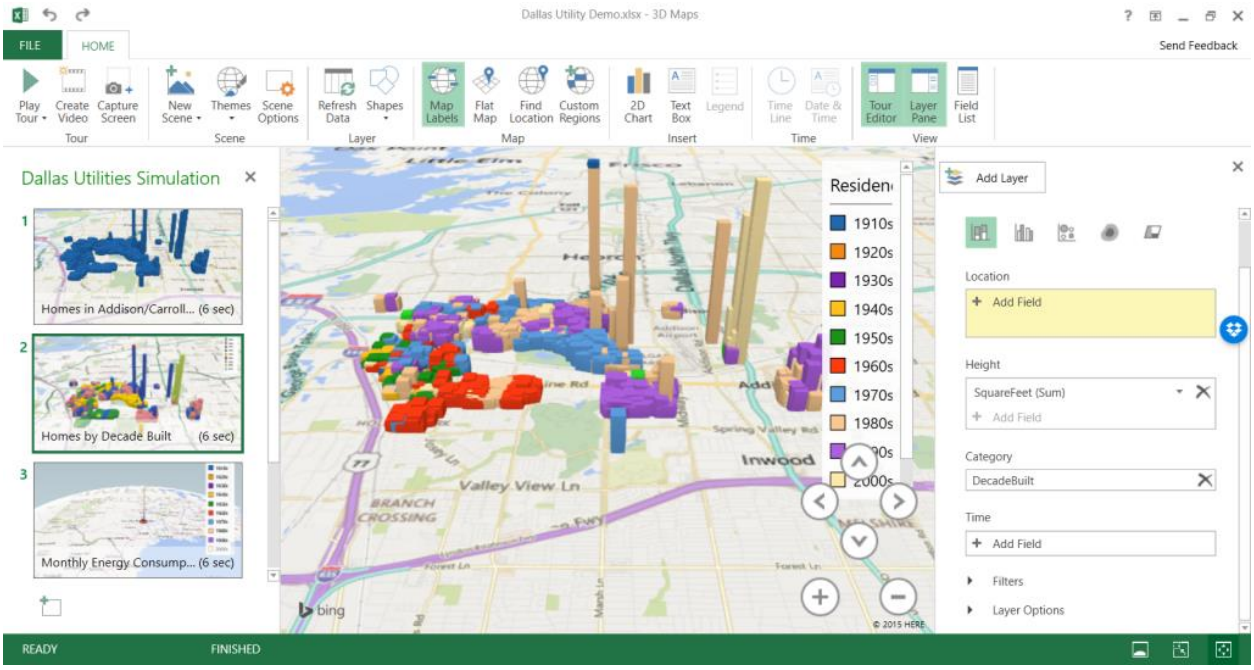


One specific good feature of Power BI Globe visual is that it sync simply with other visualization items in the report (it is not an isolated component as Power Map), so if you click on column chart's specific column, you will see only related part of the data for that visualized in the map.



Power Map

Well, Power Map is much more mature in 3D Geo-Spatial visualization, you can have different layers of visualization (such as column chart and heat map, and region visualization). You can zoom into a map on a particular angle if you want to. You can have a play axis which is very important for storytelling.



Here are some features on Power Map, and the information about either they are or not yet supported in Power BI;

Feature	Power Map	Power BI 3D Globe Visual
3D Geo-Spatial Map	Yes	Yes
Bing Map	Yes	Yes
Column Chart	Yes	Yes
Heat Map	Yes	Yes
Zoom in/out	Yes	Yes
Stacked Column	Yes	No
Bubble Chart	Yes	No
Region Visualization	Yes	No
Synchronization With Other Charts in Report	No	Yes
Customization on size and opacity of columns	Yes	No
Map Labels option	Yes	No
Custom Regions and Custom Map	Yes	No
Scene Creation	Yes	No
Video creation	Yes	No
Camera Movement	Yes	No
Time/Play Axis	Yes	No
Host and Show 3D map on Web	No	No

Conclusion

Power BI team did a great step forward with adding 3D map visual in Power BI Desktop. Thank you Microsoft Power BI team because of that! It is really useful for some scenarios that users need to see visualization on 3D map. However this feature is far behind Power Map features for storytelling, creating tours, play axis, and many other features. I believe

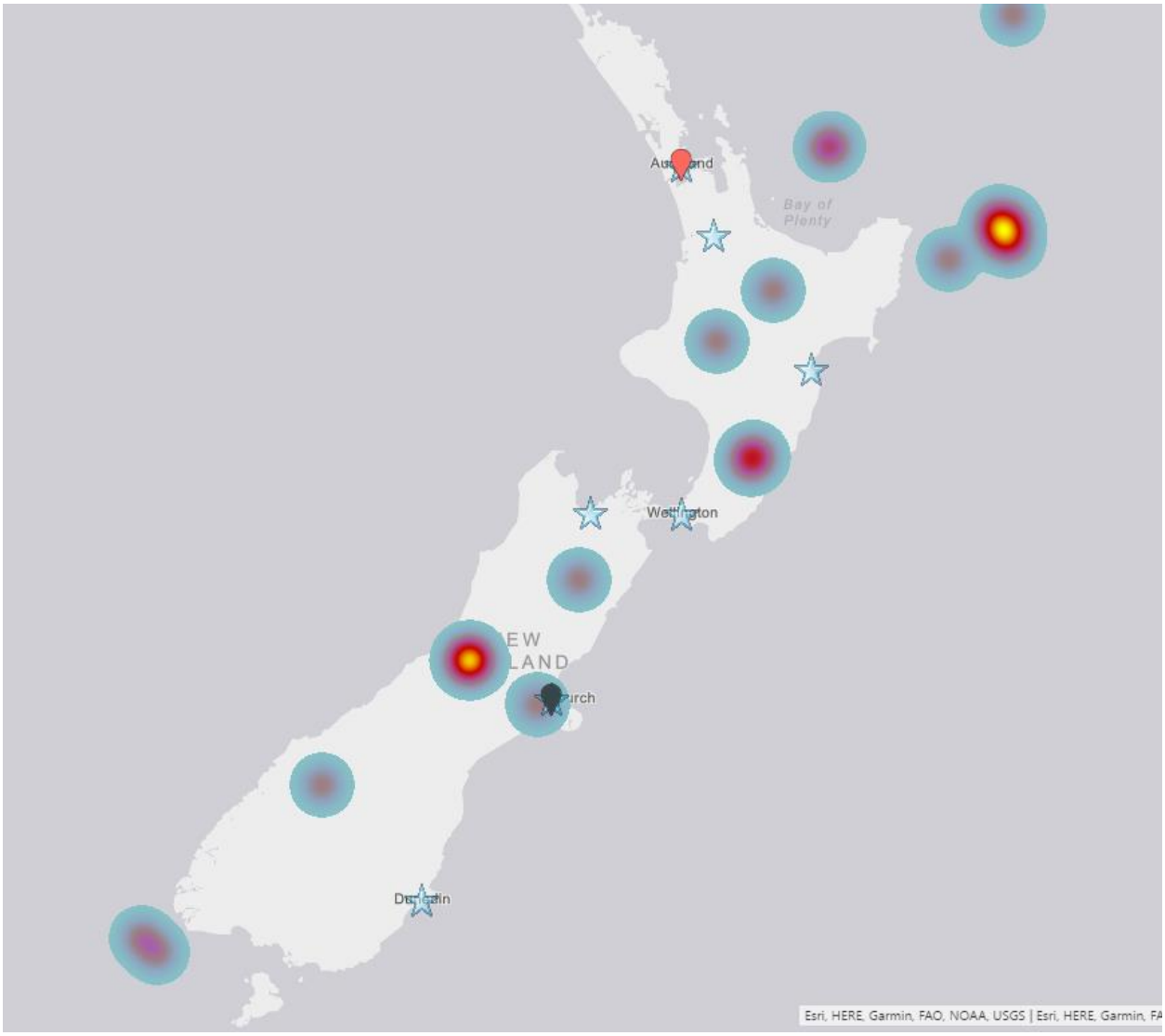
that soon many of these features will be added to Power BI. So I say Power BI said hi to 3D maps, but please be quick on that Microsoft team because Power Map raised expectations of our clients to a very high level! They will be looking for same features (at least) in Power BI desktop.

A Question For You

Have you ever used the Power Map or any other 3D Geo-Spatial data visualization tools? What are the features of that (those) tools that you liked most? What are features that you didn't use? What about Power Map? What are great features of this product from your (or your customers) point of view? And what needs to be added?

ArcGIS Map in Power BI; Simple, But Insightful

Published Date: April 13, 2017



I have written about four other types of map visual with Power BI before. In this post, I want to explain how ArcGIS visual work as a map visual. There are some specific features in this visual which are simple to use but will give you a lot of insight. With this type of map visual, you can add multiple layers of data, and use even some of the existing geolocation information from ArcGIS map directory. Let's go through an example and

see what features with this visual are. To learn more about Power BI, read Power BI book from Rookie to Rock Star.

Maps in Power BI

There are many ways to visualize something on Map in Power BI, some of it is as below;

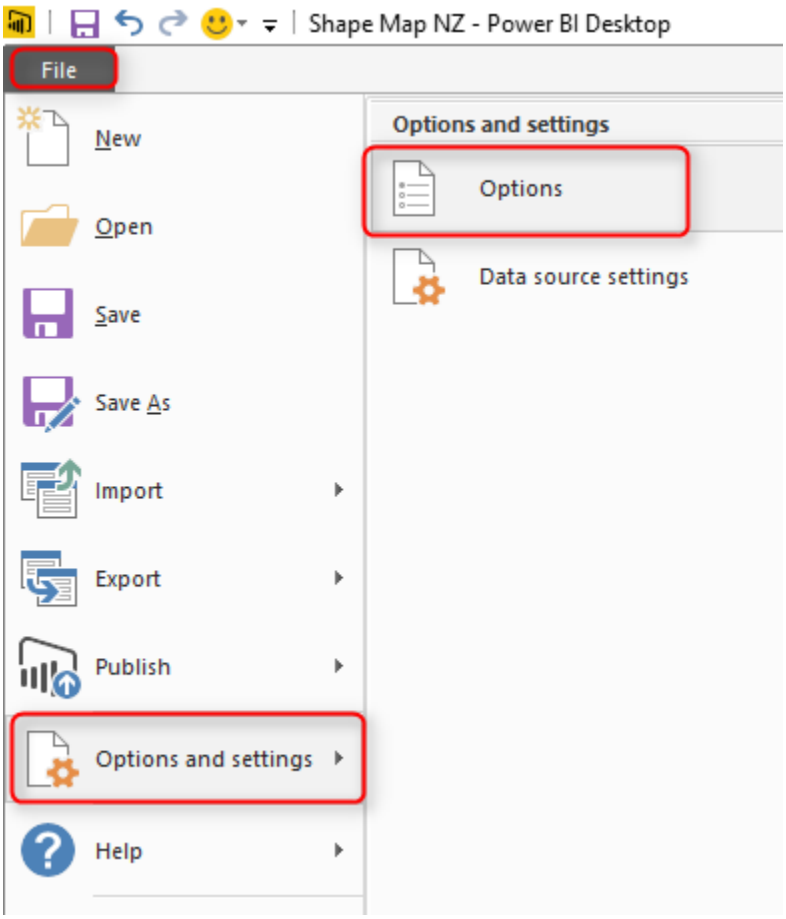
- Map Visual
- Filled Map Visual
- Custom Visuals – Synoptic Panel by OKviz
- Custom Visuals – GlobeMap by Microsoft
- Shape Map Visual – Preview
- ArcGIS Map Visual – Preview

I have written about them all except the last one. This post focus is on ArcGIS Map visual. Hopefully, in the end, I will write a post about the comparison.

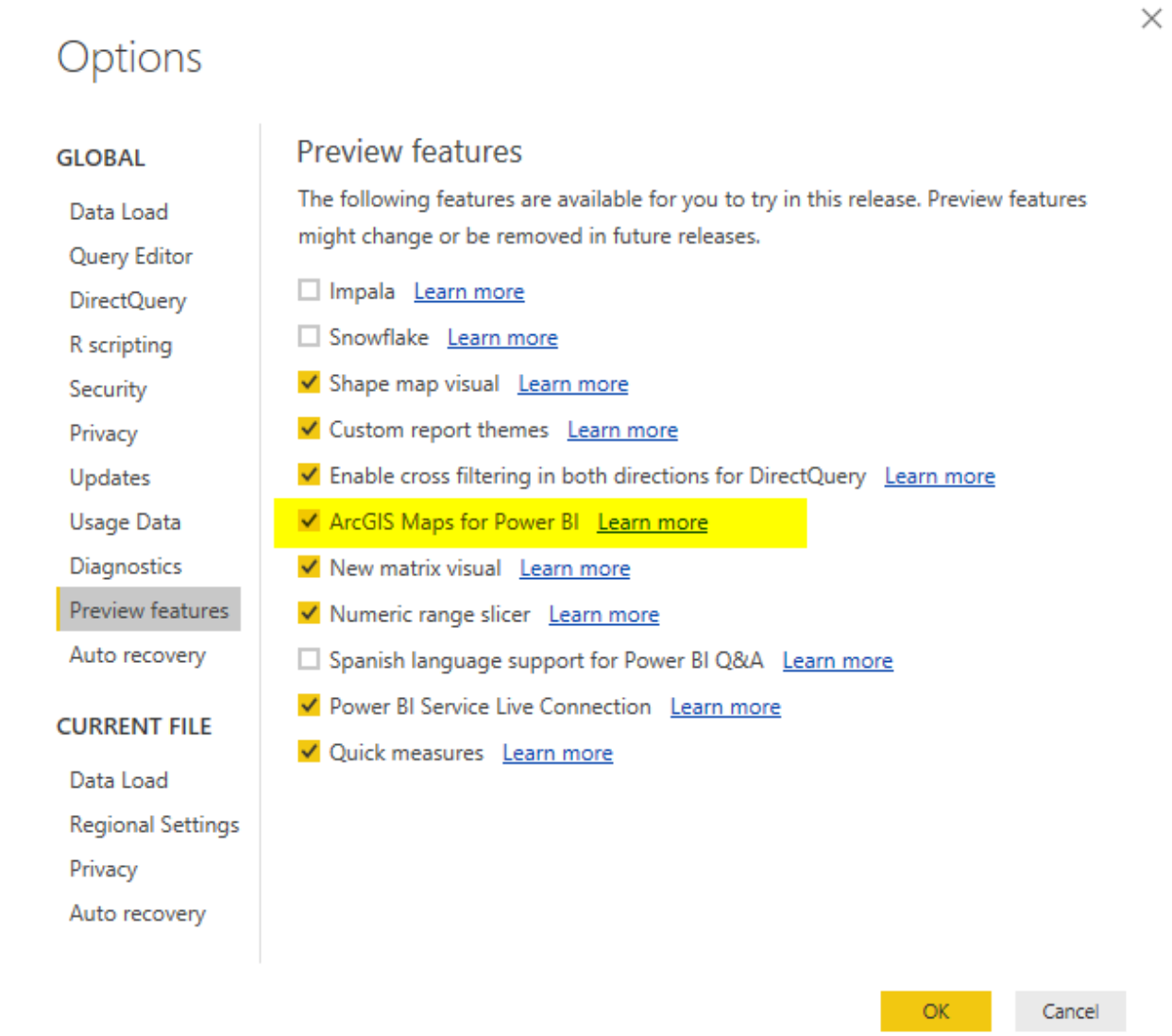
ArcGIS Map Visual

This visual is still preview at the time of writing this post, and for using it, you need to enable this preview feature. To enable it to go through:

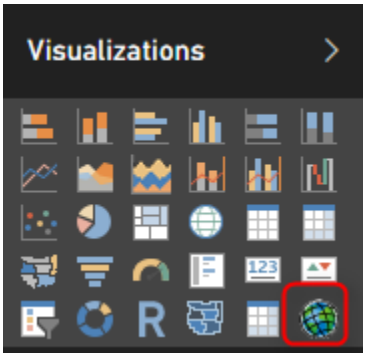
File Menu -> Options and Settings -> Options.



In preview features tab, select ArcGIS Maps for Power BI.

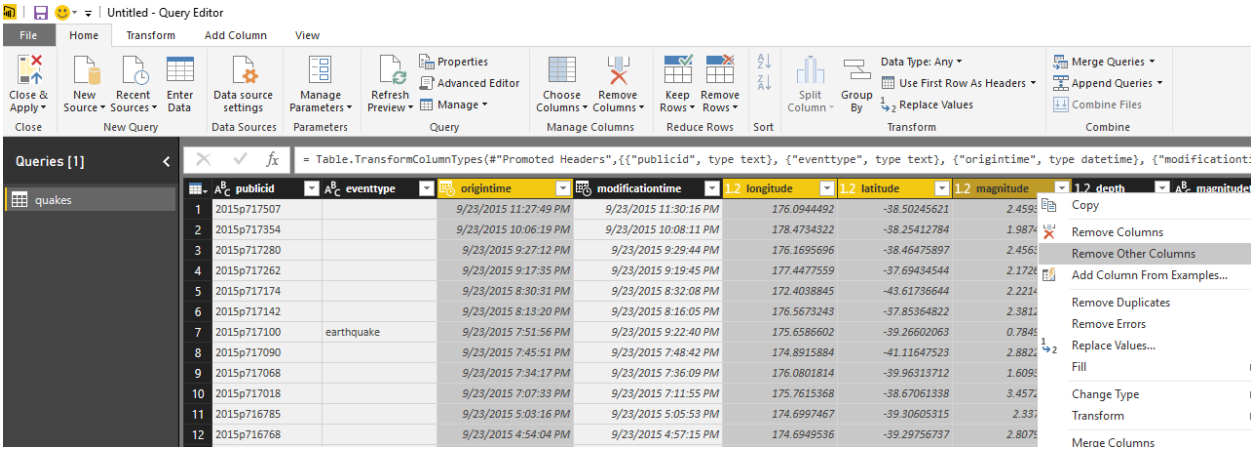


After clicking OK. You need to close your Power BI Desktop and re-open it again. You should be able to see ArcGIS Map visual in the list of your visuals now.

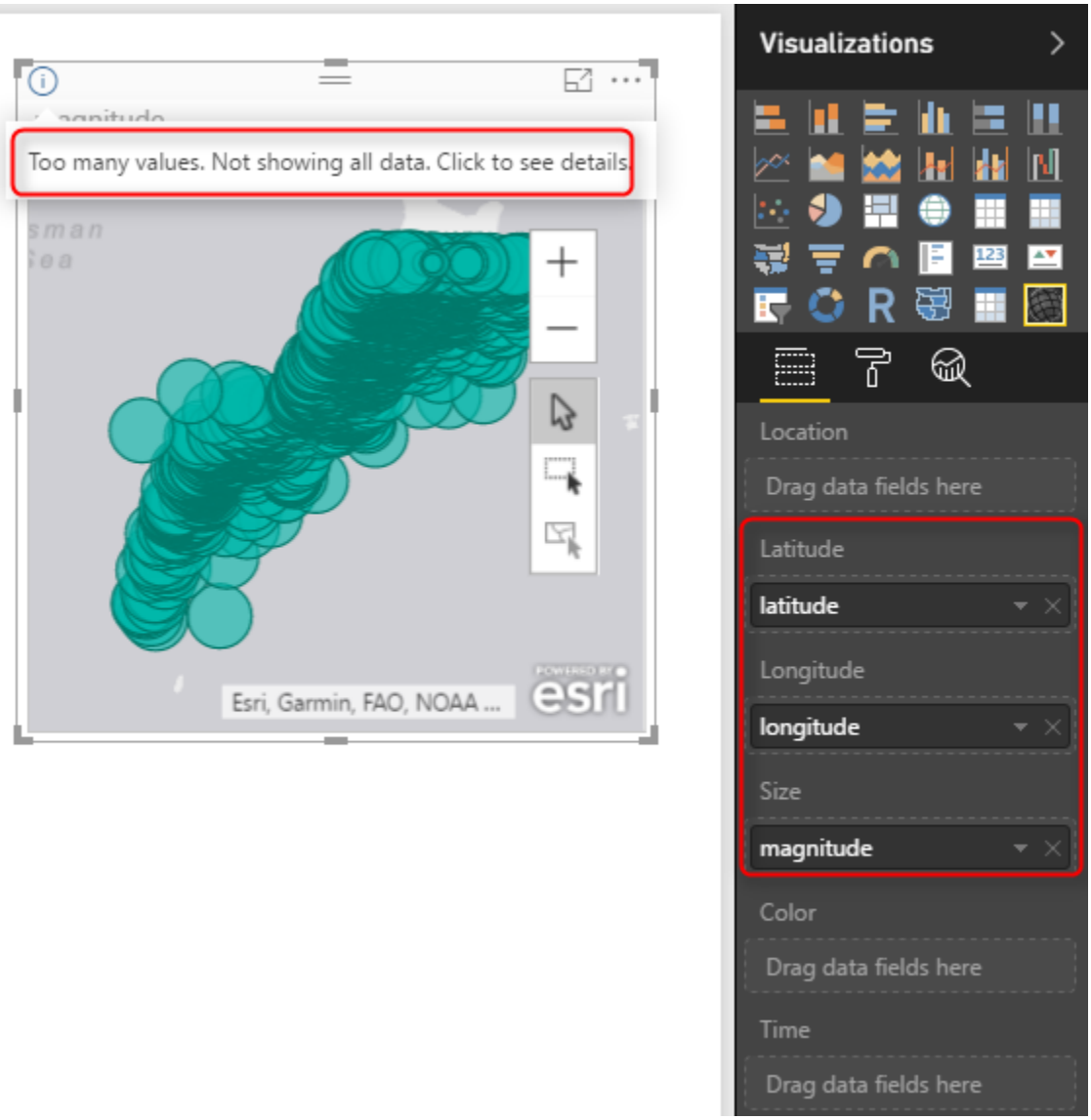


Get Data

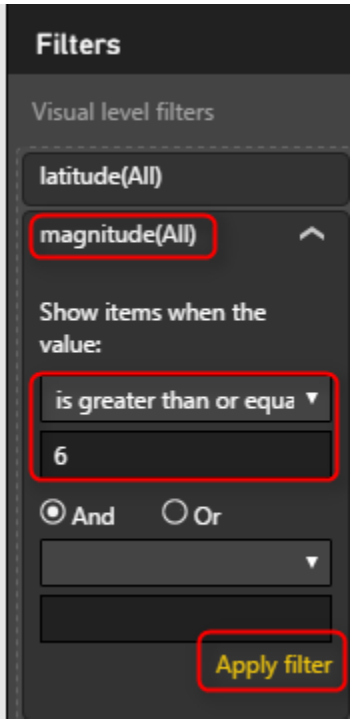
To start with the sample data set, Get Data from Text/CSV, and select the quakes.csv file (link above in this post), Click on Edit in Navigator window, and you will see the whole data set. Only keep these columns and remove the rest: Longitude, Latitude, Magnitude, and Origintime. That means; select these columns, and from the right-click menu, click on Remove Other Columns.



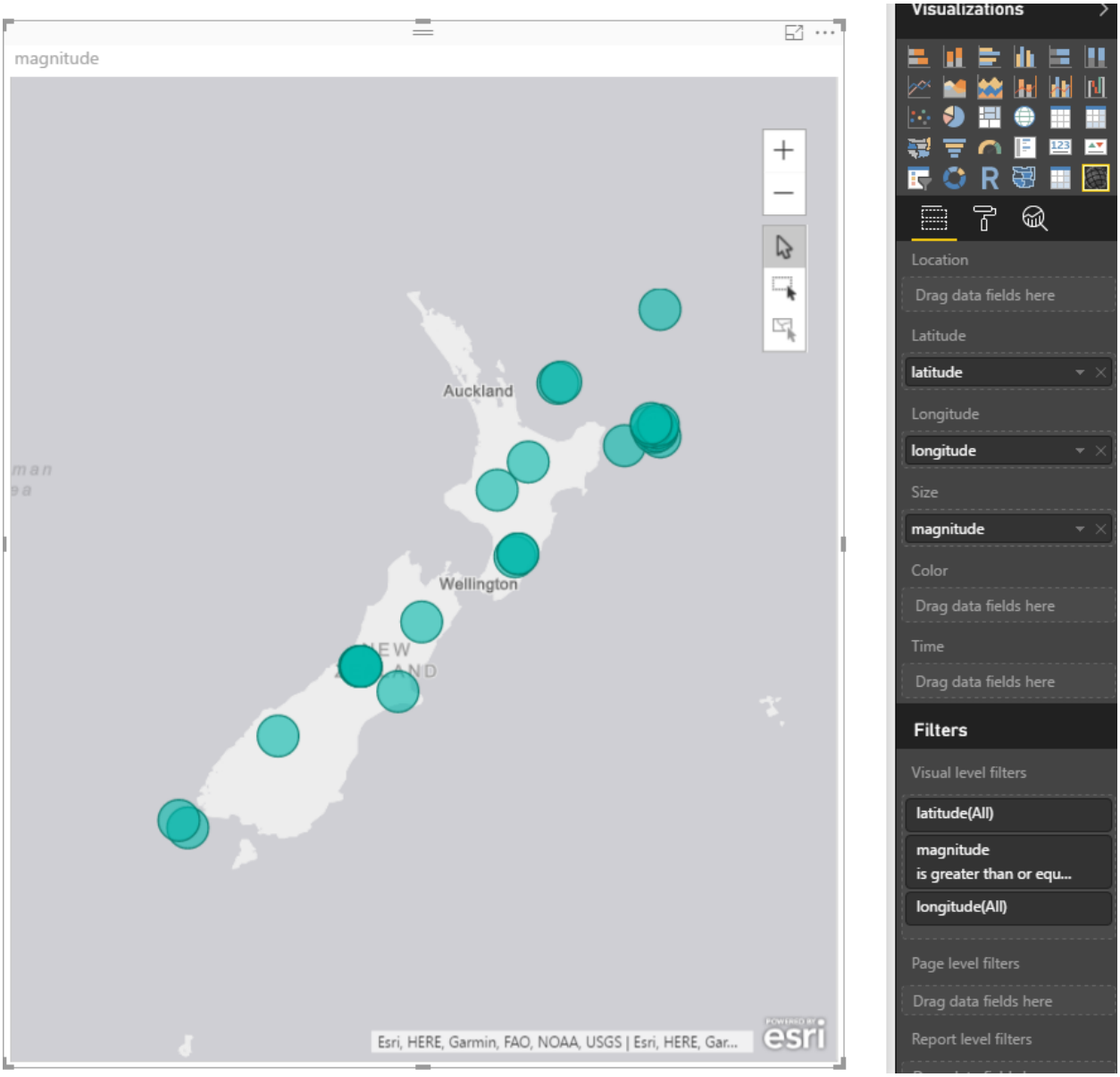
Close and Apply the Query Editor window. Drag and Drop a new ArcGIS map visual in the report, and assign values from latitude to latitude, longitude to longitude, and magnitude from fields list to the Size section of the visual.



This visual, like the basic map visual in Power BI, has a limitation on the number of data points to show. Because we have 20K data points, it cannot visualize them all. Let's filter the data set, and only focus on everything with magnitude greater or equal to 6. For doing this in visual level filter expand the Magnitude filter and apply to filter. Remember to click on Apply Filter. Otherwise, nothing happens.



After applying the filter, you would see only a few numbers.

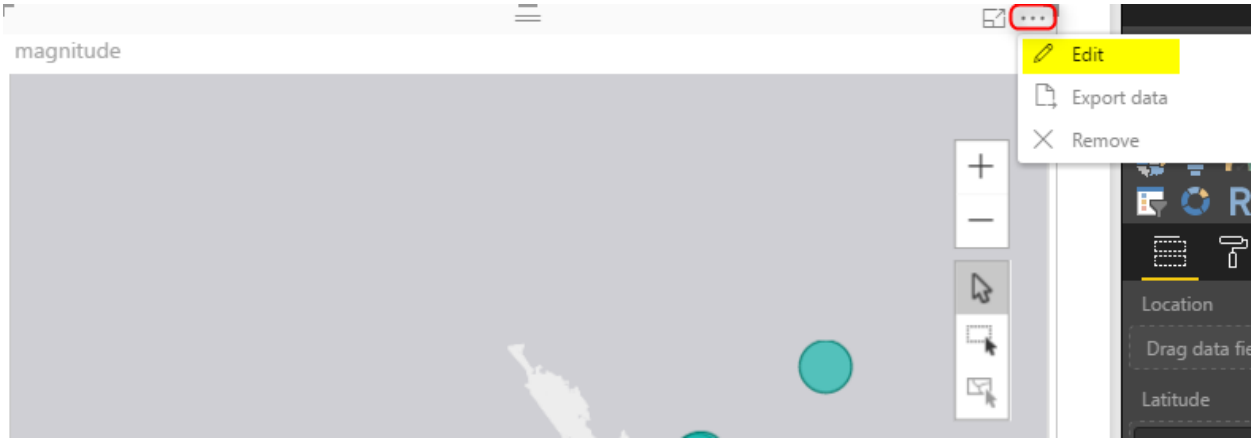


All of these earthquakes with a magnitude of more than 6 happened in 2015! Can you imagine?!!!! Anyway, let's go back to ArcGIS map;

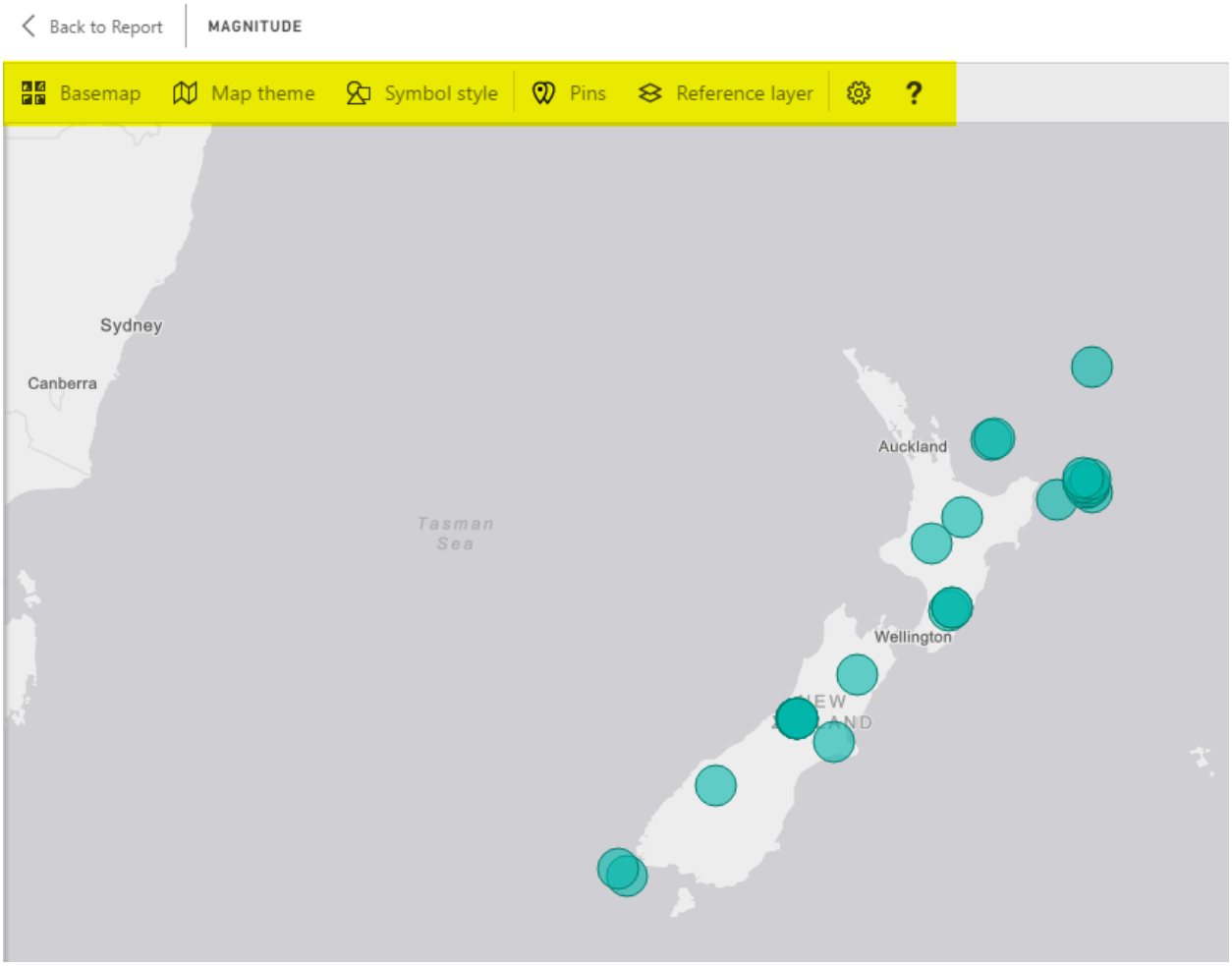
So far, the map is very similar to normal Power BI basic map visual with bubbles. Now let's see what other options we have with ArcGIS visual;

ArcGIS Features

To go through features of this visual, you need to click on three dots icon on the top right corner of visual and click on Edit.

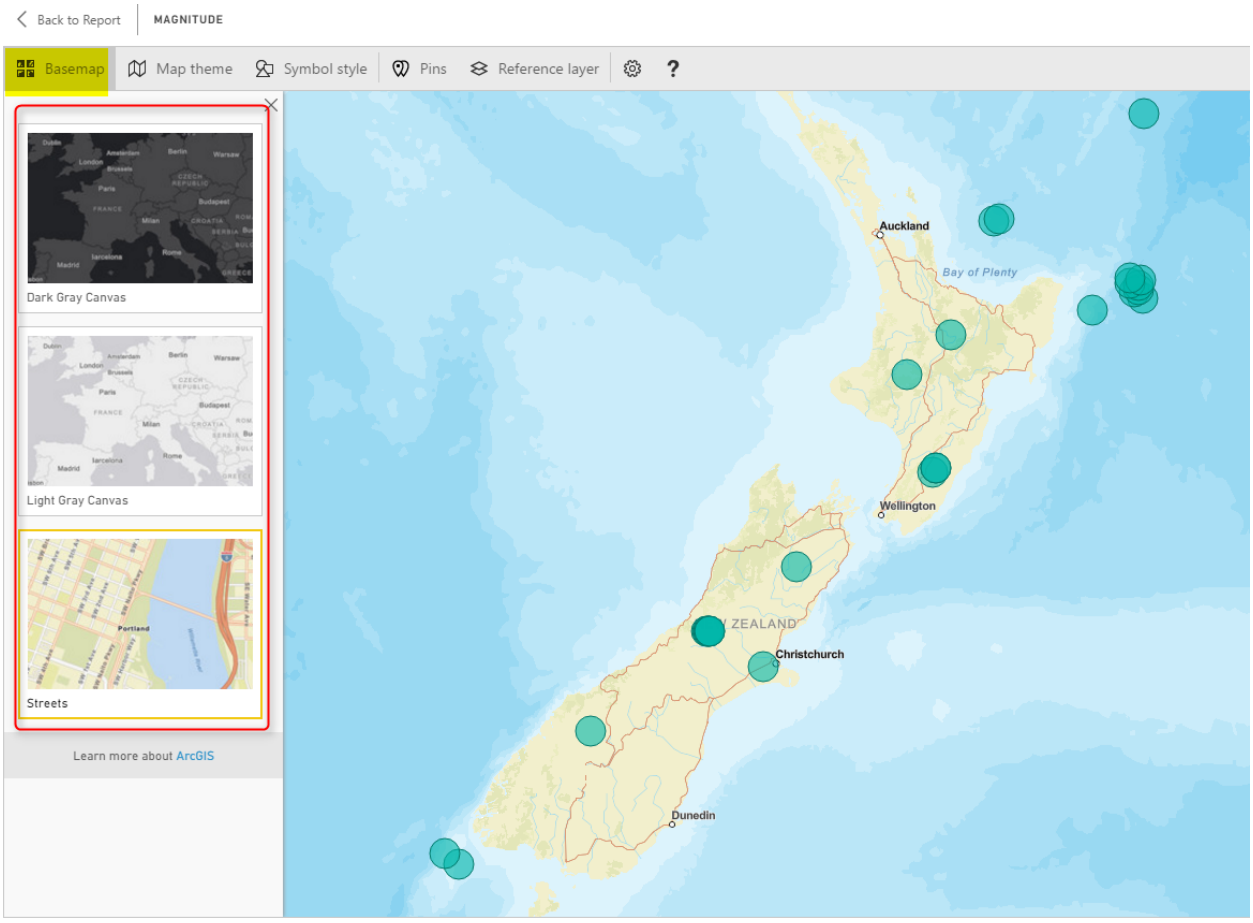


You will be redirected to an Edit mode, where you will see the map in full-screen view, and number of menu options at the top;



Change Base Map

The first change you can make is changing the base map, to be something different. You can choose from Dark Gray Canvas, Light Gray Canvas (Default), or Streets.



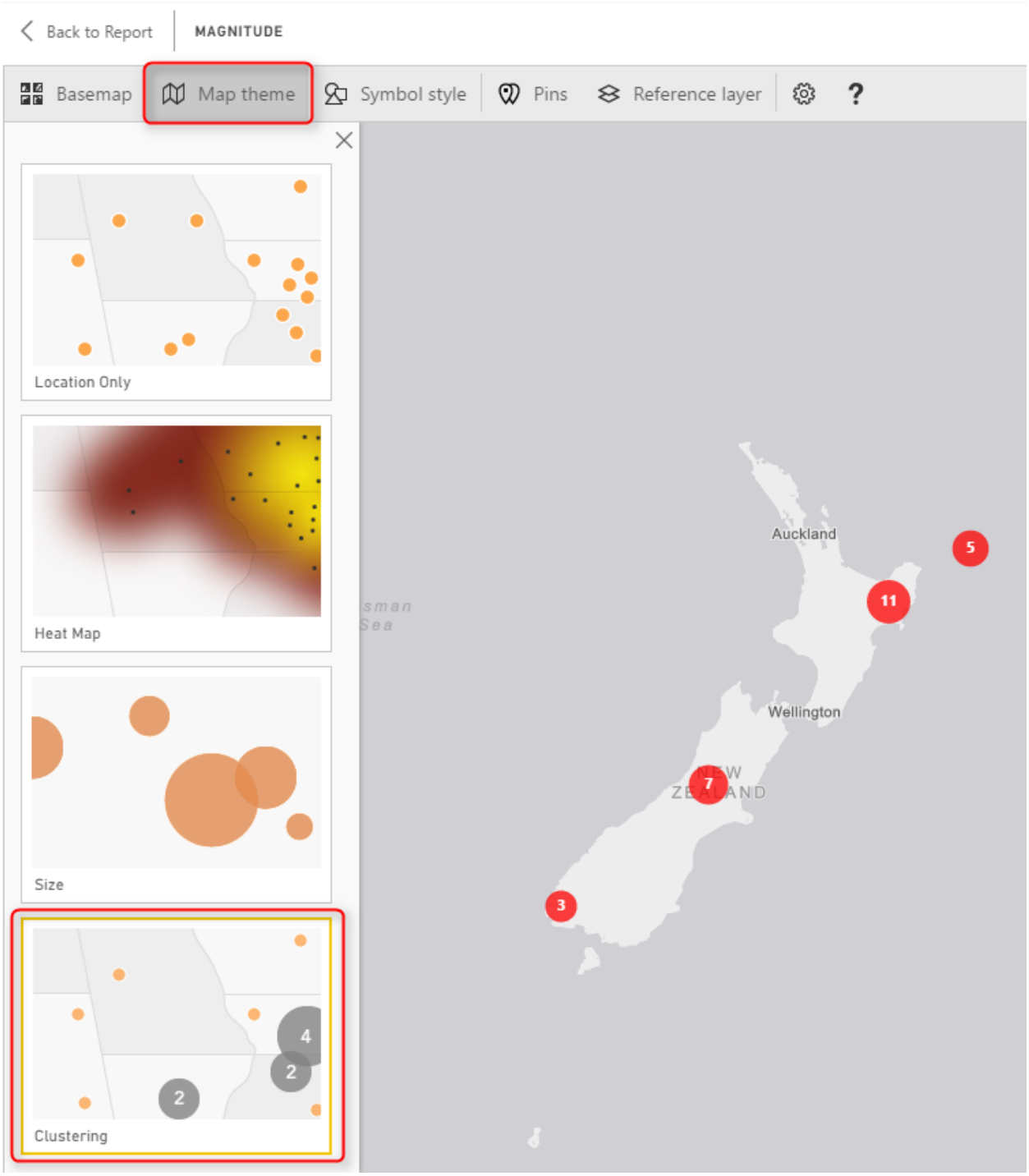
This feature is good to match the map with the theme of your report, or even get some street information.

Map Theme

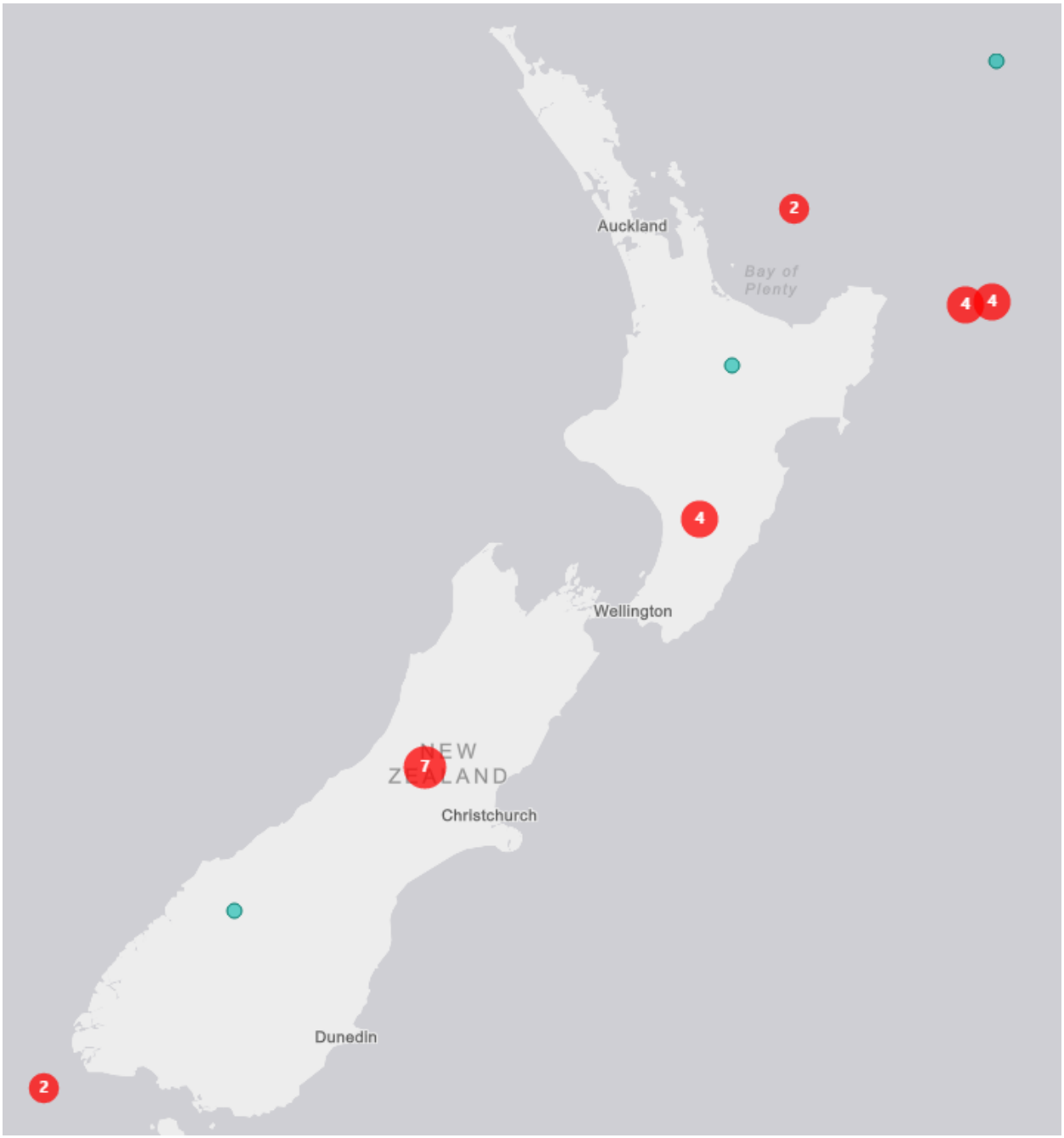
One of the interesting features of this visual is to change the theme of the Map. This type of map can give you four themes;

5. Location Only – no size difference between bubbles
6. Heat Map
7. Size – bubbles with different sizes based on measure's value
8. Clustering – Good option for drill down

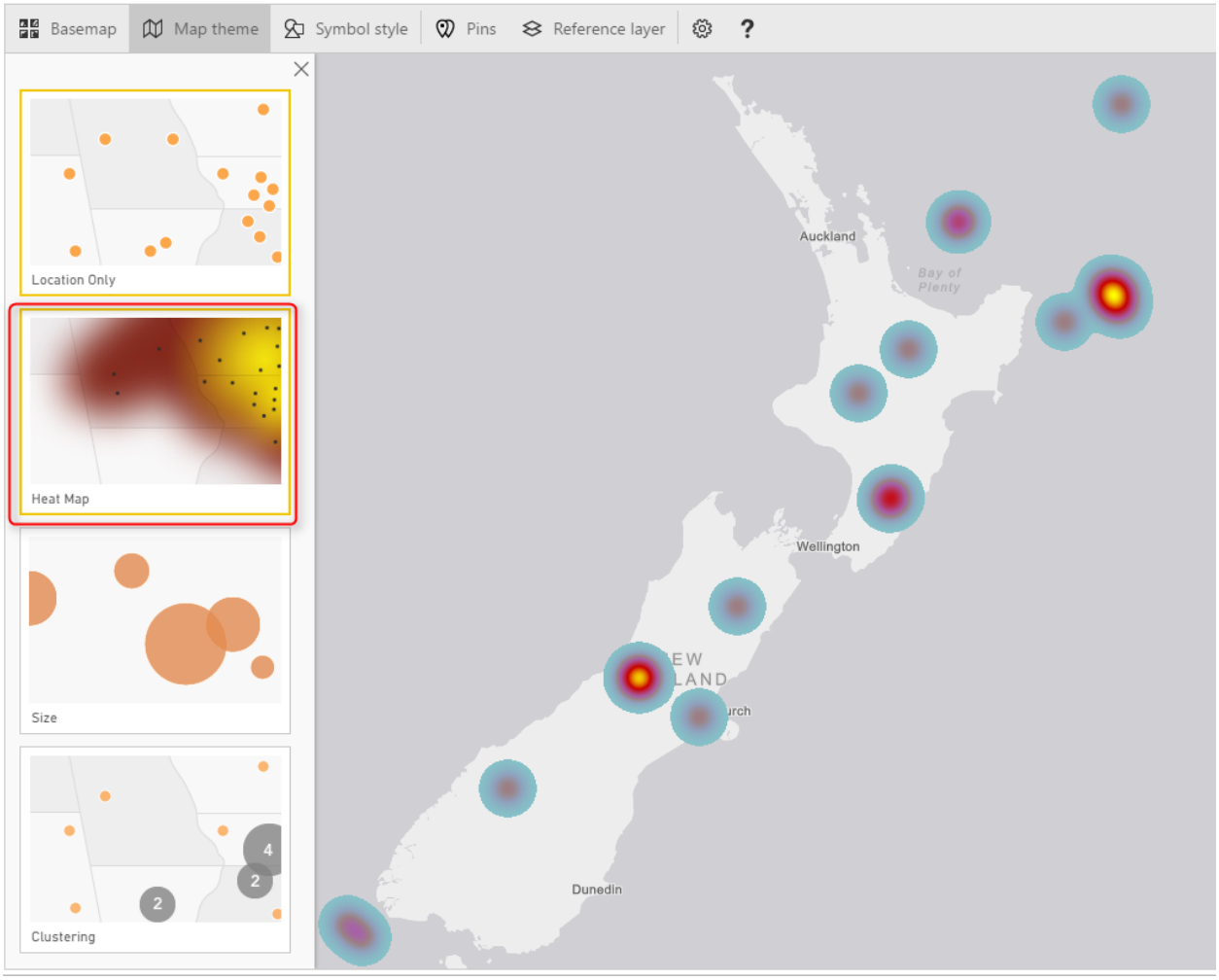
Clustering is good if you want to have a high-level view, and the ability to drill down into each region. Here is a view of clustering;



Each bubble shows you the total count of the data point in that region (more you zoom out, bigger your region will be). And if you double click on a bubble you will drill down into that region;



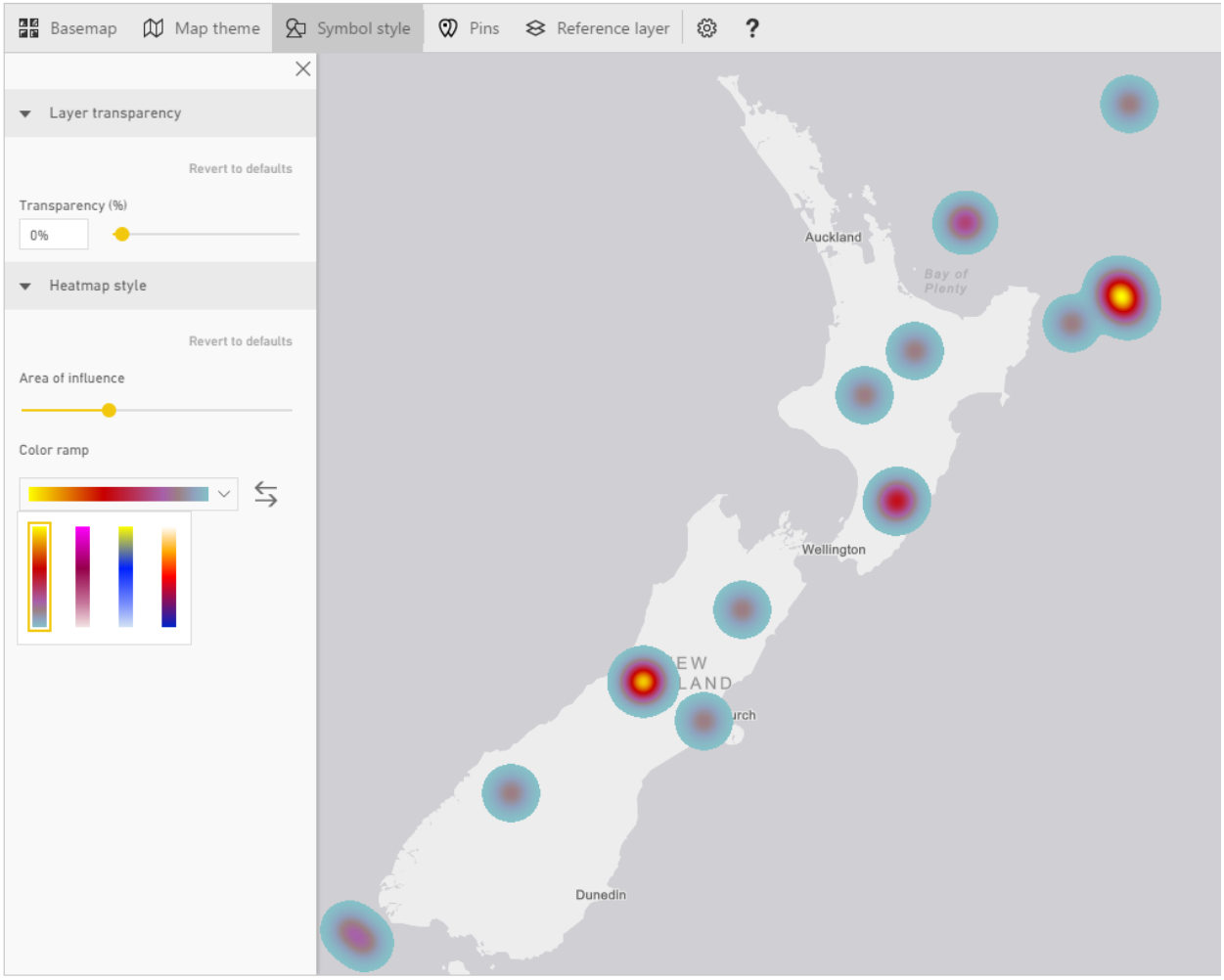
Heatmap is a good visualization for showing the severity of an earthquake in each area more graphically;



You can also use Location only or Size, which are simple to use.

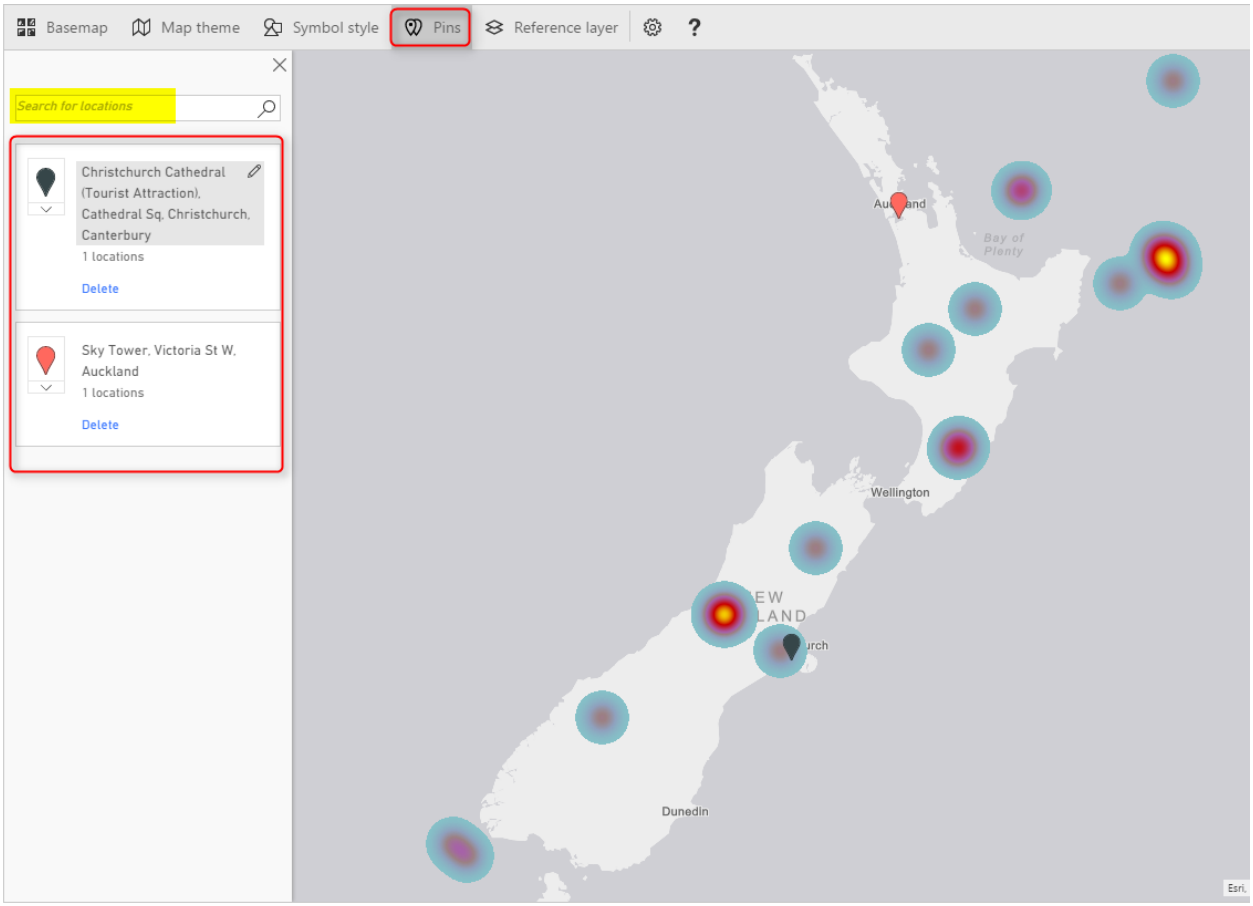
Symbol Style

Depends on what Map Theme, you've selected, you can do the details configuration of that in the Symbol Style section. For example, if you have selected heat map, you can change the color. If you have selected size, you can change the bubble sizes, etc.



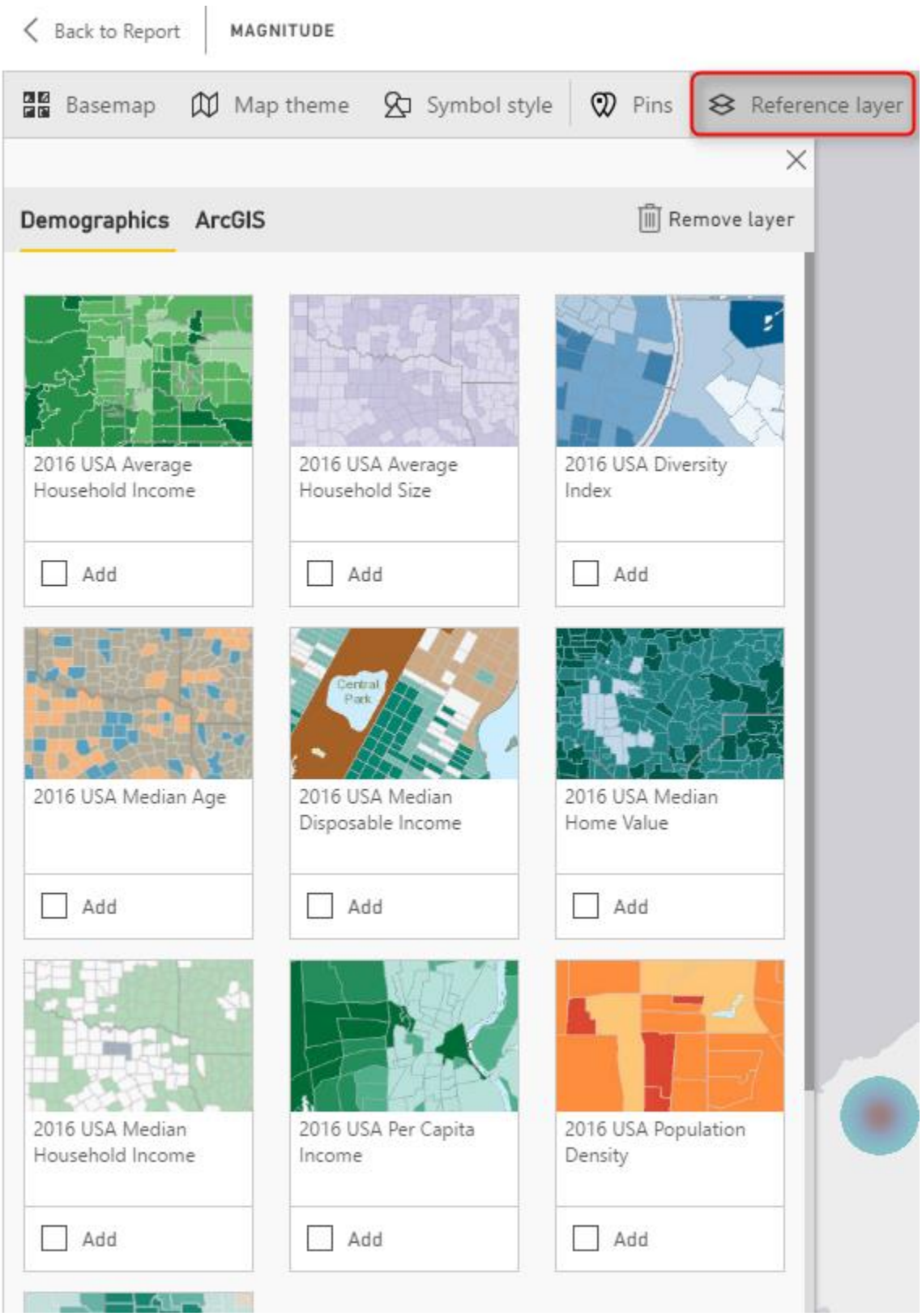
Pins

You can add your pins. These pins can be locations of branches, hospitals, schools, or whatever else you want to use as a pin on the map.

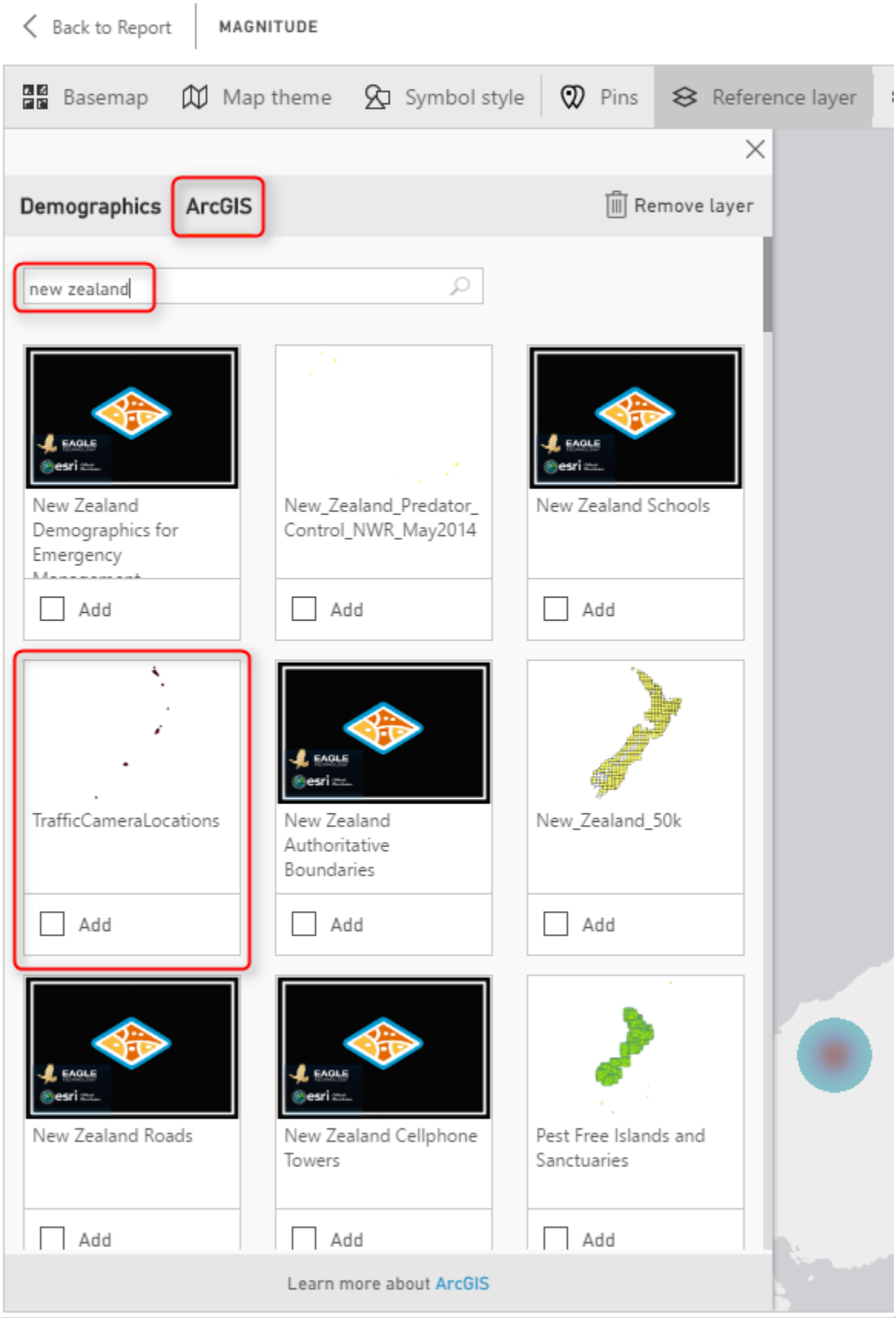


Reference Layer

The last feature, but not least is adding a reference layer. In my opinion, this is one of the best features of this visual. You can add another layer of visualization based on a map in the directory of ArcGIS maps. ArcGIS has many maps that you can use, almost map of everything! If you click on Reference Layer menu option, you can see some of the existing maps for the USA.


Back to Report
MAGNITUDE
Basemap
Map theme
Symbol style
Pins
Reference layer
Demographics
ArcGIS
Remove layer
2016 USA Average Household Income
Add
2016 USA Average Household Size
Add
2016 USA Diversity Index
Add
2016 USA Median Age
Add
Central Park
2016 USA Median Disposable Income
Add
2016 USA Median Home Value
Add
2016 USA Median Household Income
Add
2016 USA Per Capita Income
Add
2016 USA Population Density
Add

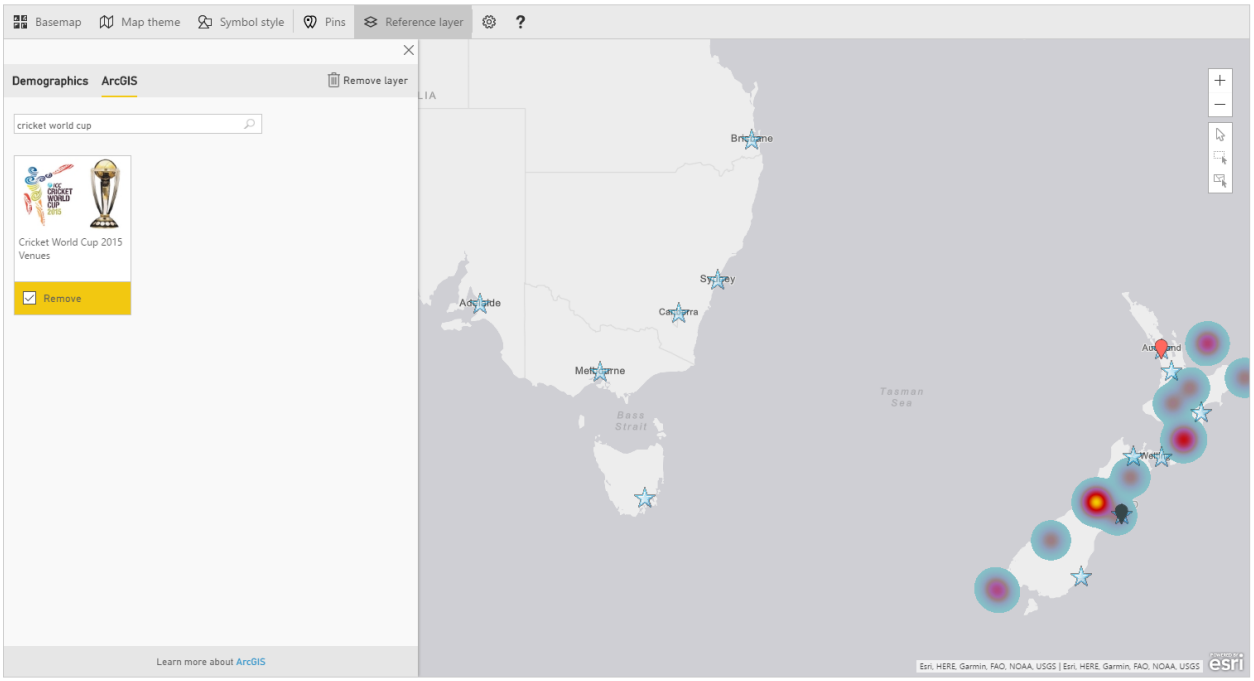
To access more maps, click on ArcGIS at the top, and there you can search for maps. For example below are some maps in the New Zealand area;


Back to Report
MAGNITUDE
Basemap
Map theme
Symbol style
Pins
Reference layer
Demographics
ArcGIS
Remove layer
new zealand
New Zealand Demographics for Emergency
New_Zealand_Predator_Control_NWR_May2014
New Zealand Schools
Add
TrafficCameraLocations
New Zealand Authoritative Boundaries
New_Zealand_50k
New Zealand Roads
New Zealand Cellphone Towers
Pest Free Islands and Sanctuaries
Learn more about ArcGIS

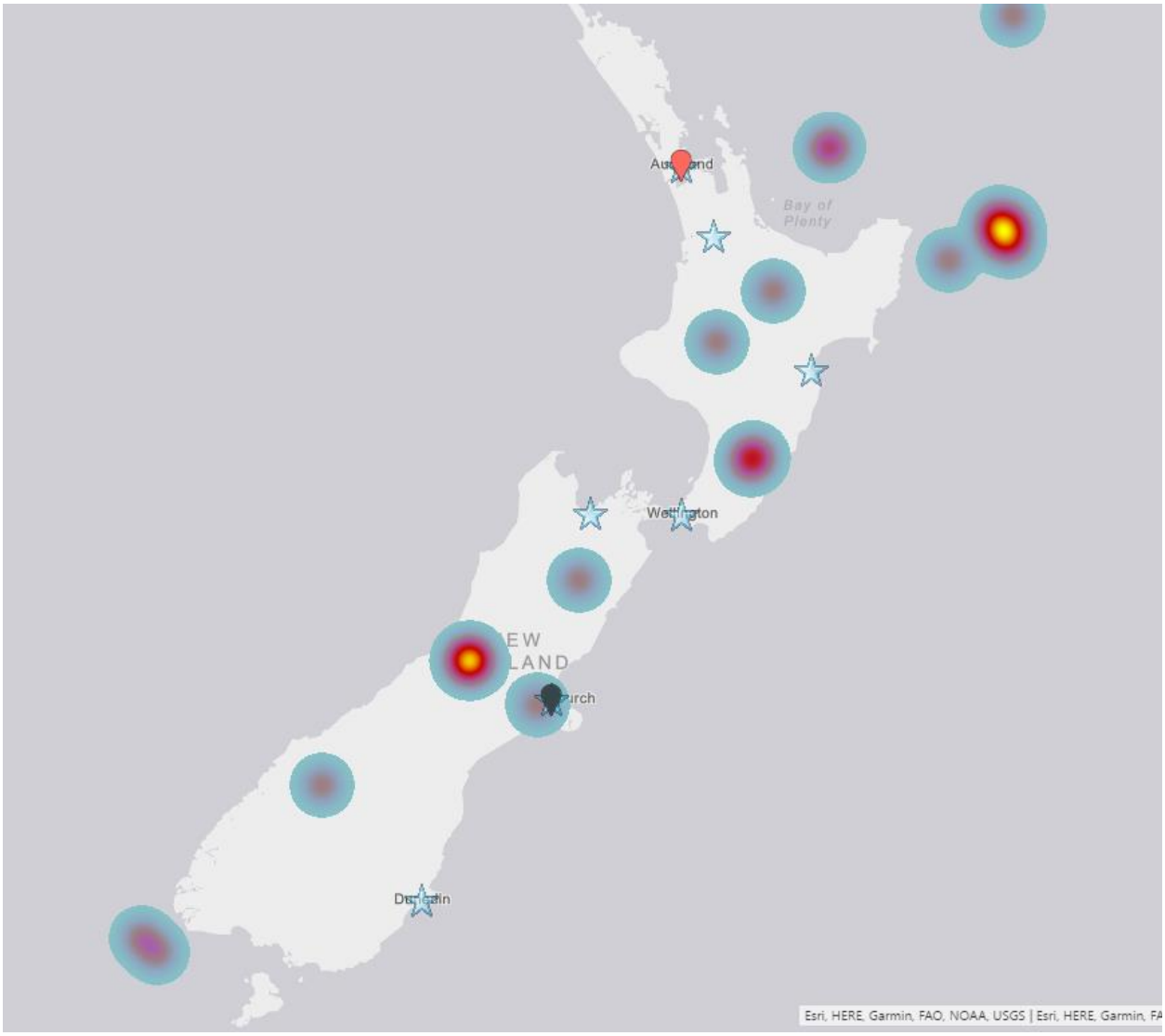
There are maps for schools, pipelines, gas stations, almost everything. Even there is a map for **Traffic Camera Locations**, Very useful map!

Because the current data set is for New Zealand 2015, and there was a cricket world cup in New Zealand and Australia at that time, so it might be good to bring a map of venues for that and realize are those cricket world cup venues close to the earthquake centers or not. You can search for the cricket world cup, and you will get the map very easily. Click on Add to add the layer to map;

It will take a few seconds for the layer to load, and now you will see locations with star mark on it. Wonderful, isn't it?

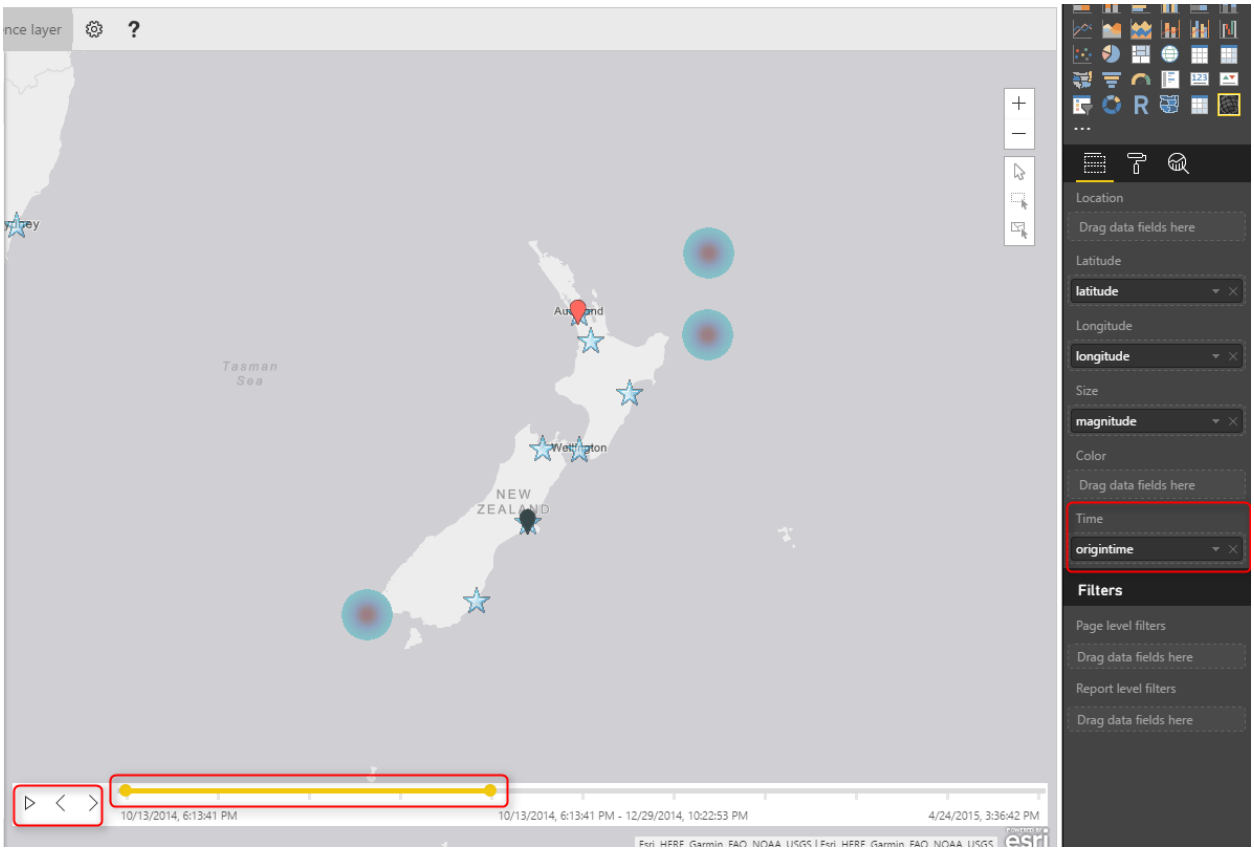


Now if you zoom in more to the New Zealand part of the map, you will see how close are venues. The venue in Christchurch was pretty close to one of the earthquakes.



Adding Time Dimension

All of the above features can be much more insightful with adding a time dimension, and understanding how the measure'a value (in our case earthquakes) changed through the time. If you bring Origintime to the Time section of this visual, you will see a new time bar under the map, which you can select the time range for it, and click on play to see how earthquakes happened through the time. Similar to the Play Axis feature in Scatter Chart, Very insightful dimension to add.



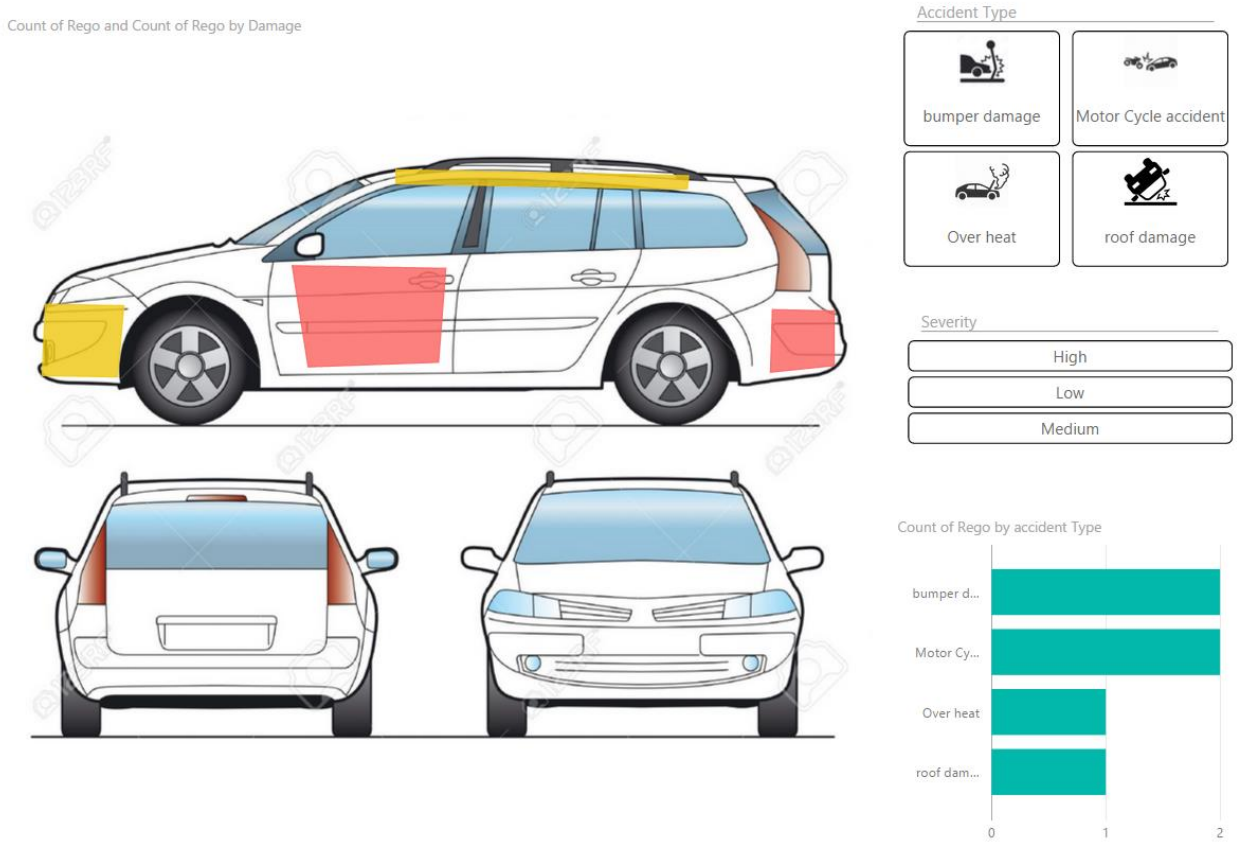
Summary

I hope demos of this post has been motivating enough to show you the power of this visual. ArcGIS map visual is not like other map visuals, it is the best of all I would say. There are pros and cons (which I will cover in another post later). However this visual gives you many things; using different themes, adding reference layers from ArcGIS map directory, and adding time dimension. These features are not easy features to use with other types of maps. There is just one part which is not 100% clear, and that is the licensing part of this visual. This visual at the moment is a preview and free. However, I'm not sure how long it will be available for free. Because this visual is still in preview mode, expect to see some errors and bugs in it. Sometimes you get an error. And you need to close the Power BI Desktop and open it, which will be fixed I believe in the general availability version.

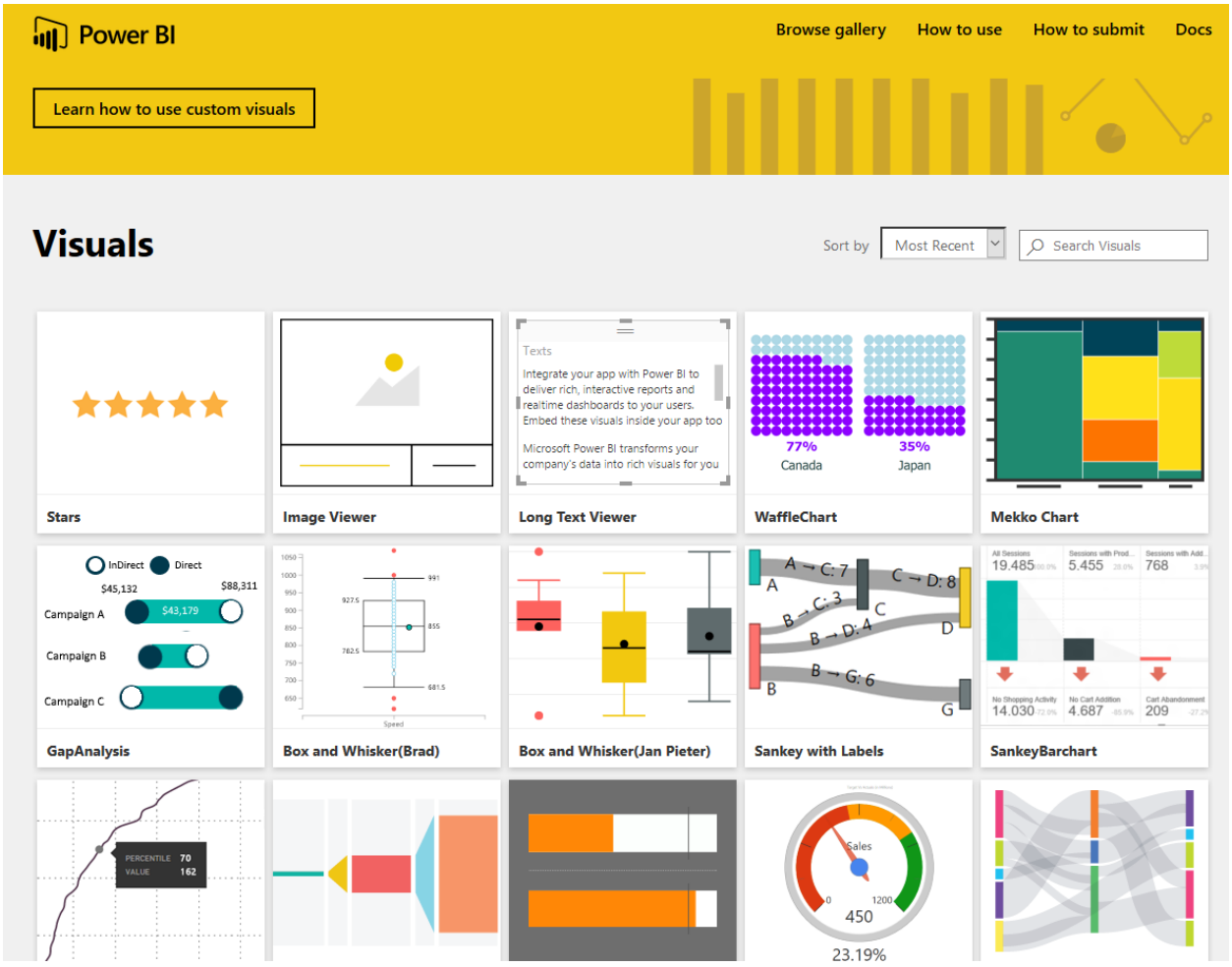
Part IV: Custom Visuals

Custom Visuals in Power BI; Build Whatever You Want

Published Date: March 9, 2016



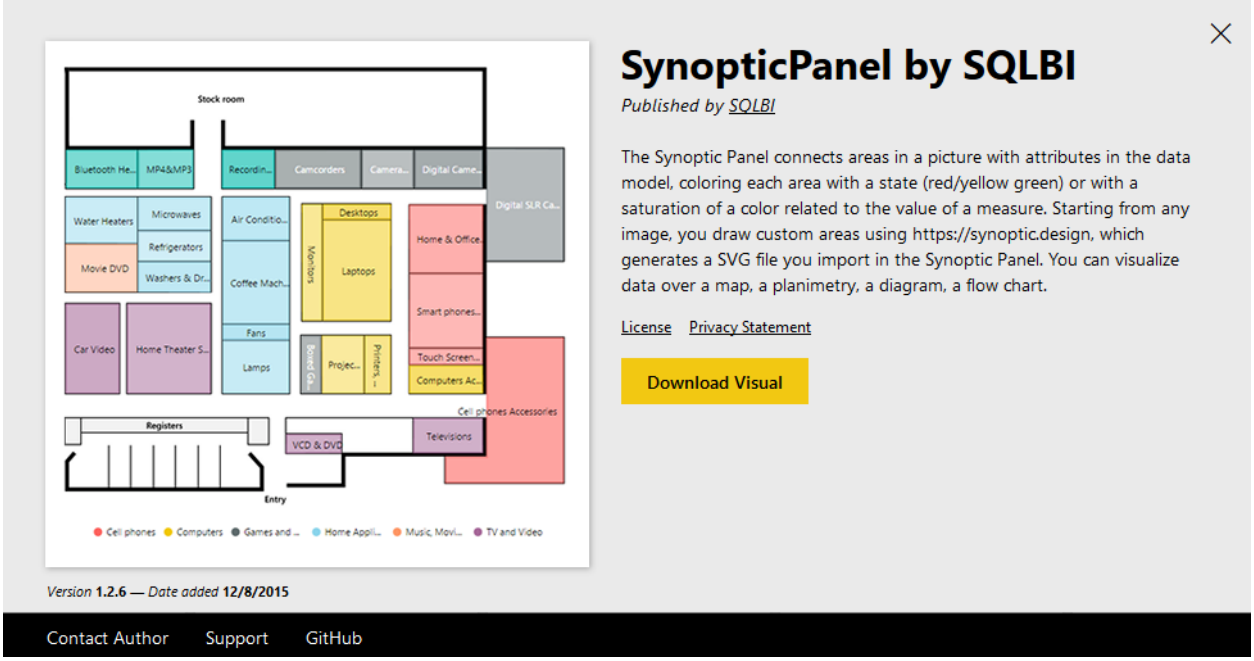
In previous posts of Power BI from Rookie to Rock Star, you've learned that Power BI has a bunch of useful built-in visualizations such as bar chart, column chart, waterfall chart, treemap, and many other visualizations. However, there is always a requirement for new types of visualizations. You might want to visualize parts of the data in a custom image. Or any other visualization that is not built-in. Fortunately Power BI gives you the ability to create your custom visualizations. You can use share your visualization with others in your organization or even with the world through public custom visuals website. In this post, I'll show you some of the great examples of custom visuals in Power BI and how to use them. In future posts, we will go through the scenario of creating one.



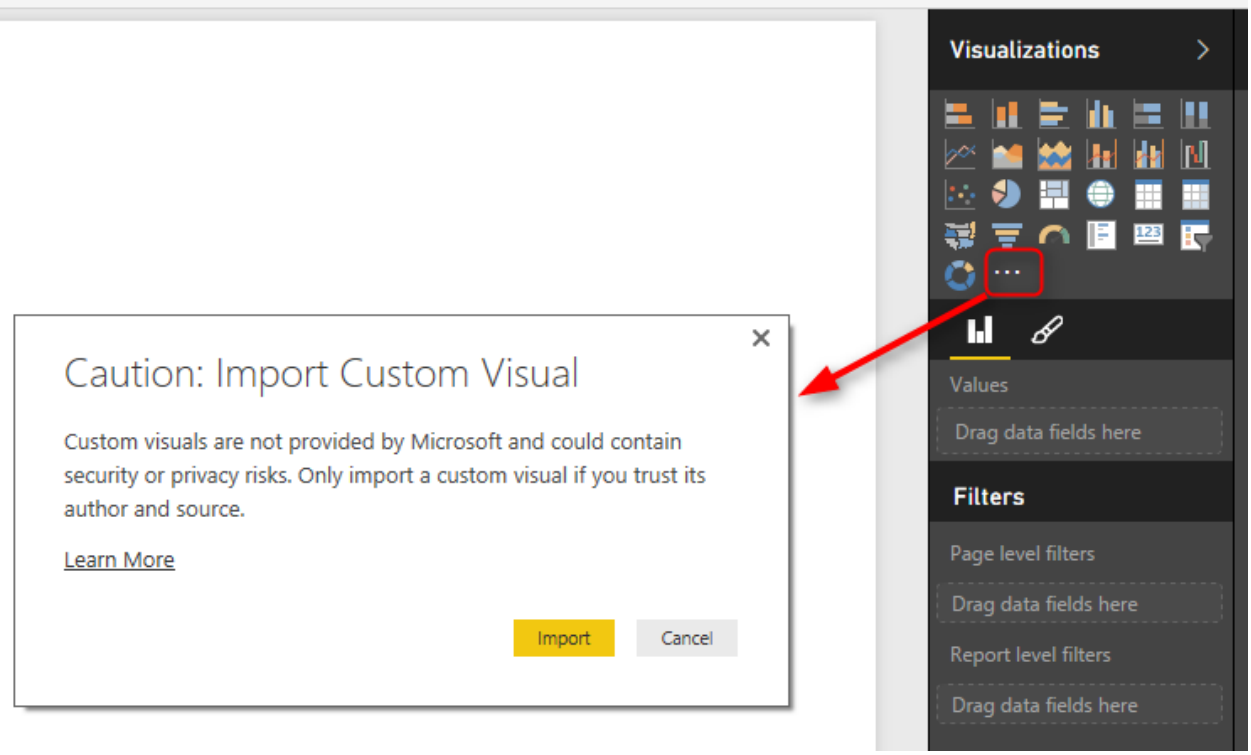
Synoptic Panel by SQL BI

This is one of the coolest custom visuals I've seen so far. The reason is that this custom visual has customization in it! With this visualization, you can define regions in any picture or images, and map data points to the image in your Power BI report. The image can be everything; human body, airplane seat layout, shop floor layout or football field. You choose the image you want; then you define regions. Let's have a closer look at this visual.

You can download the latest version of Synoptic Panel from Power BI visuals gallery or the Synoptic Design website. Please note that custom visuals might be developed by third parties not Microsoft, so you are using them at your own risk (I mean regarding support if an issue happens). Synoptic Panel is a custom visual built by SQLBI company. After downloading this visual, you will have a *.pbiviz file.



You can import that file into Power BI desktop with clicking on ellipsis button in visualization pane and choosing the *.pbiviz file.

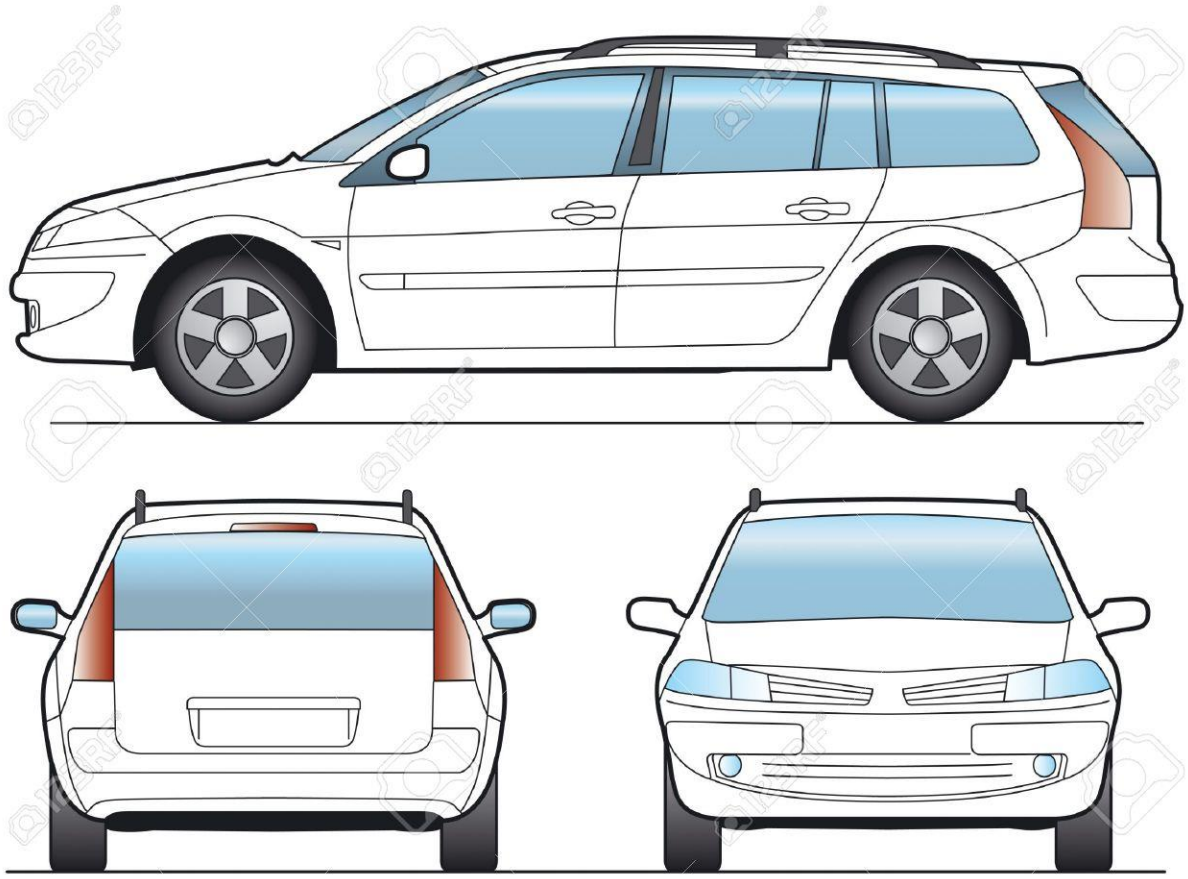


After importing you will see the visual listed in visualization pane.

Now let's do an example with that. Consider we have a dataset of car accidents which has the date of the accident, the registration number of the car, car part which broke in the accident, accident type and severity of the accident. Here is the example data set:

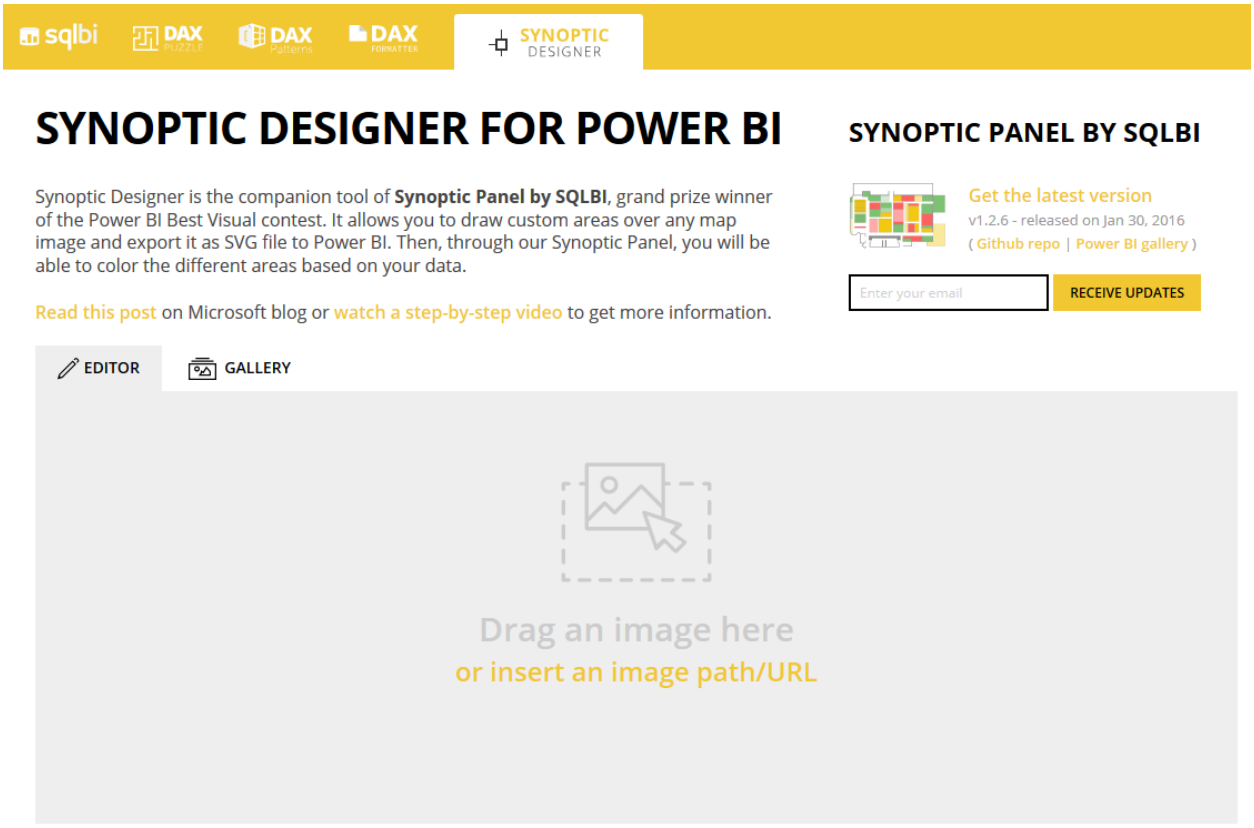
Date	Rego	Damage	Severity	accident Type
1/15/2015	wht345	roof	High	roof damage
6/25/2015	dsg562	bumper	Low	bumper damage
12/10/2015	lkn282	door	Low	Motor Cycle accident
10/23/2015	HGB345	front bumper	Medium	Over heat
12/12/2015	lkn265	door	Low	Motor Cycle accident
3/25/2015	dsg545	bumper	Low	bumper damage
10/23/2015	HGB345	front bumper	Medium	Over heat
12/12/2015	lkn265	bumper	Low	Motor Cycle accident
3/25/2015	dsg545	bumper	Low	bumper damage

As you see in the dataset above the Damage column shows which part of the car the damage has occurred. So a very useful visualization is having a layout of car exterior design (considering that damage only happened on the exterior for simplicity). With a simple search in google I've found the image below:

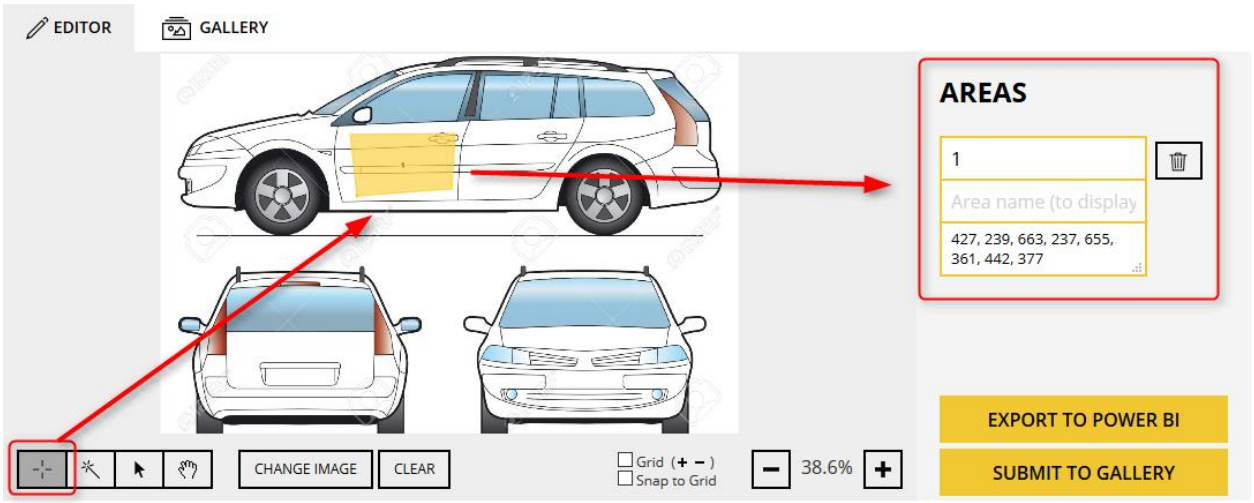


Source of the image: http://www.123rf.com/photo_1648382_sw-car–layout-for-presentation–vector.html

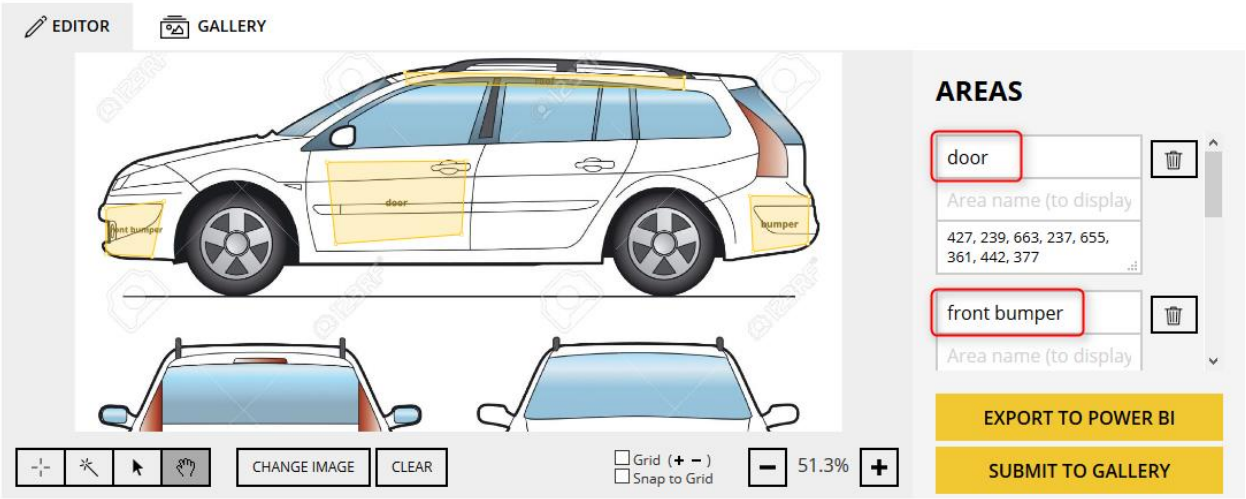
What I need to do is to define regions on this image. Synoptic Panel also has a designer tool that allows me to draw regions! So let's do that. Go to the Synoptic Designer website and upload your image there.



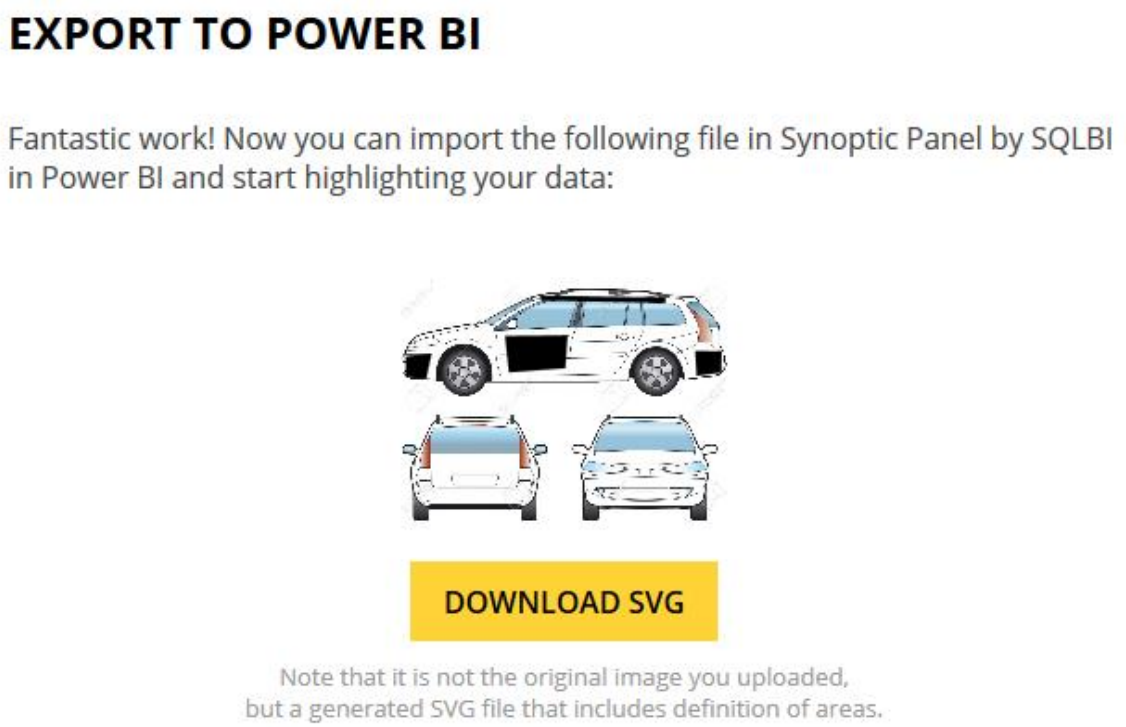
add the image there, and then use the designer tool for drawing an area. After drawing the area, you will see the area highlighted and listed on the right-hand side.



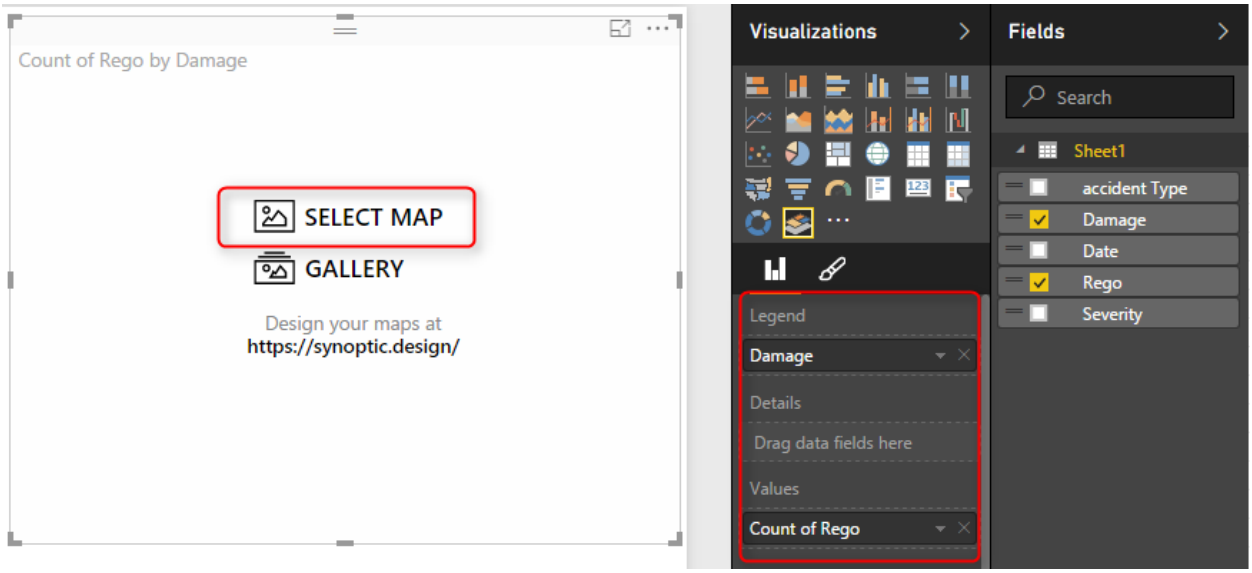
Define other areas (for the bumper, roof…). And name each area as the values you have in your dataset's Damage column.



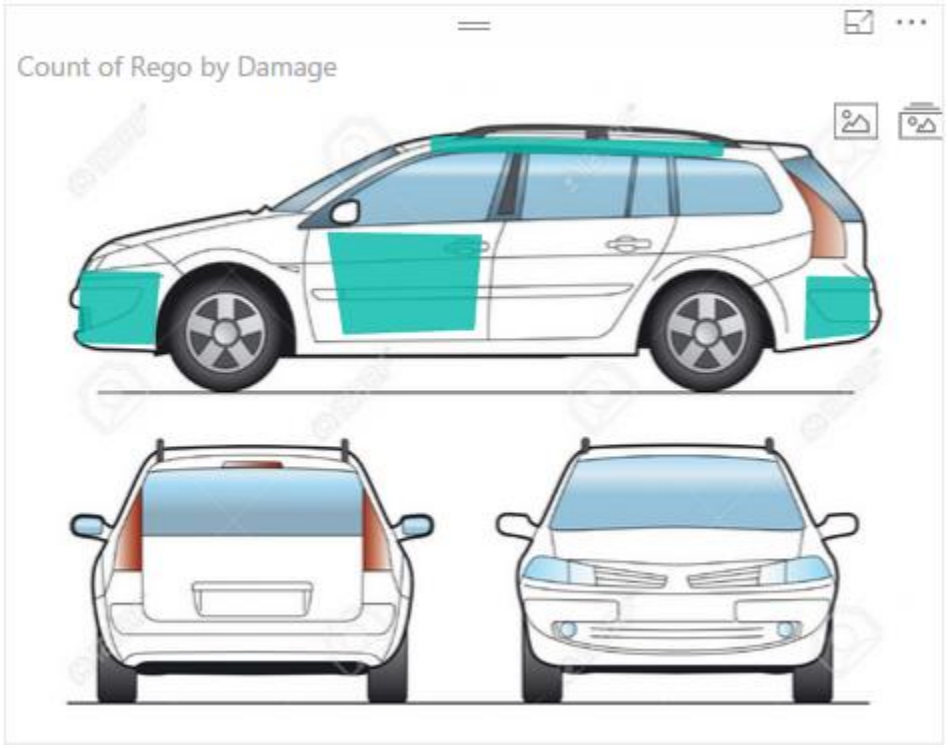
Now you can export this design into your Power BI by clicking on Export To Power BI. This will create a *.svg file for you to use in the Synoptic Panel visual.



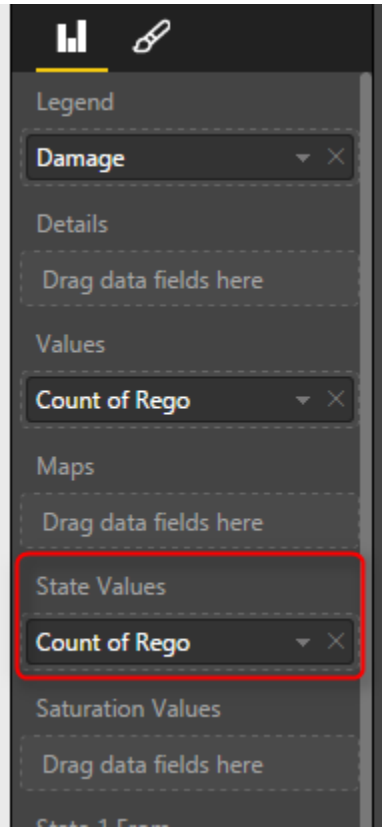
Import the *.svg file into Power BI desktop's Synoptic Panel visual. As you can see I've mapped Damage field to Legend of the custom visual and count of Regos to values field.



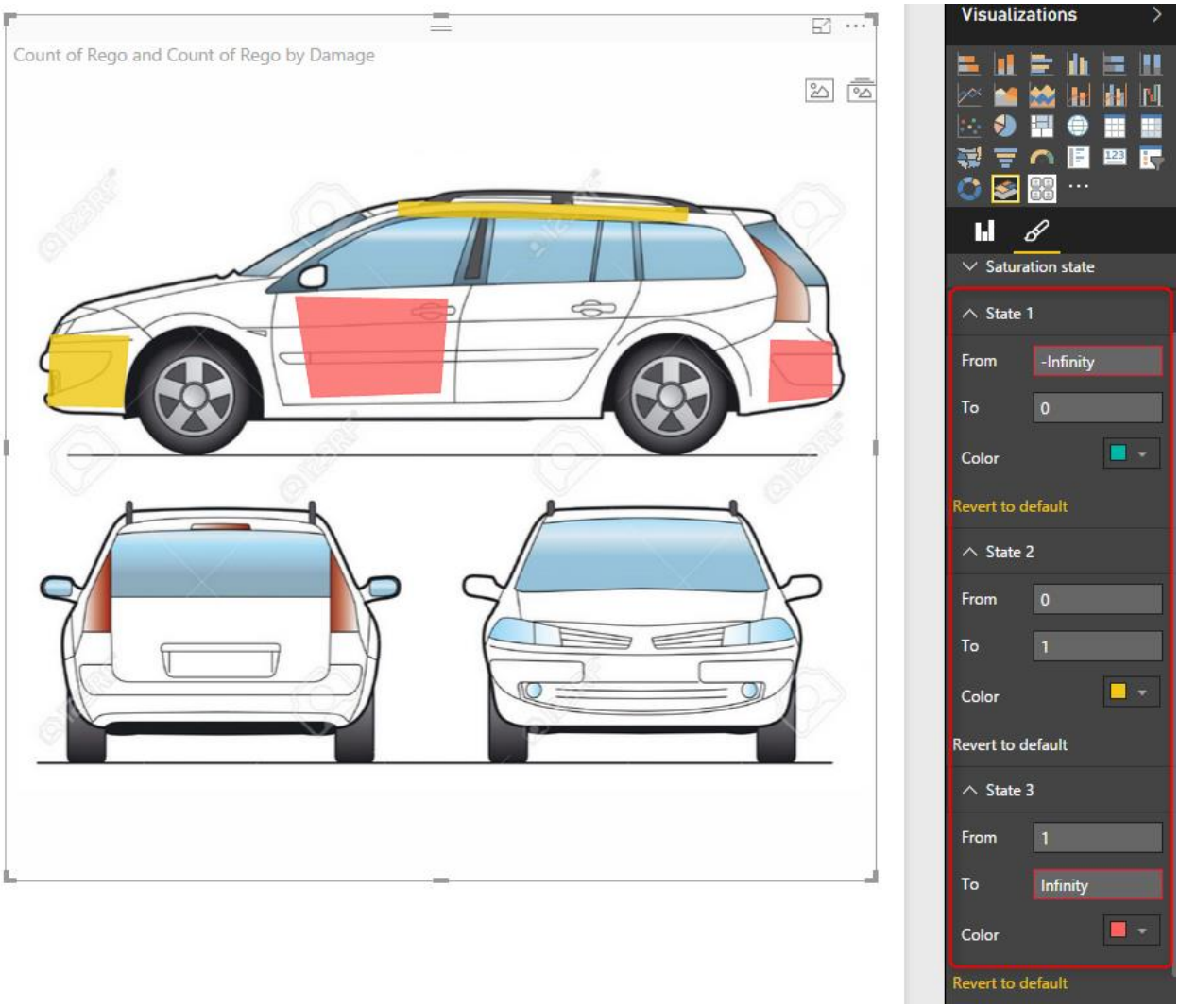
After adding the *.svg file as the map, you will see regions highlighted. This shows that there are some values for those regions.



You can set a color state for this visual. Before doing this, you should set a field as the state field for this visual;



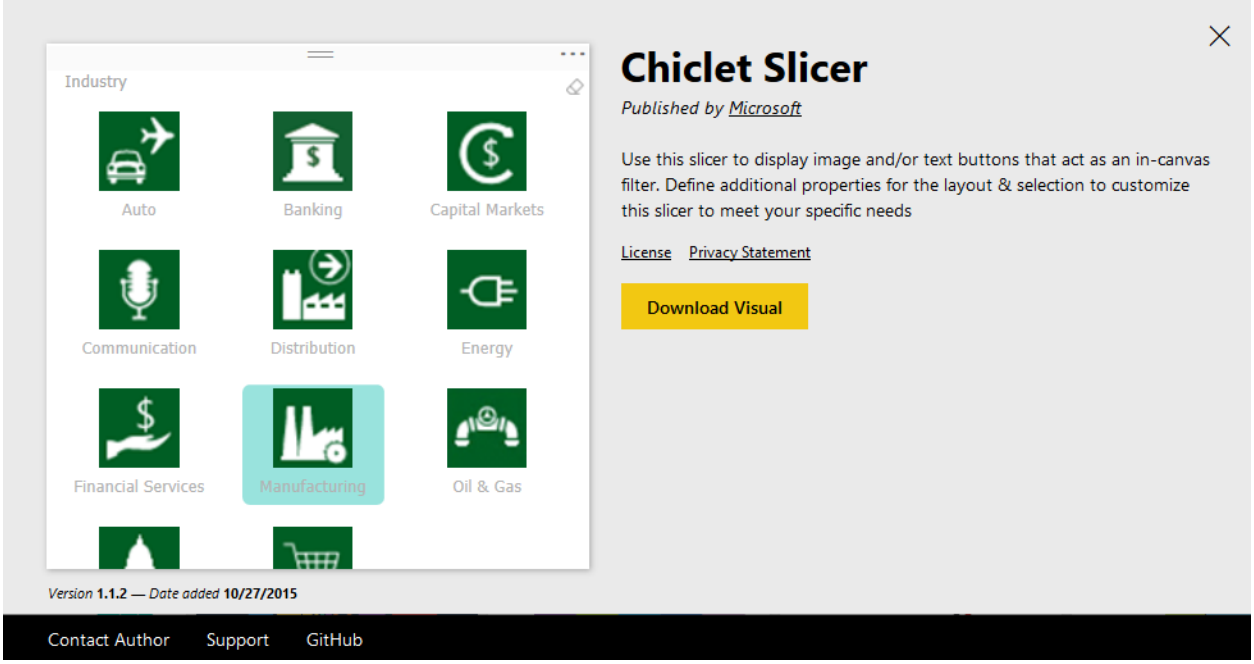
Then you can define rules for coloring. For example, a value is between 0 to 5 then the state color can be set with Green color. If it is between 6 to 10 then state color 2…. Here is what I defined:



Nice visualization, isn't it? There are some other customizations that you can apply to this visual. I'll leave that part to you for further studying if you are interested. Watch SQLBI YouTube video which illustrates some of this visual's features. There are also some pre-built maps for this visual that you can use if you want.

Chiclet Slicer

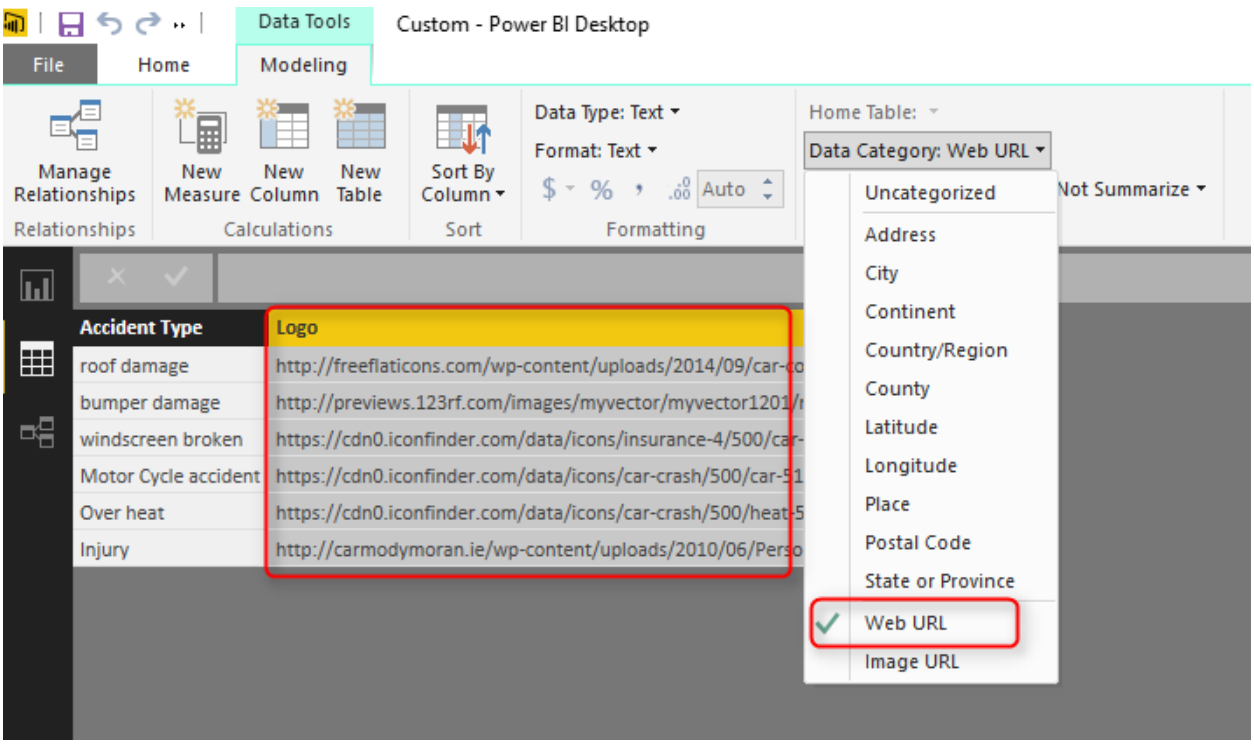
The other custom visual I want to talk about in this post is Chiclet Slicer. This is a custom visual built by Microsoft itself. The default slicer in Power BI is very basic; you can't do much formatting on it. Chiclet slicer allows you to do text formatting, box formatting and also adding images to your slicer items.



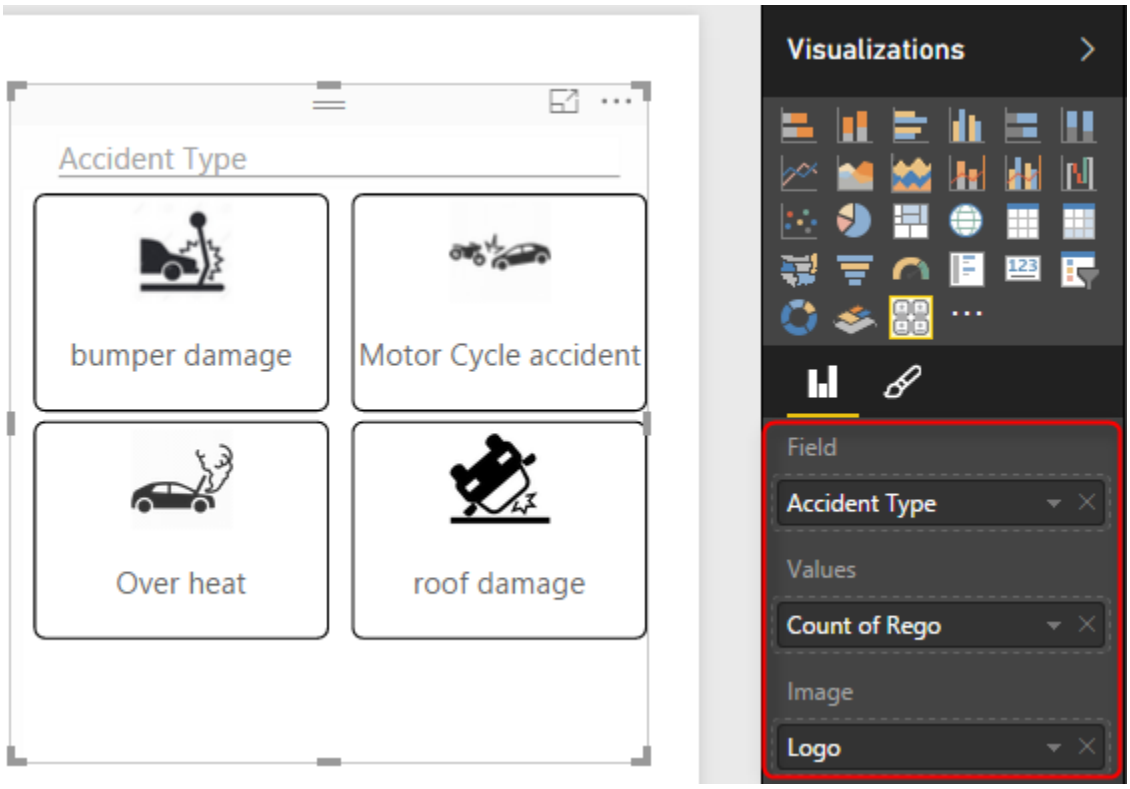
Let's add this slicer to our existing car accident example. As you've seen in dataset above we have accident type field which contains values such as roof damage, motor Cycle accident, overheat, etc. It is good to have a slicer that shows these accident types as images. So what I've done was creating another spreadsheet with accident types and a field called logo which is a URL for an image related to each item.

Accident Type	Logo
roof damage	http://freeflaticons.com/wp-content/uploads/2014/09/car-copy-141057655684kng.png
bumper damage	http://previews.123rf.com/images/myvector/myvector1201/myvector120101576/12126552-Vector-illustratior
windscreen brok	https://cdn0.iconfinder.com/data/icons/insurance-4/500/car-512.png
Motor Cycle accid	https://cdn0.iconfinder.com/data/icons/car-crash/500/car-512.png
Over heat	https://cdn0.iconfinder.com/data/icons/car-crash/500/heat-512.png
Injury	http://carmodymoran.ie/wp-content/uploads/2010/06/Personal-Injury-icon-e1333481462230-210x300.png

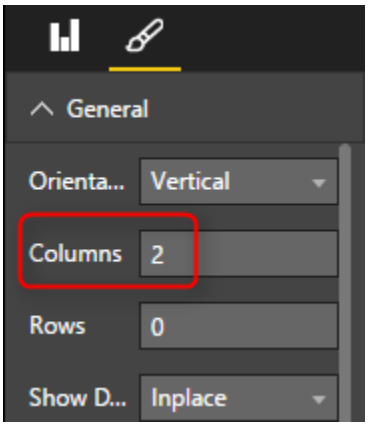
I've then loaded this dataset into my Power BI model and created a relationship based on AccidentType. Then I've changed the Data Category of Logo field in my Data tab to Web URL.



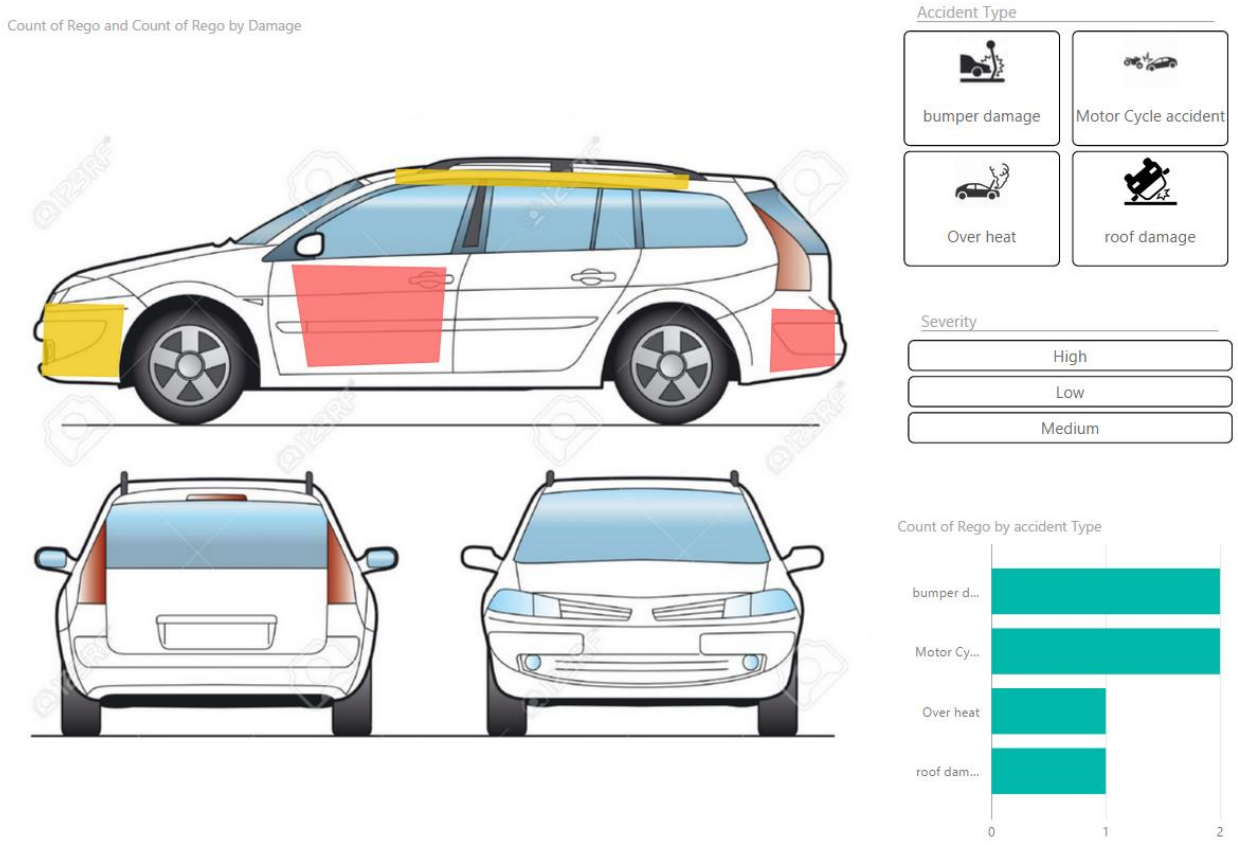
Now in the Chiclet Slicer custom visual, I set fields as accident type, and Image as Logo, and count of rego as Values. Here is the result.



For the result above I've also configured the number of columns in my chiclet slicer to be 2.



Even if I don't have an image for chiclet slicer, still I can use it as it shows text field in a way much better. I've used it for Severity field as well. And the final result is here:

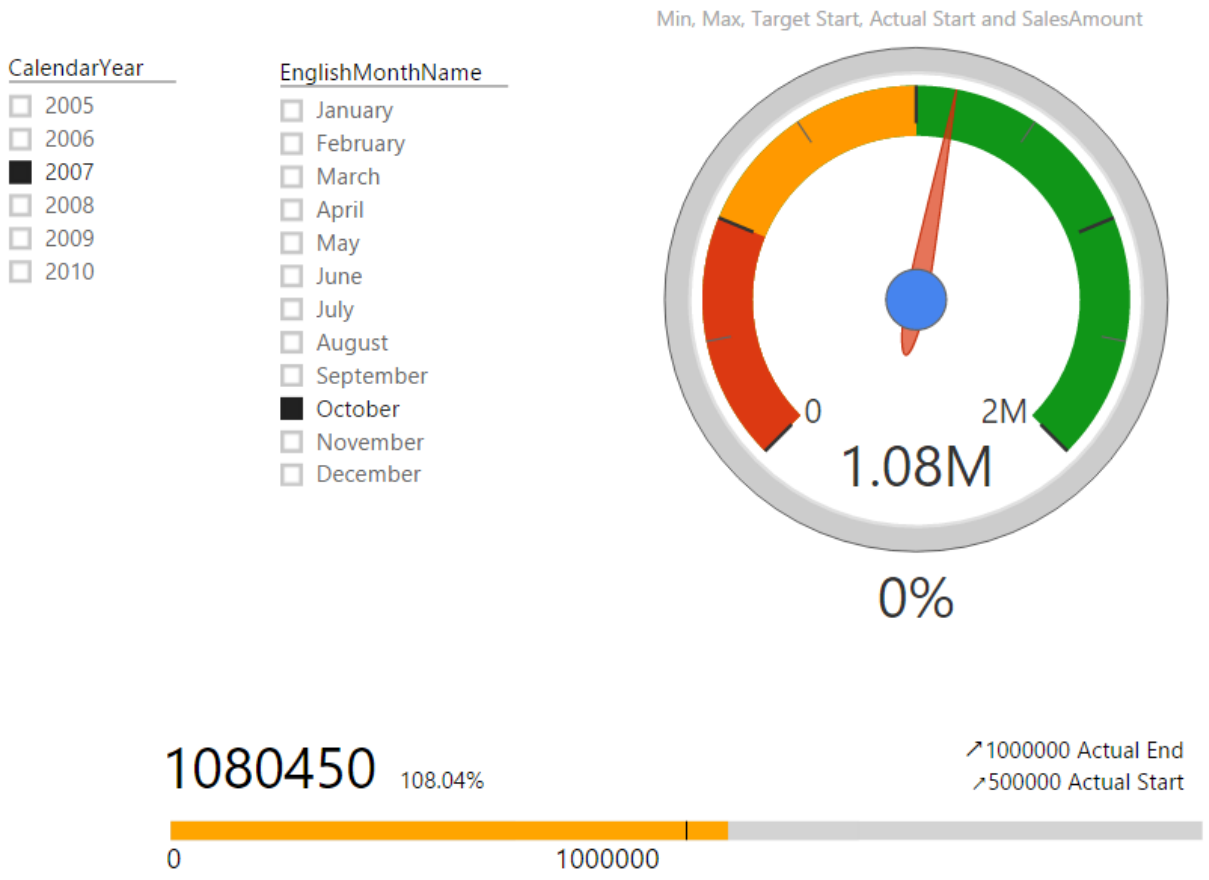


You can see that adding two custom visuals made my report much better regarding both the look and feel and also understanding the insight better. In future posts of

Power BI from Rookie to Rock Star book, I'll explain some other useful custom visuals and the method of developing your own custom visual.

KPIs and Power BI; Visualization Aspect

Published Date: April 12, 2016



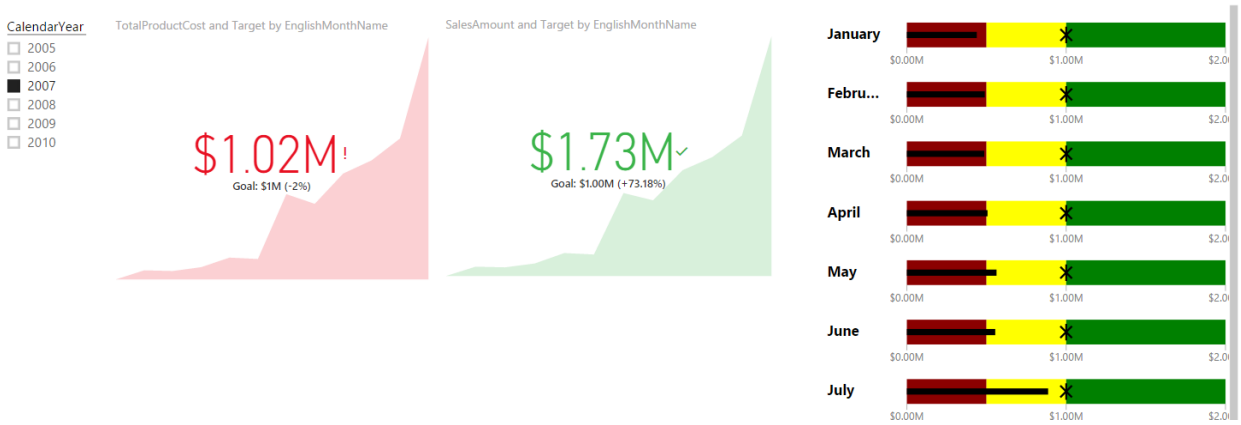
In every reporting solution, you might feel KPI as a requirement. KPI or Key Performance Indicator is a measure for business to understand how they are acting in a specific area that is very import for their business. Power BI supports built-in visualization for KPI, and there are also some good custom visuals that can be used for this purpose. In this post, you will learn how to create KPI visualizations with Power BI.

What is KPI?

Key Performance Indicator is a measure for business to understand how they perform in a specific area that is important and many times critical for their business. For example, they would like to see how the current year to date sales are going against what they estimated? Is it higher or lower? What is the trend? Is it going upward or downward?

There are some visualization options to show KPIs, and from them, the most commons are; Gauges, Charts with arrows that show upward or downward, and color code of red, amber, or green (visualizing the status).

Fortunately Power BI has a built-in KPI visualization (released 29th of Feb 2016) which can be used for this purpose. There are also some great custom visualizations that I found useful and like to share them with you here.



KPI Elements

KPIs are measuring something and show trend and status. So they have components to work with as below:

- Value; The main measure which we want to evaluate
- Target; What we want to compare the Value with
- Trend; How Value performs in a period, is it going upward, downward…?
- Status; What is the current status of Value against Target?

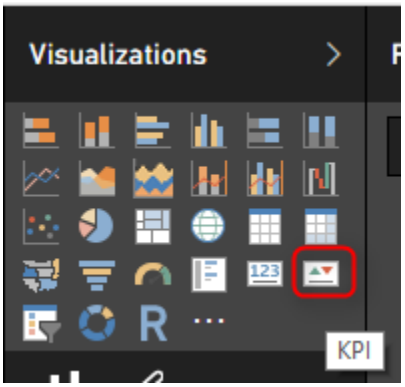
There might be other components as well, but let's keep it simple. And work on these elements. In below example, you'll see how we apply attributes and configurations for each visualization element to visualize KPI there.

Prerequisite

For running examples of this post, you need to install AdventureWorksDW like other examples of Power BI online book.

Built-in KPI

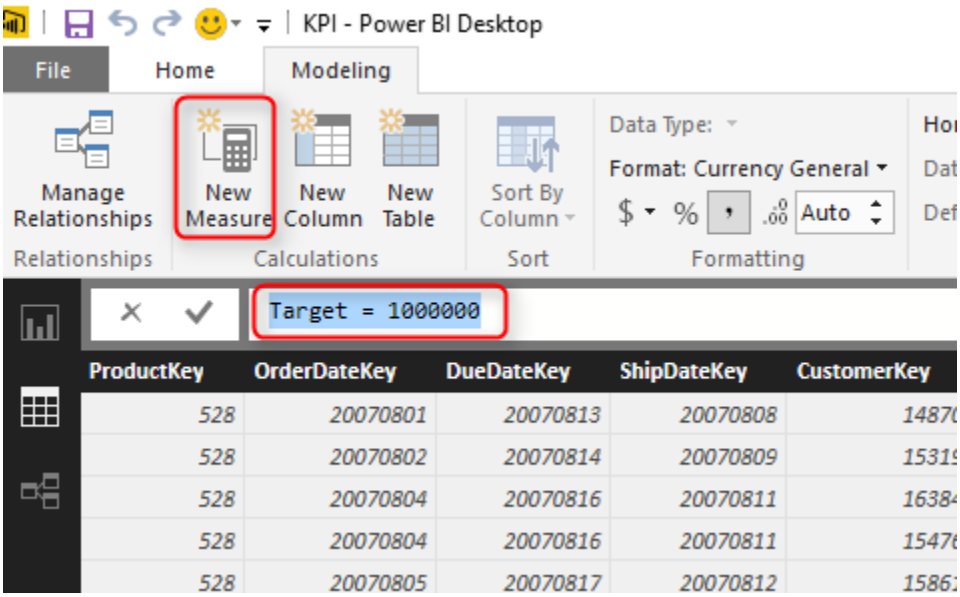
As I mentioned earlier, KPI recently added to Power BI and you can find it in built-in visualization list in visualization pane.



Using this item is easy as it only has three data fields to configure:

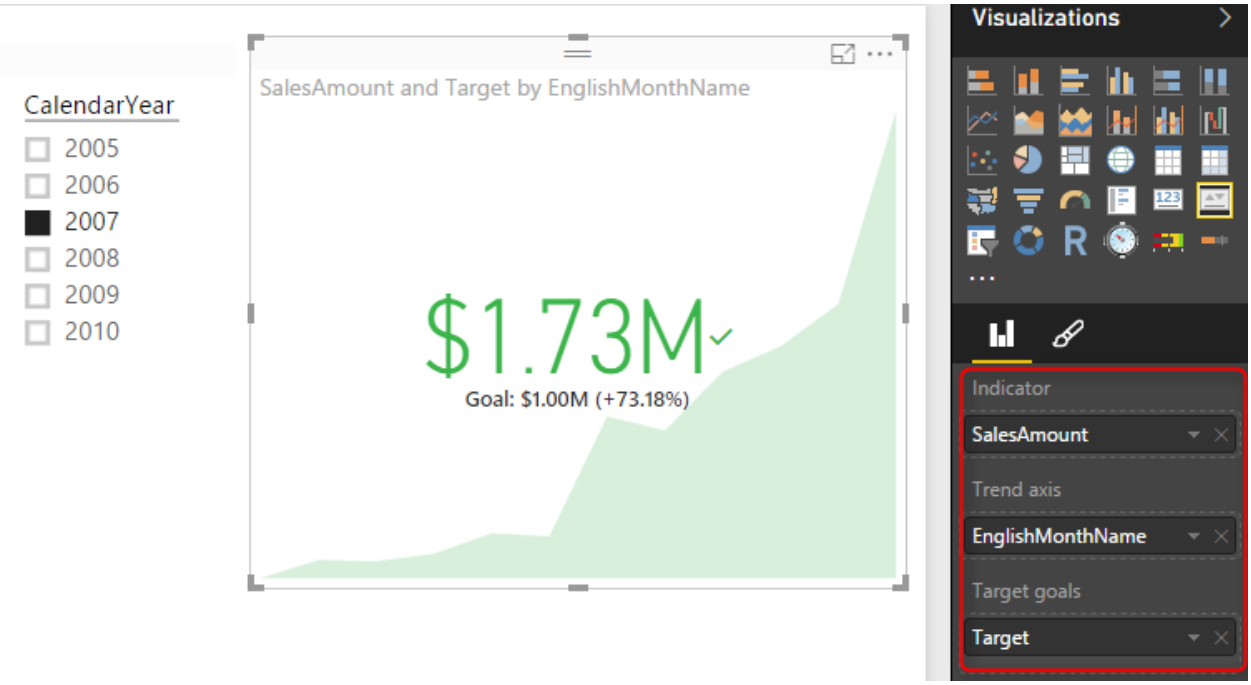
9. Indicator: This would be your KPI Value or the measure to evaluate.
10. Trend Axis; dimension attribute to calculate trend on it. For example Months of year to check the trend throughout the year.
11. Target Goals; Your target value. Something that KPI value will be compared with.

I've only used FactInternetSales and DimDate from AdventureWorksDW in this demo. For simplicity, I got the target value as static value. I've created a measure in FactInternetSales called Target, and assigned the static value 1,000,000$.

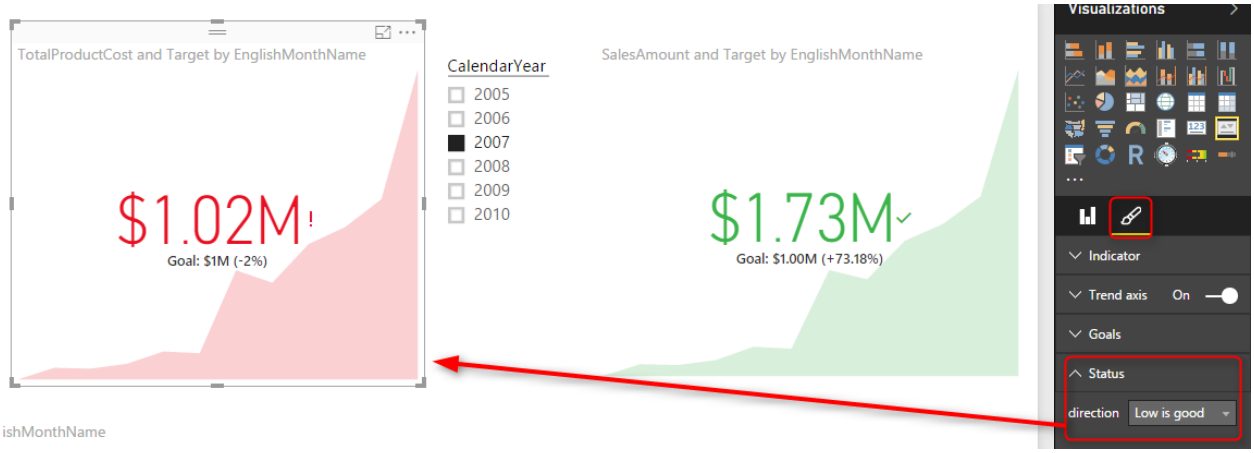


As I said, this is just for simplicity. Your target value in real-world scenarios might come from a forecast table, or a budget table or something like that.

In the report area, create a slicer on Calendar Year. And then drag and drop a KPI element into the report. Set Indicator as SalesAmount, Target goals to be the Target measure, and Trend Axis to be EnglishMonthName (Before doing that you have to Sort EnglishMonthName column by MonthNumberOfYear in the Data Tab). Then this is what you get:



As you see the KPI now shows me the value or indicator (which is Sales Amount) in the middle with a large font ($1.73M), and the Goal or target under that with smaller font ($1M), and the percentage of the value compared with goal besides it (+73.18%). You also see this colored green which means the status is good or in the other words value is higher than expected. In the background, you also see an area chart of value throughout months (Green area chart shows value over months). You can change the calendar year in the slicer and see how the KPI change.
Now let's see another KPI and how to change Status on that. For the other KPI, I want to see TotalProductCost as Indicator, and everything else the same. Costs usually, the lower is better which is different from previous KPI. In the first KPI the higher value means the better result, the higher sales is desired. But for Costs, I expect a decrease. So I can simply change the Status in the Formatting area of KPI to have the direction as Low is good. And here would be the result;



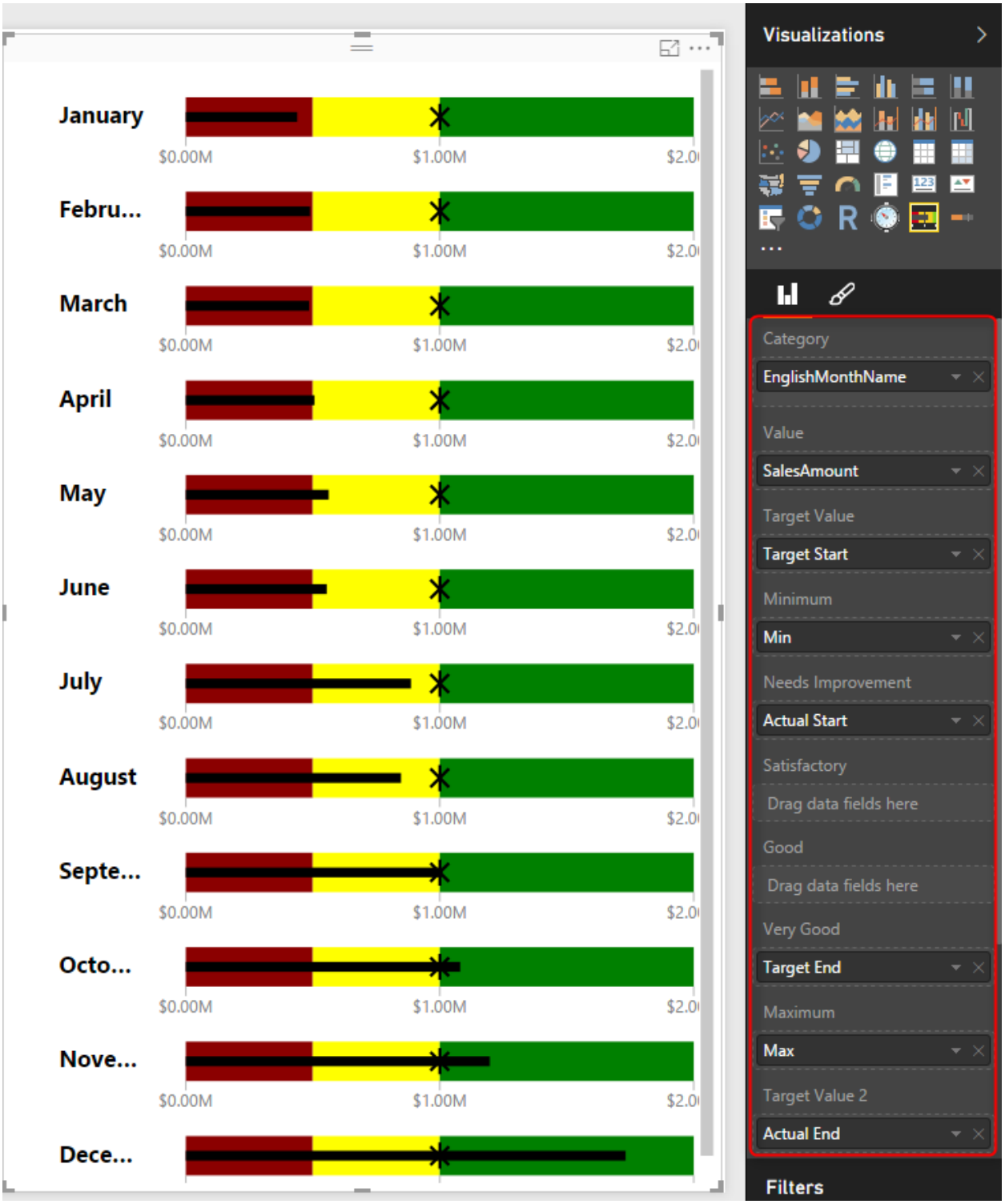
Now you see that although TotalProductCost is greater than the goal still, it shows it as red, because low is good, and high is bad. The default behavior for Status is that High is good.

Bullet Chart

Bullet chart is a custom visualization published by Microsoft. You need to download it from Visuals Gallery and then import it into Power BI. This chart has many fields to configure; you can configure them all or part of them. Required fields are Value, Target Value. You also need to set Minimum and Maximum to appropriate values. There are also areas with red, amber, and green colors that can be assigned with Needs Improvement, Satisfactory, Good, and Very Good fields. For this chart I've used a sample table with a single line as below:

Min	Max	Target Start	Target End	Actual Start	Actual End	Percentage
0	2000000	1000000	2000000	500000	1000000	10

And I configured Bullet chart with fields from this table combined with FactInternetSales, and DimDate as below;

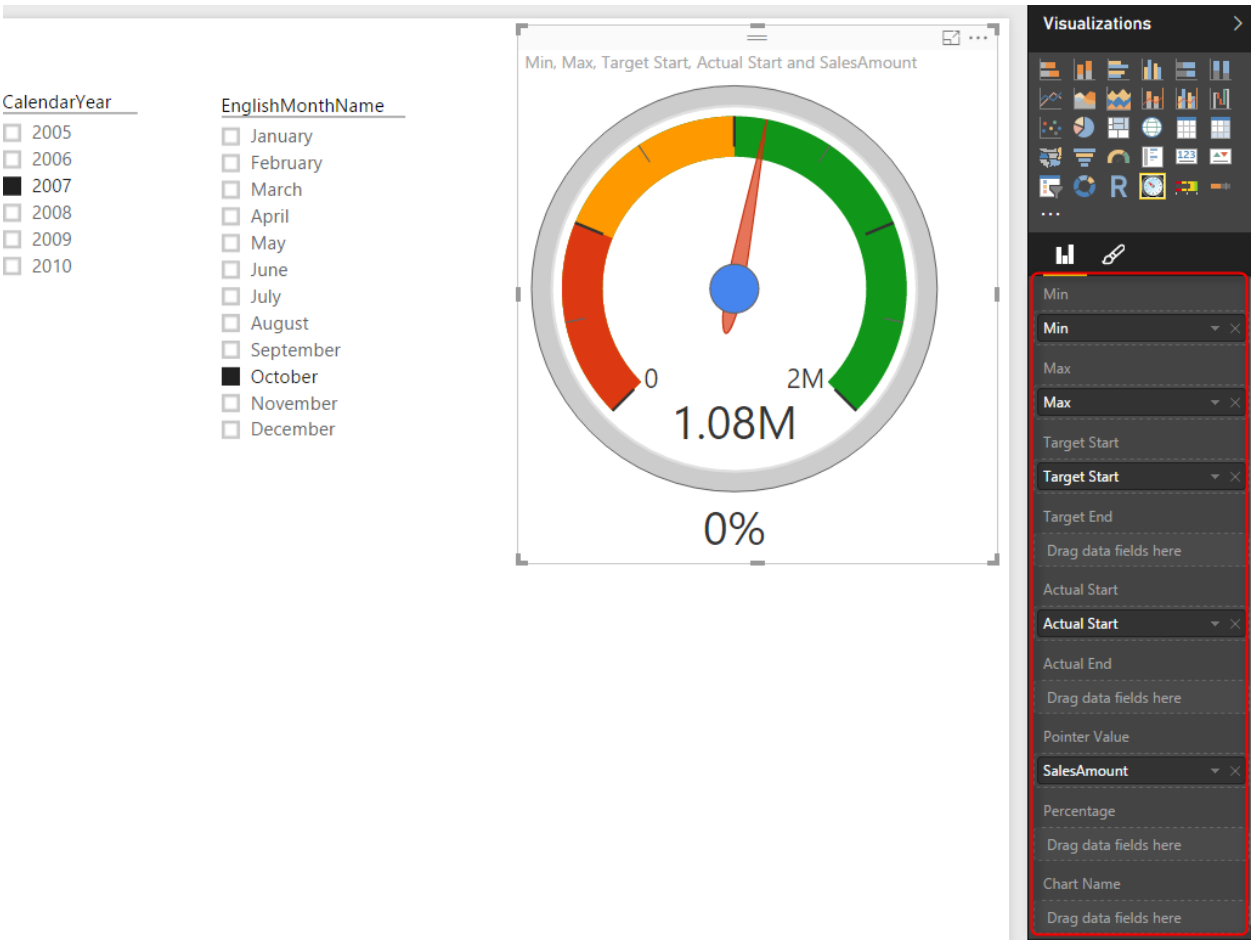


As you can see in the above chart which is for the calendar year 2007; that for some months like December the sales amount is in a good range (from $1M to $2M). For some months it is in the amber range like August and June (between $500K and $1M), and for some, it is below $500K and is in a red range such as January.

As you see in the above configuration, I haven't used Satisfactory and Good range. Have a play with this chart and configure it to see what you get out of it.

Dial Gauge

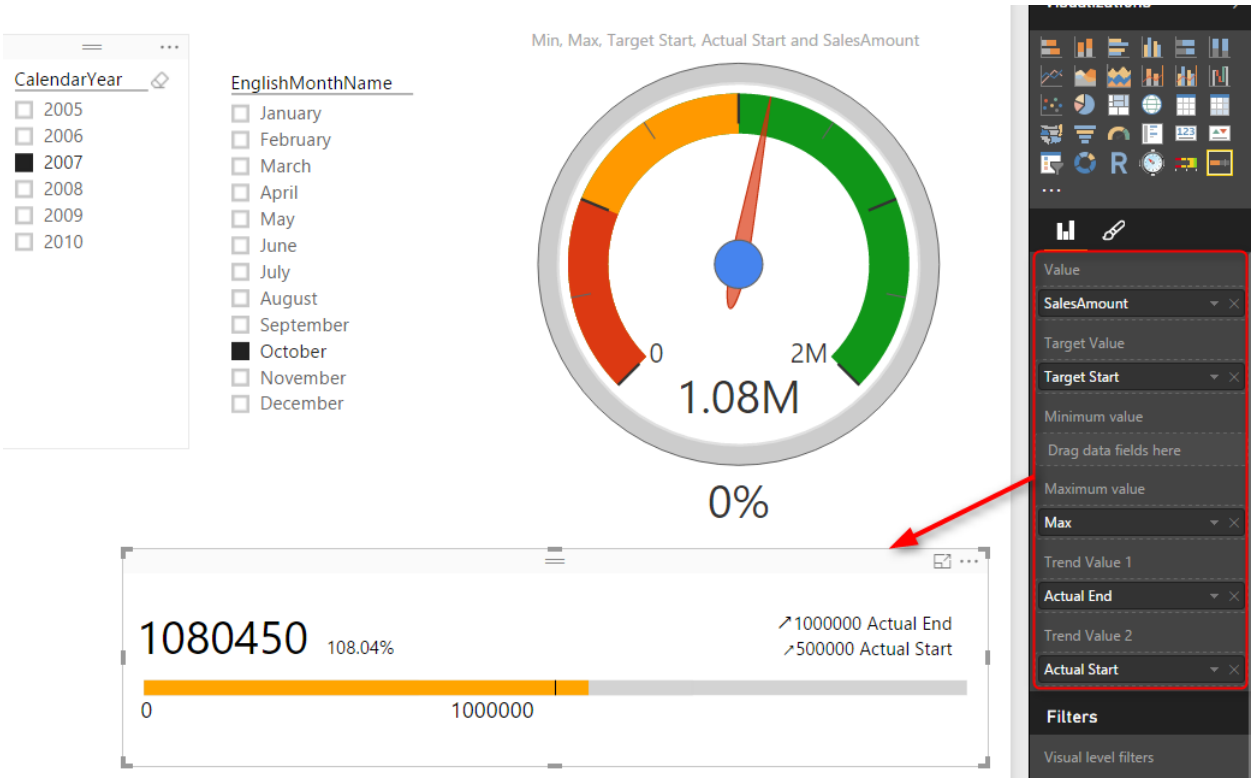
Another custom visualization which gives us the gauge visualization is DialGauge. CloudFonts Technologies LLP has published this visual. Like the normal gauge for KPI, this component gives you the flexibility to define ranges for green, amber, and red. The Pointer Value is the value we want to evaluate. You can also set a percentage for this gauge. I've used this gauge with the sample table I've mentioned earlier in this post. And SalesAmount as the pointer value. For this chart, I've used another slicer for the month in addition to the slicer for the year.



As you see the pointer value stays in the green area because the sales amount of October 2007 is $1.08M which is between $1M and $2M. You can check what you see if you change the month to August (expect a pointer to fall into the amber area).

Linear Gauge

LinearGauge is the custom visual published by MAQ Software. You can set minimum and maximum values, target value, and two trend values. As an example in the below chart, I've used SalesAmount as the value, and other information from the sample table above.



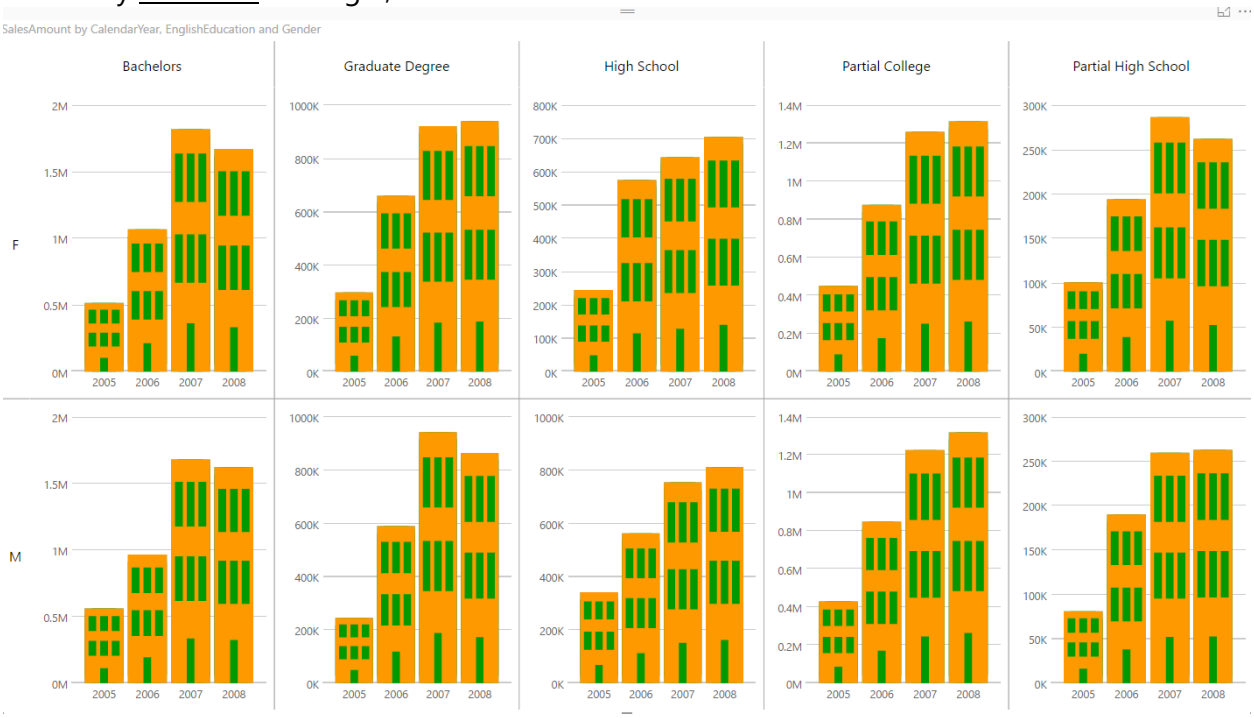
As you see the target value showed with a vertical line in $1M point. The orange filled section shows the value which is sales amount $1.08M for month October 2007. Percentage against the target is 108.04% which is +8.04%. Trend values show that the sales amount is going upwards compared to each trend value.

Summary

In this post, you've seen some visualization items that are useful to show KPIs. There will be more charts and custom visuals in upcoming months. However, this post gave you a better feeling about how to use them, or what items to look for and configure when you deal with KPIs. If you are interested in learning more about Power BI, please continue reading Power BI online book.

Infographic Designer: Not Just Another Visual

Posted by Reza Rad on Aug 2, 2017



At the time of writing this post; there are already more than 97 custom visuals posted in the Office Store. The list includes many interesting custom visuals. However, Infographic Designer is one of the visuals that is not just another visual. This custom visual has some unique features that you cannot see in many other visuals. Some of these features help a lot in your visualization scenario if you know how to use it. In this post, I'll explain some of the great features of this visual. If you like to learn more about Power BI; read Power BI online book from Rookie to Rock Star.

Sample Data Set

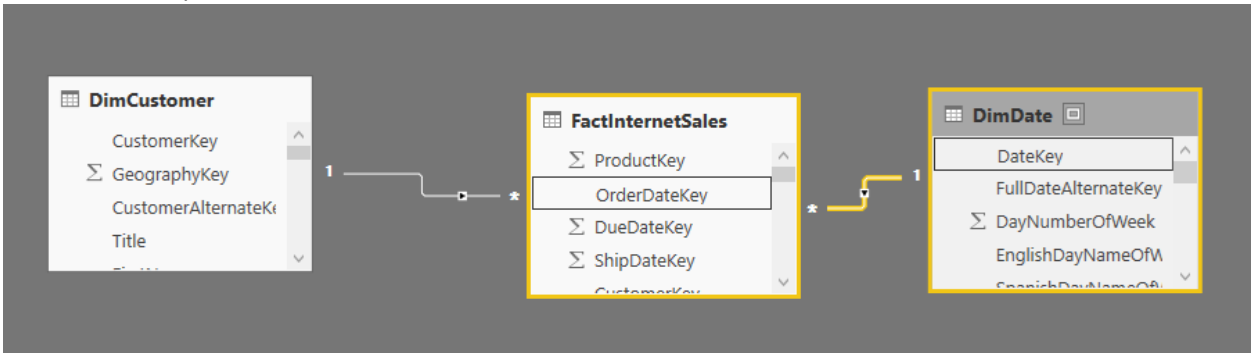
For this example, you need to have a copy of the AdventureWorksDW database.

About Infographic Designer

Infographic Designer is a custom visual built by Microsoft. This visual first introduced in October 2016. This visual gives you the ability to create charts with some infographic in it. However, this is not the only great feature of this visual. This visual also gives you the ability to use Multiples (Called Row By or Column By). With Multiples you can create multiple charts based on specific dimension attributes. In this blog post, we will have detailed look at options and features of this visual.

Create Sample Model

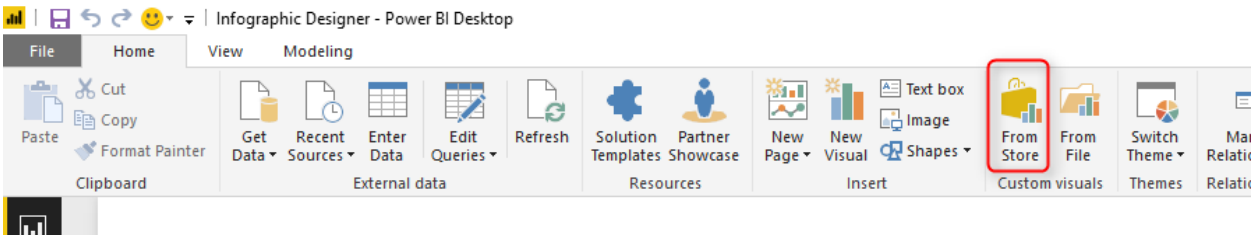
For this example, you need to have AdventureWorksDW which you can download it from the link above. Select these tables from this dataset; DimDate, DimCustomer, and FactInternetSales. Here is a screenshot of the data model;



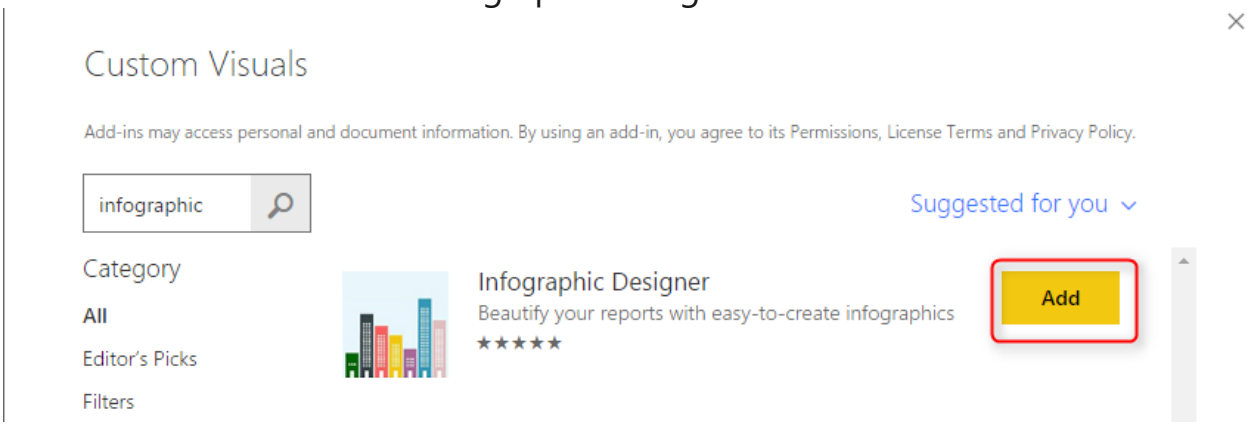
make sure to create a relationship between DimDate(DateKey) and FactInternetSales(OrderDateKey).

Get the Visual

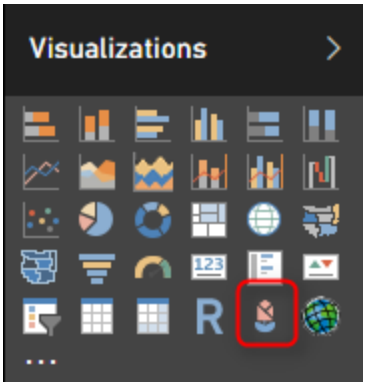
You can recently access the list of custom visuals from Power BI Desktop itself. Select From Store in Home tab;



then search in the box for Infographic Designer and add it

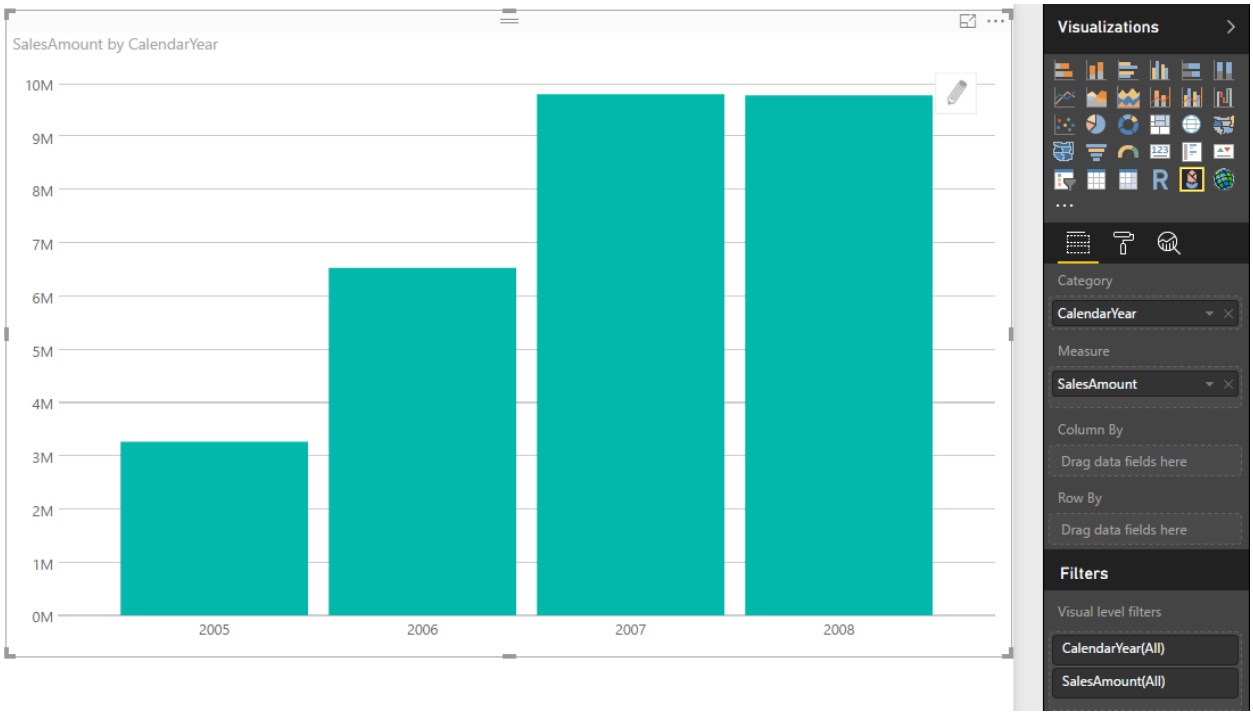


You should see the new visual added in your list of visuals



Basic Visualization

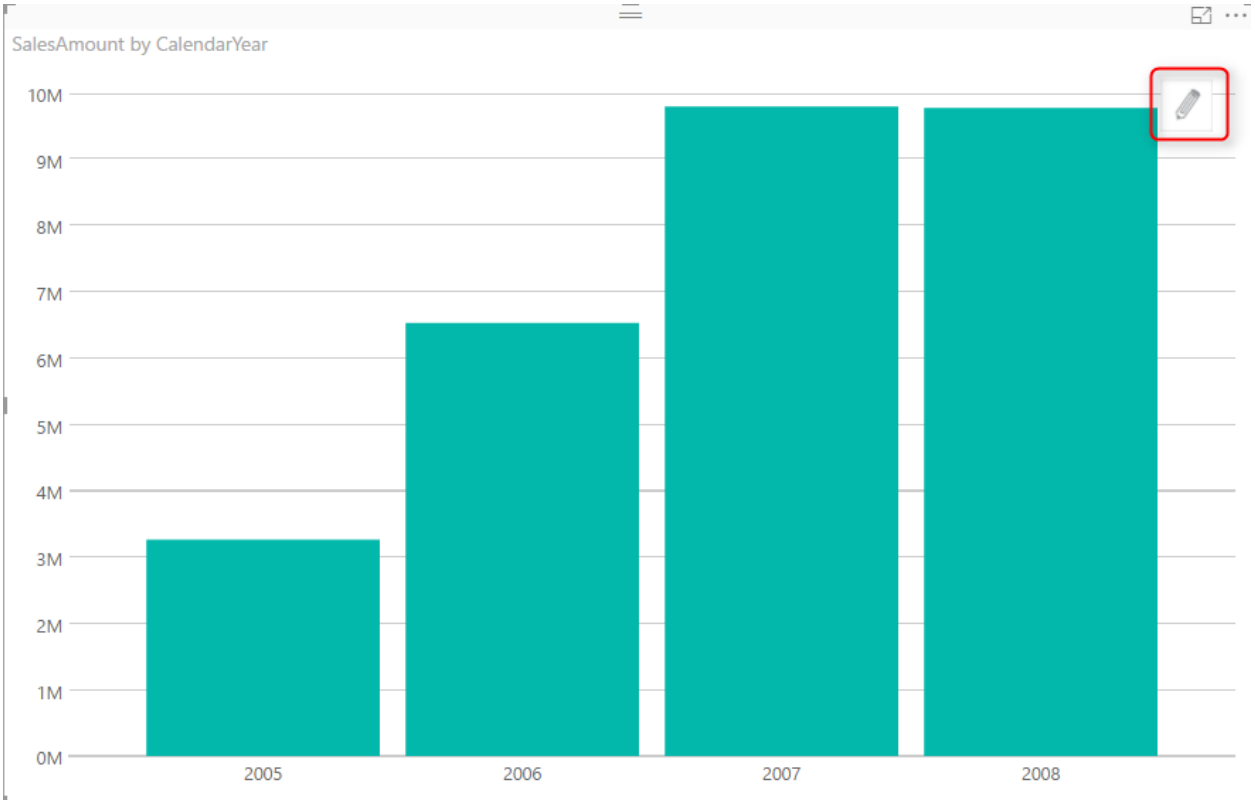
The basic look and feel of this visual are similar to a column chart. If you drag it in the report and set CalendarYear(from DimDate) as Category, and SalesAmount(from FactInternetSales) as Measure, then you will see a simple column chart as below;



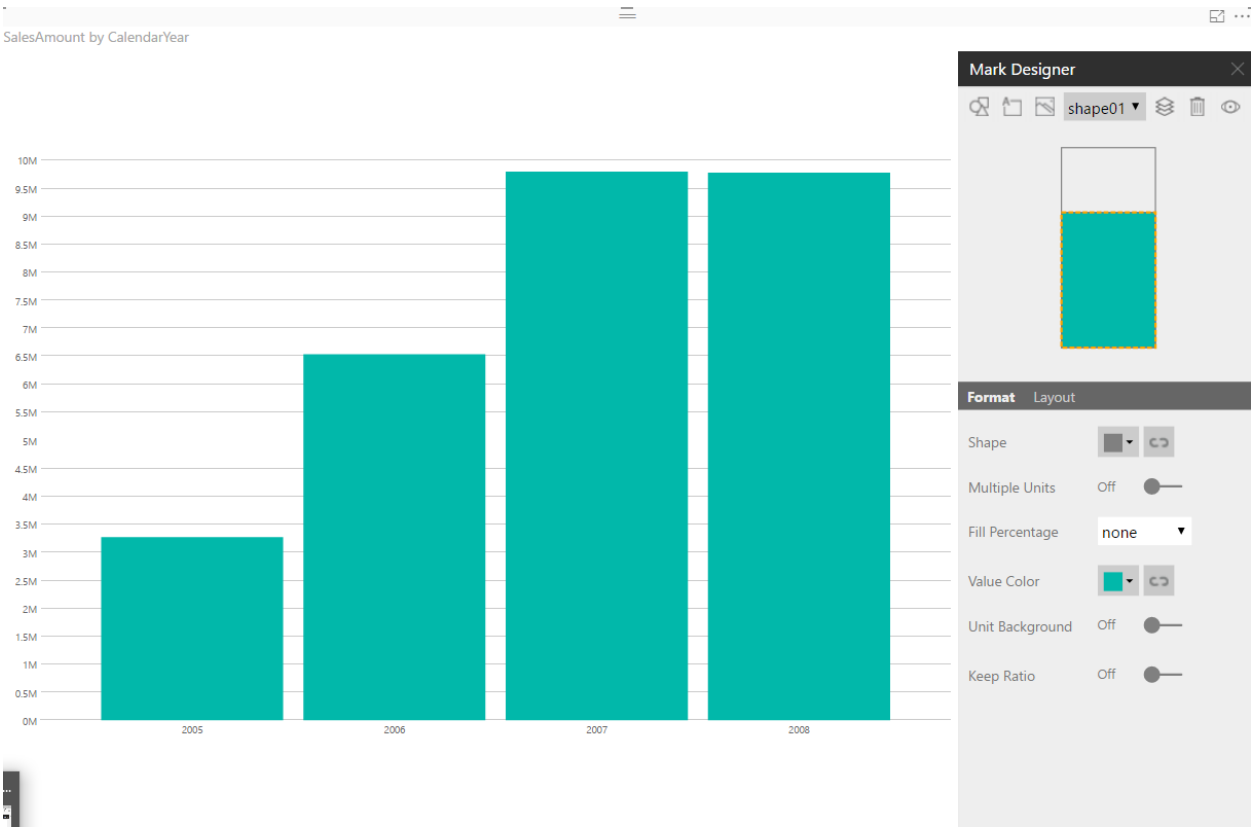
However, this chart has a lot of capabilities hidden, let's look at some of it.

Infographic Visualization

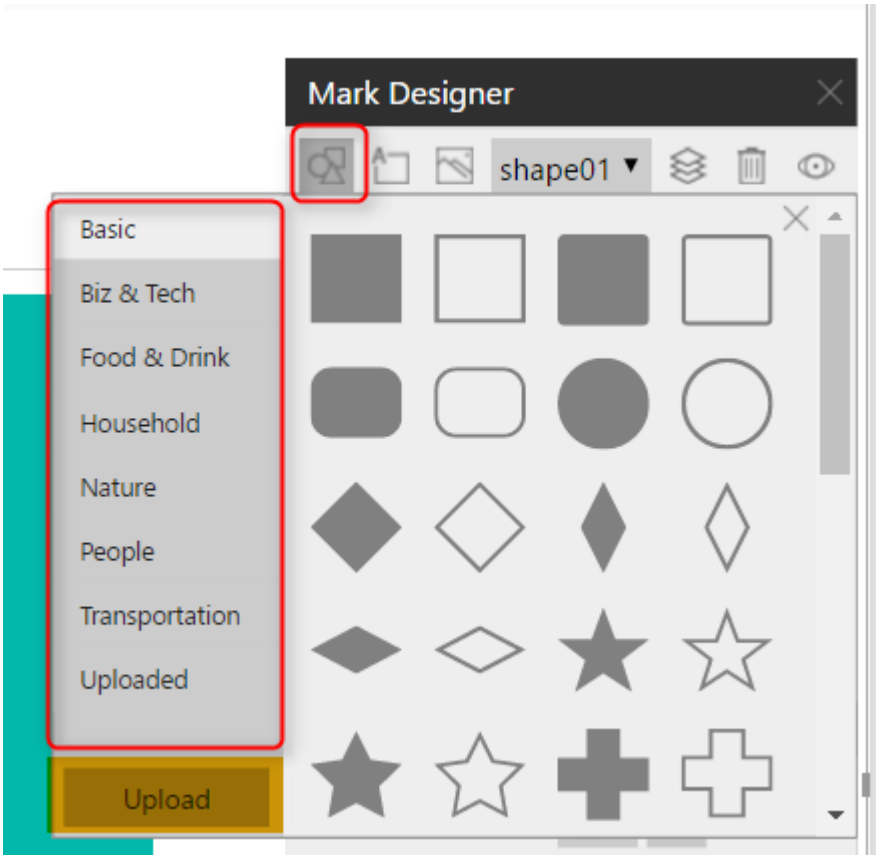
As the name of this visual says; it is a visual for the infographic. You can use it to visualize an infographic. To start that you have to click on Edit icon that appears at the top right-hand side of the visual itself.



With clicking on Edit, you will see an Edit mode in the right-hand side of the chart.

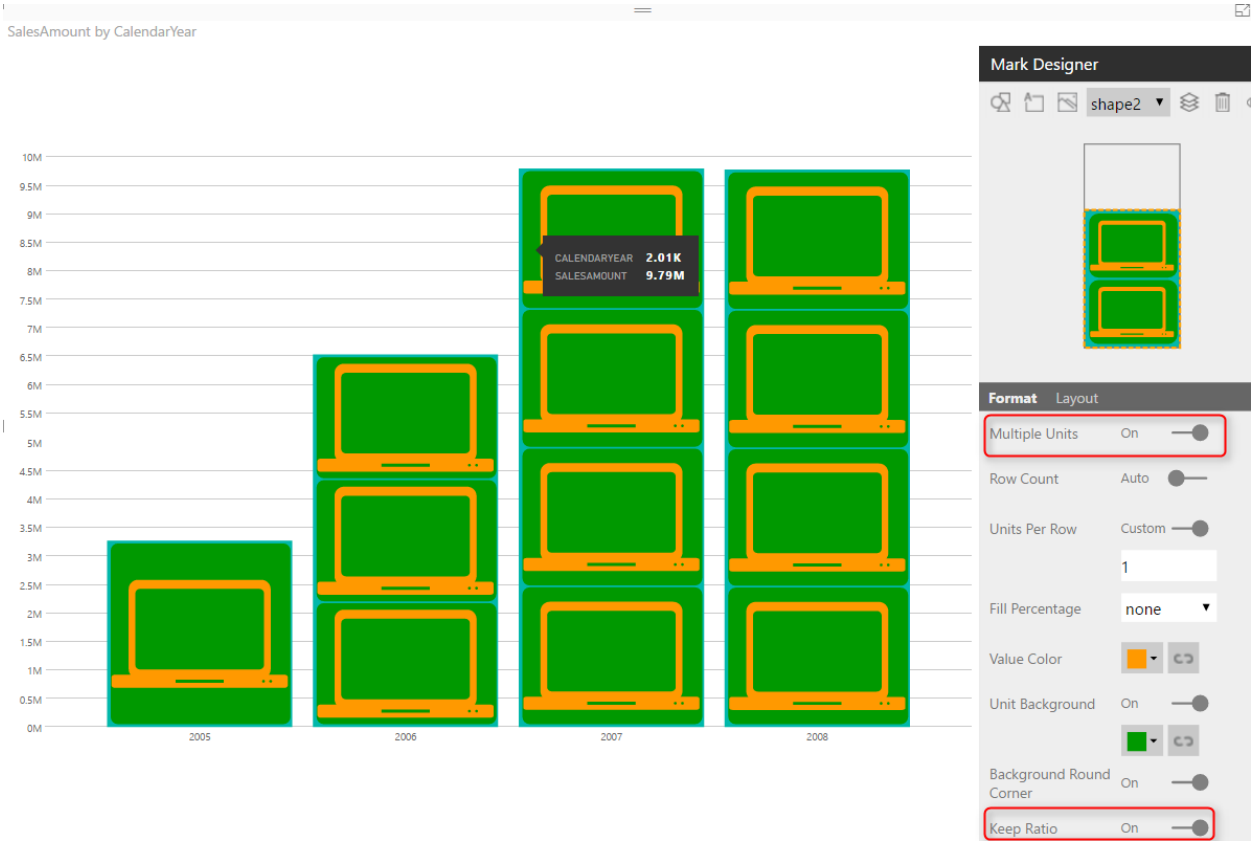


There are some configurations you can apply here in Mark Designer. You can change the color (In Value Color if you want). You can also select a particular shape.

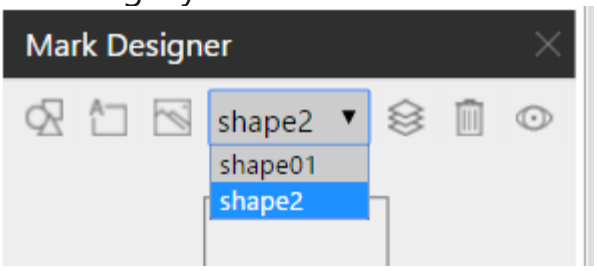


As an example; I have selected shape of the apartment, with some color changes. The result is as below;

There are also some configurations you can do for every shape. By default, shapes are stretched. You can choose Multiple units to multiply them when column height is more. Here is an example; you can see the laptop image has been multiplied.



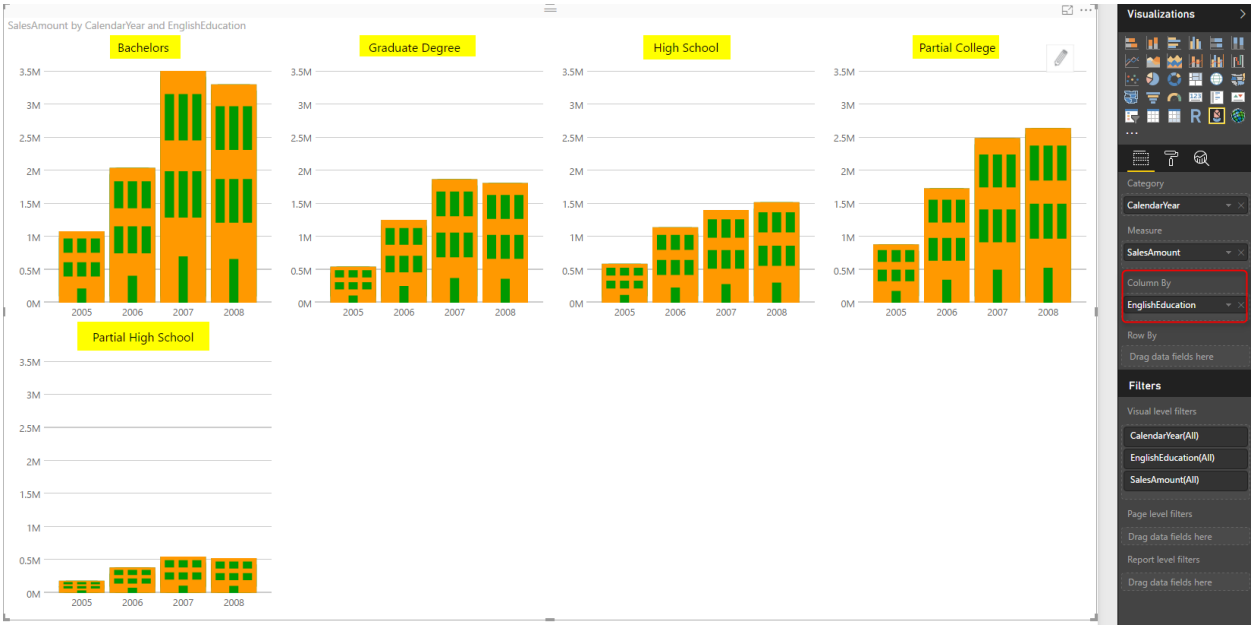
You can also add other layers of images into this. At the top section of Mark Designer, you will see all options for switching between layers or adding or removing layers.



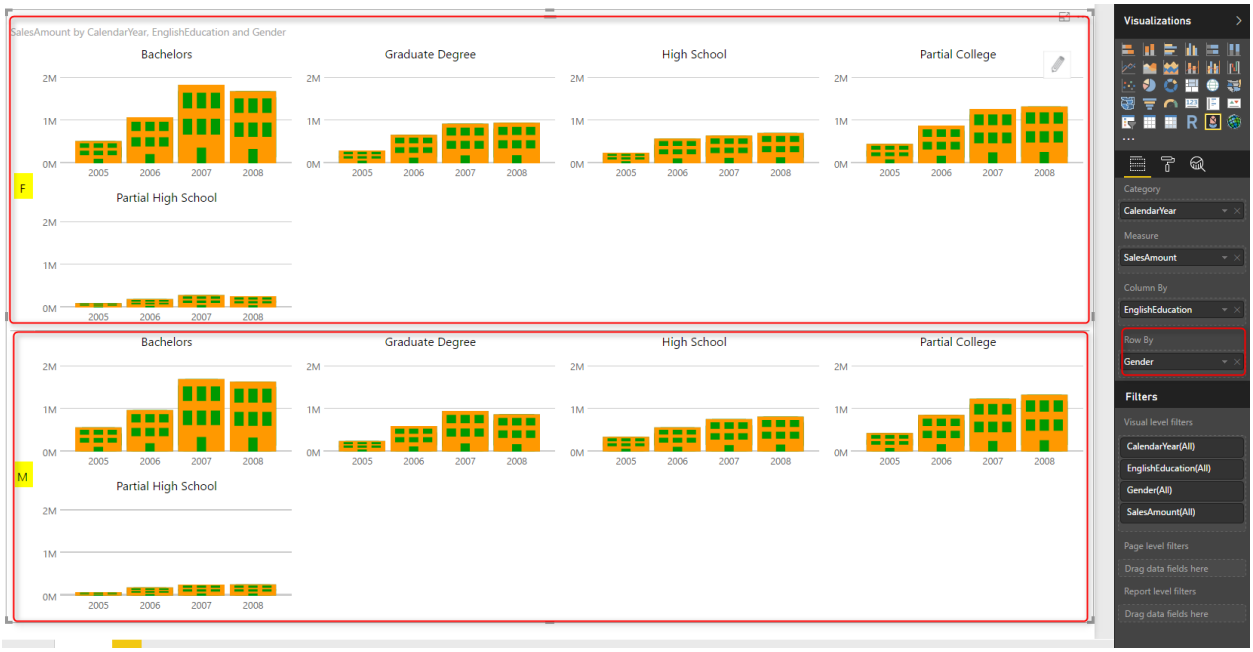
There are also some other details regarding infographic part of it, which I believe you will find interesting when playing with this visual. Now, let's take a look at the best feature of this visual.

Multiples: Row By, and Column By

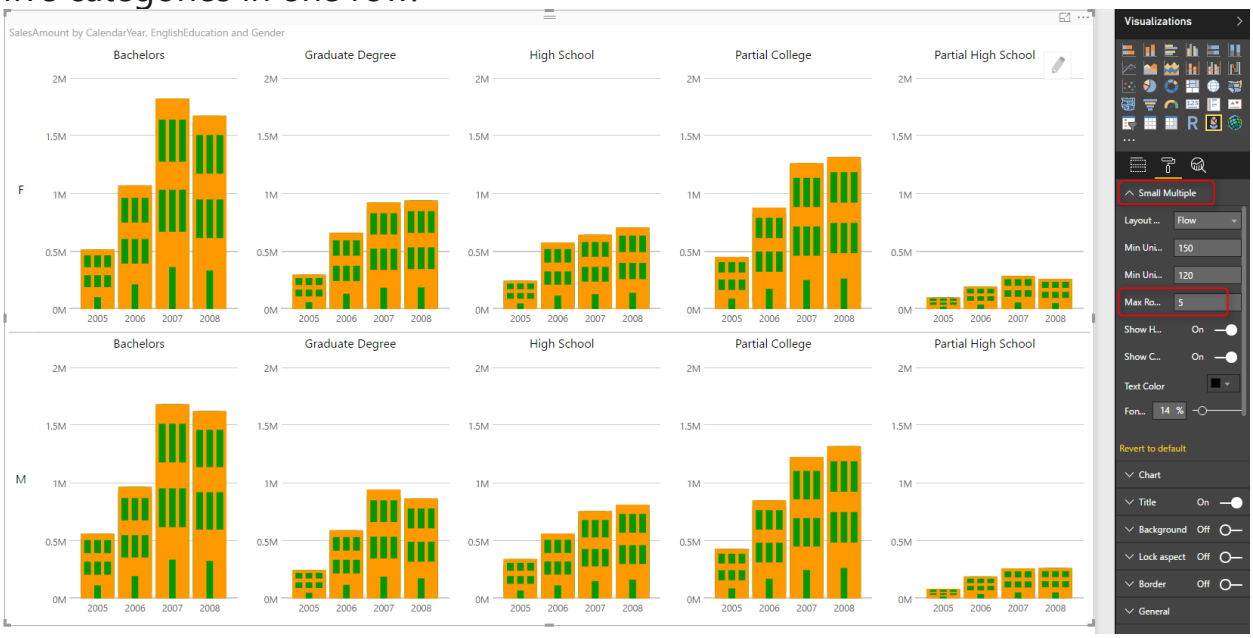
The best feature of this visual is something that previously in Power View was called as multiples. In this chart, it is called as a column by and row by. You can create multiples of a chart by another field. Let's have a look at that.
If you bring EnglishEducation (from DimCustomer) into Column By field. You will see the chart creates multiple times; one chart per each EnglishEducation value.



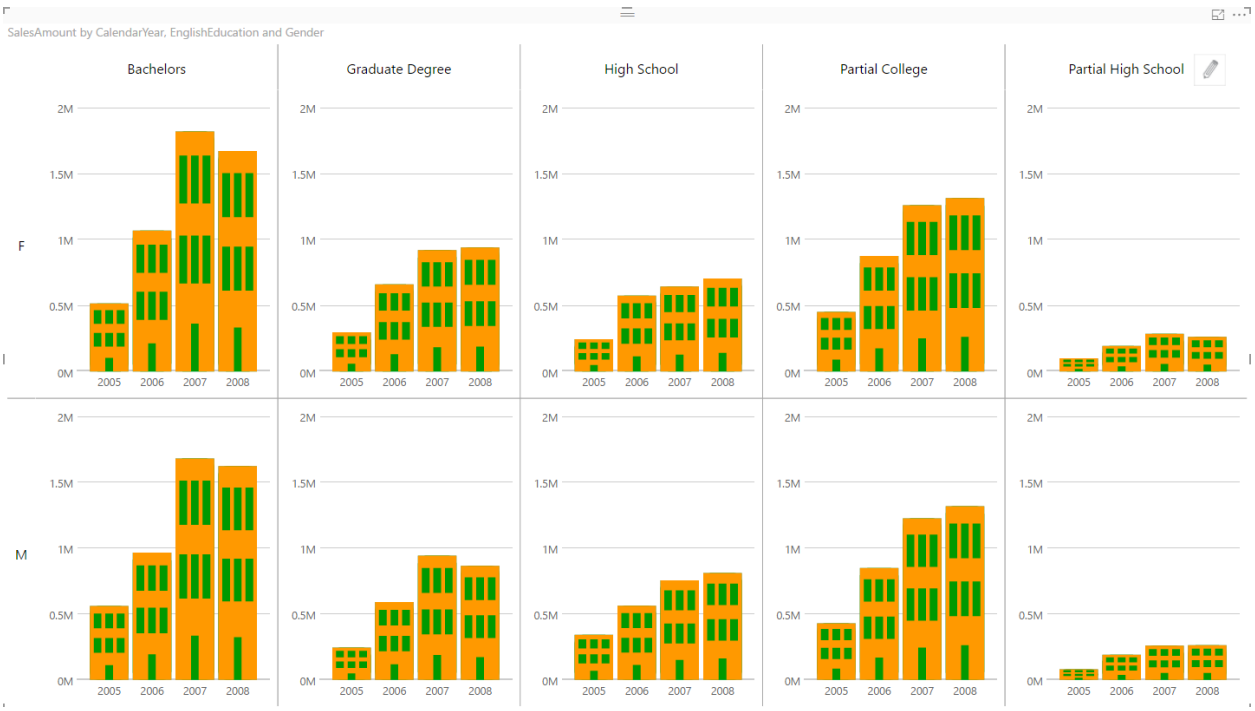
It creates a new chart in one column per each value: Graduate Degree, High School, etc. Because some charts are too much to fit into one row, so the last one goes to another row. With this chart now you can compare sales across years in all different education categories.
You can also bring another field into Row By, as an example: Gender (from DimCustomer);



You can also make some configurations to make it nicer. In the Format section, under Small Multiple you can set a number of columns to 5 to fit all five categories in one row.



You can also change the Layout to Matrix to avoid extra space used for repeating chart headers

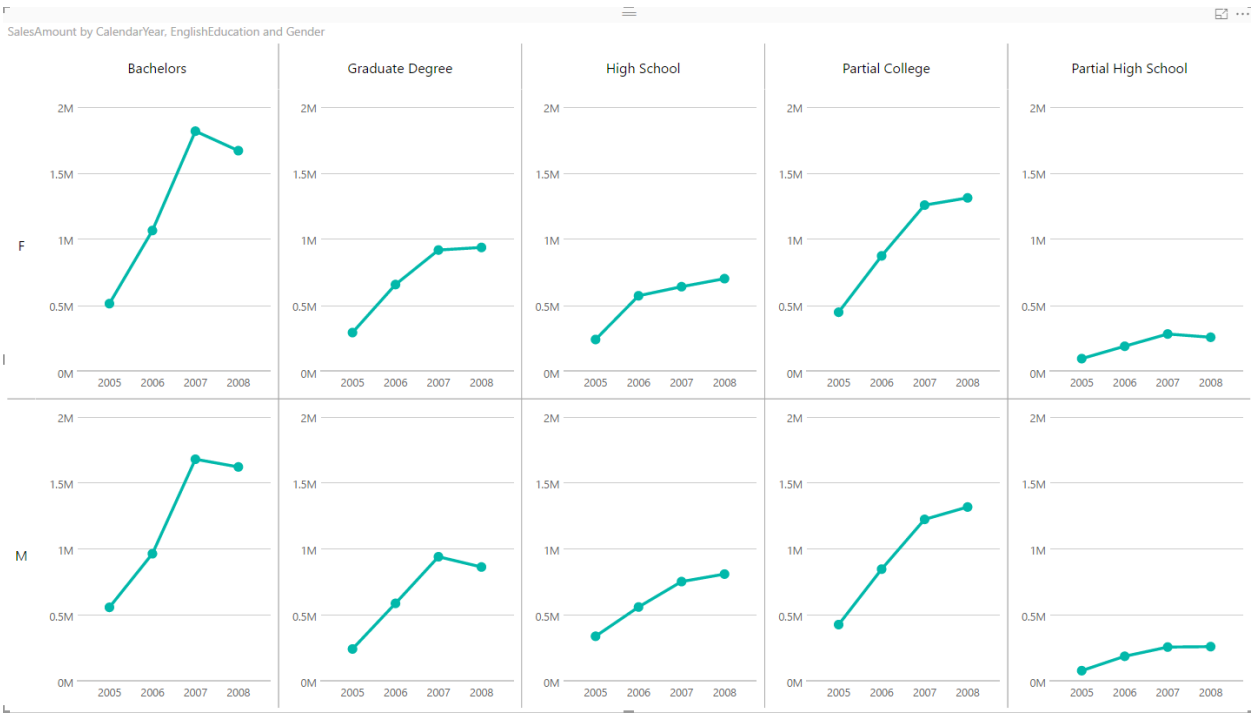


Some Extras

In addition to the powerful visualization option provided by Column By and Row By, you can even make it much more insightful with some other extra configurations. At the moment the chart above is good to show in which category of education or in which gender sales is less or high across the years. However, it is not good to compare them on the same scale, because some charts (such as Partial High School) is so small compared to others (such as Bachelors).

You can change them all to be on the same scale; For this change, click on Chart, and set Uniform Y-Axis to be off.

Now you can easily compare the ratio of values regardless of their sales amount. You can easily understand that Bachelors category for Male compared to Partial High School of the Male category. Bachelors are doing better regarding sales amount if you look at the previous chart. But in this chart, it shows that the sales for 2008 went down. However, the sales for 2008 for high school went up. It is still lower regarding $ value, but regarding ratio, it is better. So with this extra configuration, you can get extra insight as well. You can also change the Chart type to look at the trend. You can change it to be Line Chart, Bar, or Column Chart.



The example above shows when you change the chart type to Line. As you can see it gives you very insightful information to compare different education categories across different genders.

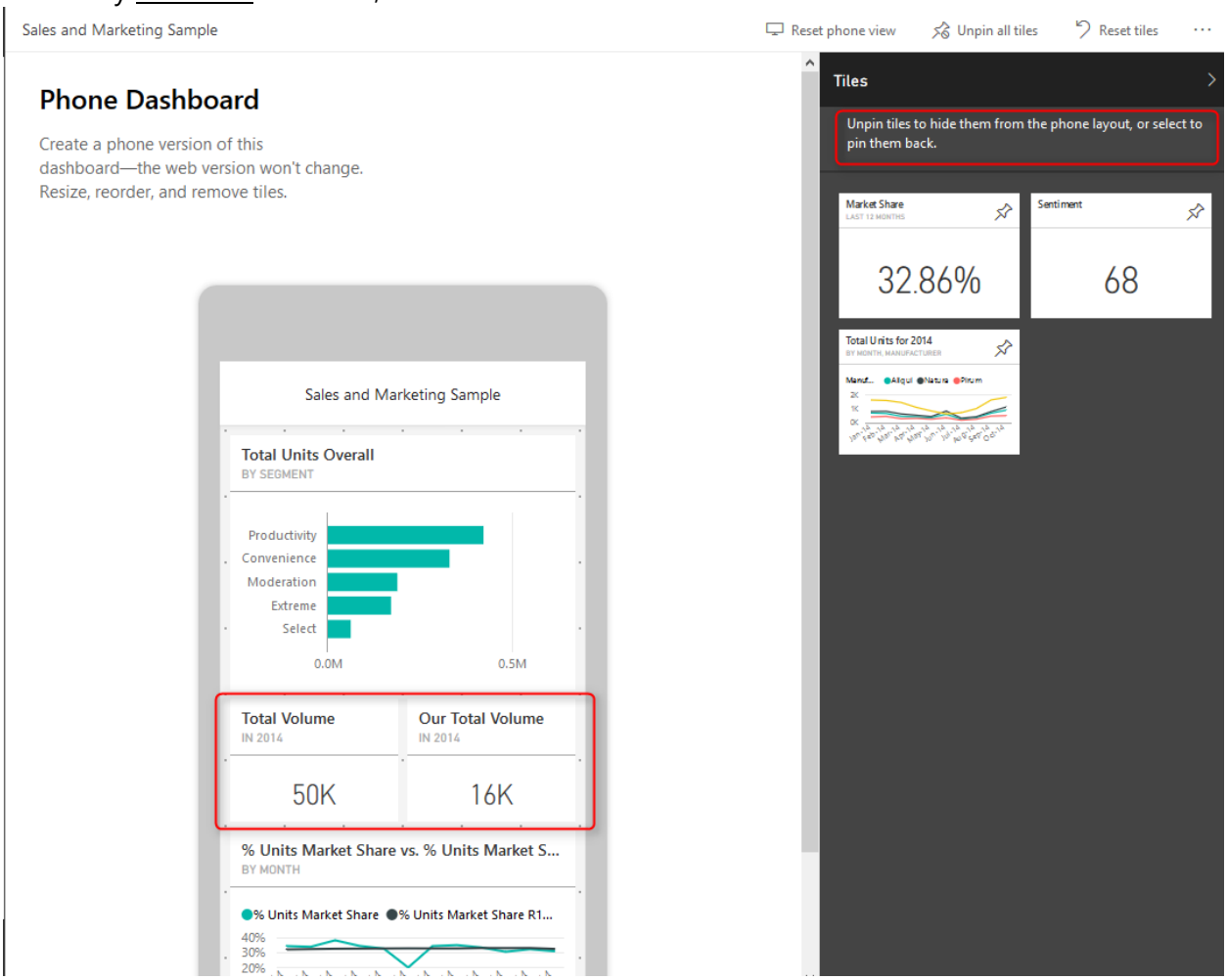
Summary

Infographic Designer is a visual that can build some nice and beautiful charts with infographic feature of that. However, never forget the best feature of this visual which is Multiples. This feature is unique for this visual; you can use it to generate more insightful visualizations and compare data across multiple dimension attributes. Have you found this chart useful? Don't hesitate to share your story with it here down in the comments below.

Part V: Mobile Reports

Dashboard Design for Mobile Power BI

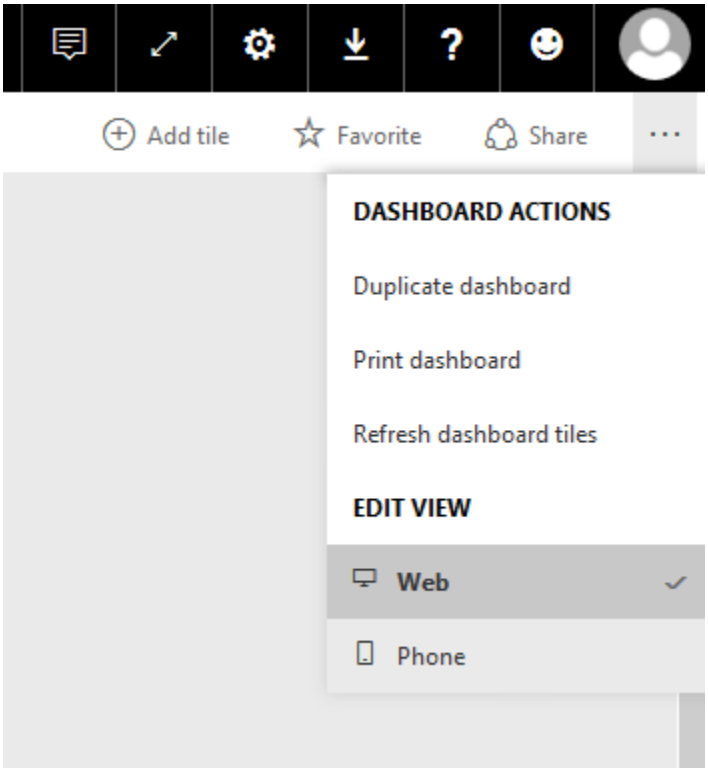
Posted by Reza Rad on Jul 18, 2016



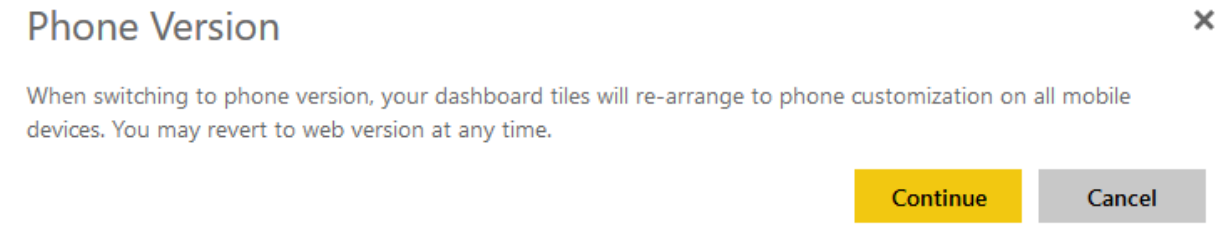
In this blog post of Mobile friendly Power BI report development series, I would explain how to design dashboards for mobile devices. Fortunately this has come right at the time of the recent update on Power BI service with the ability to design dashboard page specifically for the mobile device. The dashboard design for mobile does work with all mobile sizes and shapes as long as it is one of the supporting mobile operating systems; IOS, Windows Phone, and Android. If you have worked with Mobile report publisher of SSRS 2016, you will see very similar experience here. If you are interested in learning more about Power BI, read Power BI online book; from Rookie to Rock Star.

Change Dashboard View

With the latest update of Power BI service, you can now change the view of the Dashboard for a mobile device. For using this feature, you should log in to Power BI, and then on a selected dashboard click on ellipsis button on the top right-hand side of the dashboard (below your account's profile photo), then choose Phone under Edit View.

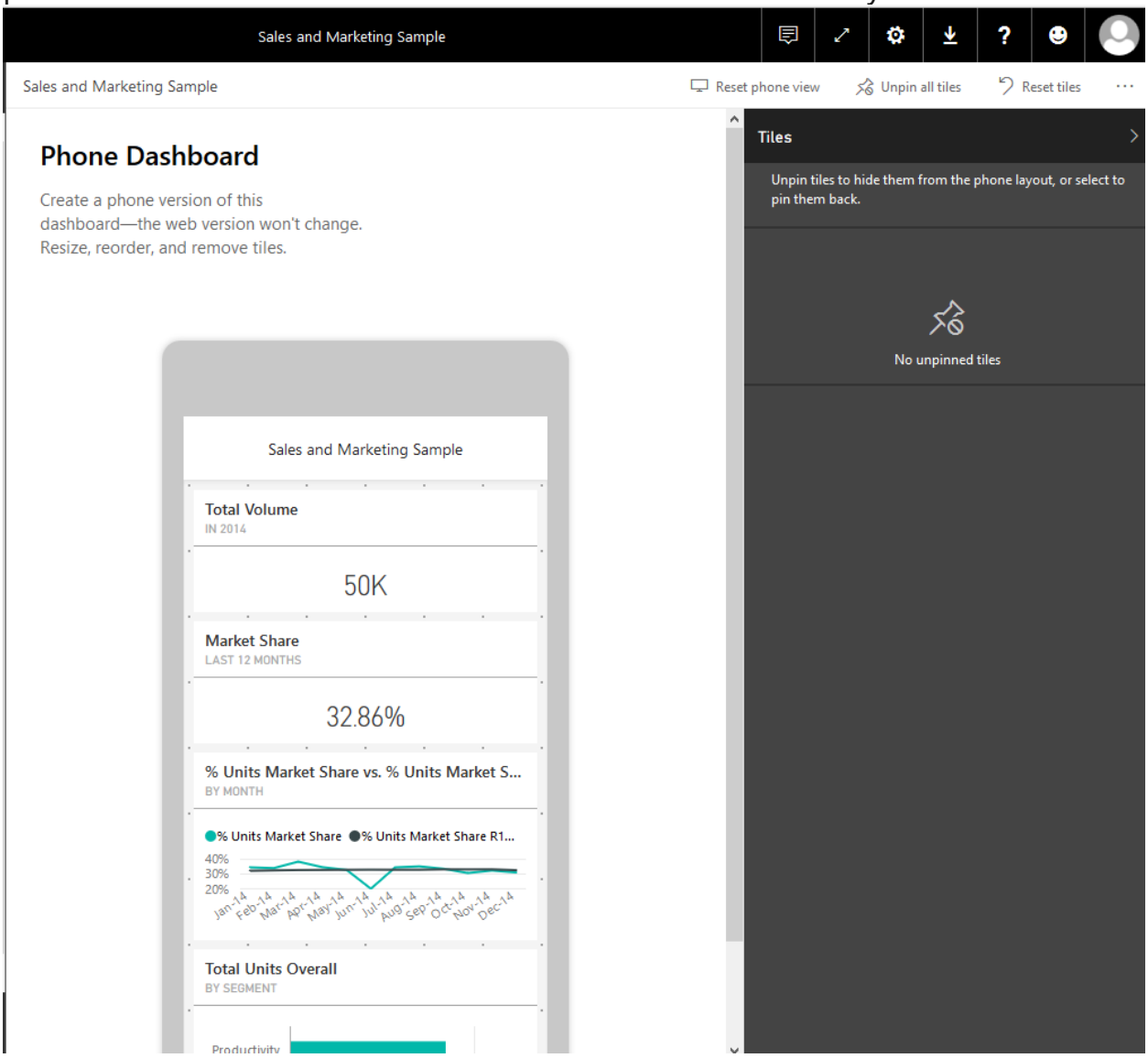


The default view is Web view, and when you change it to Phone view, you will see a message about switching to phone version.

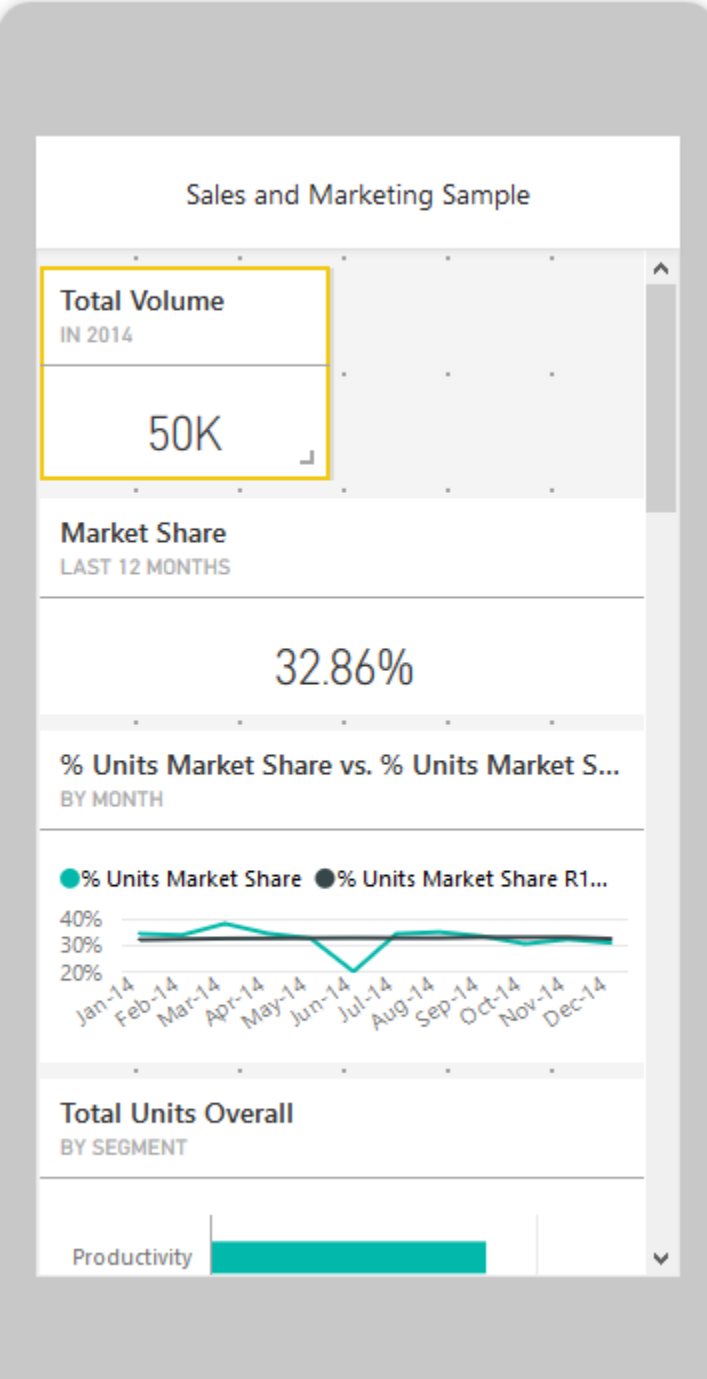


Don't worry about this message; you won't lose any configuration on your web version of the dashboard. Your dashboard would have two different

views; Web view, and Phone view. After entering to Phone view, you will see a phone view with tiles of dashboard added to it automatically.

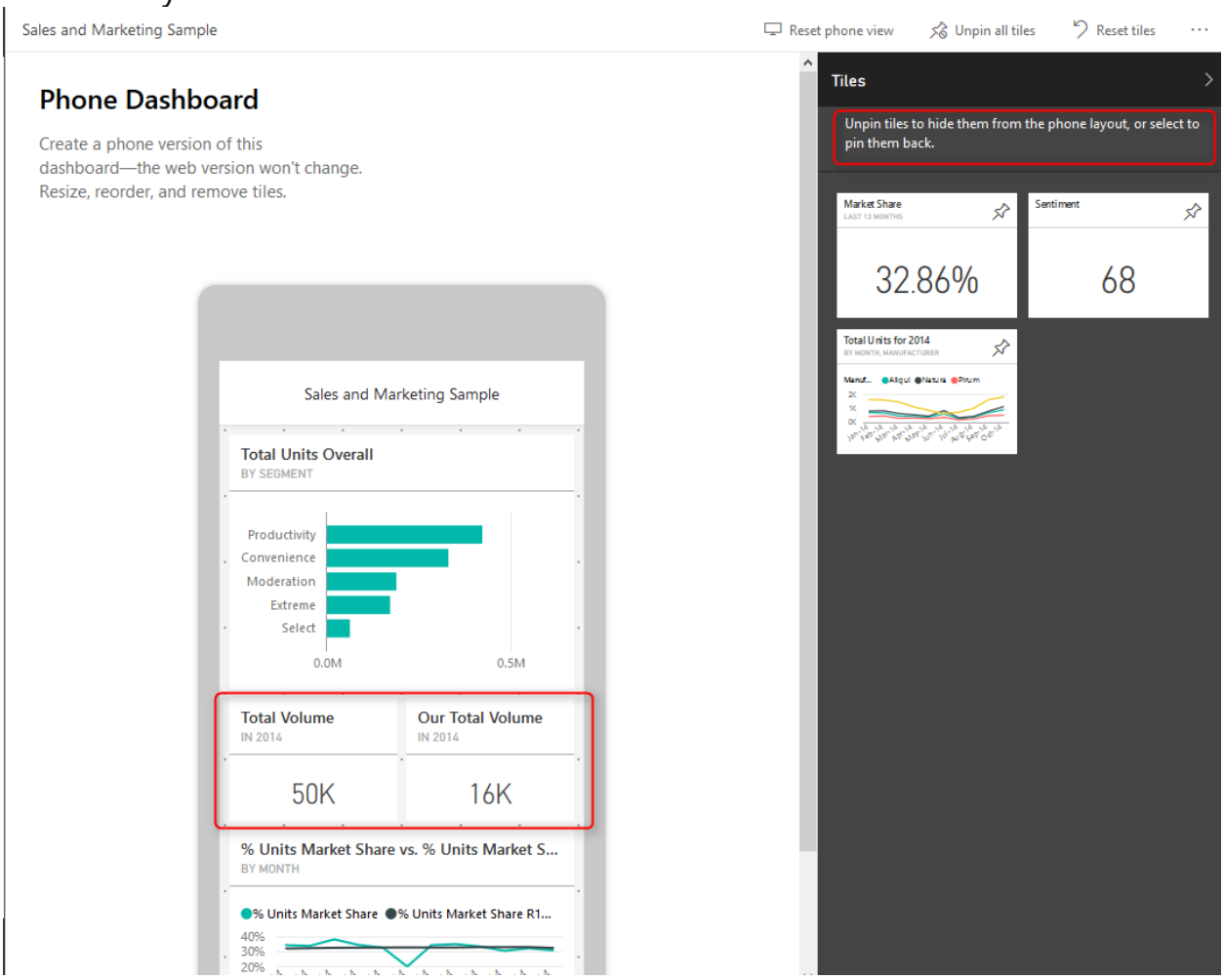


As you can see this is a view of the smartphone, and the good thing about it is that this is size independent. So works with all phone sizes. You can change size or order of a tile as you want with drag and drop or moving their borders to resize it.



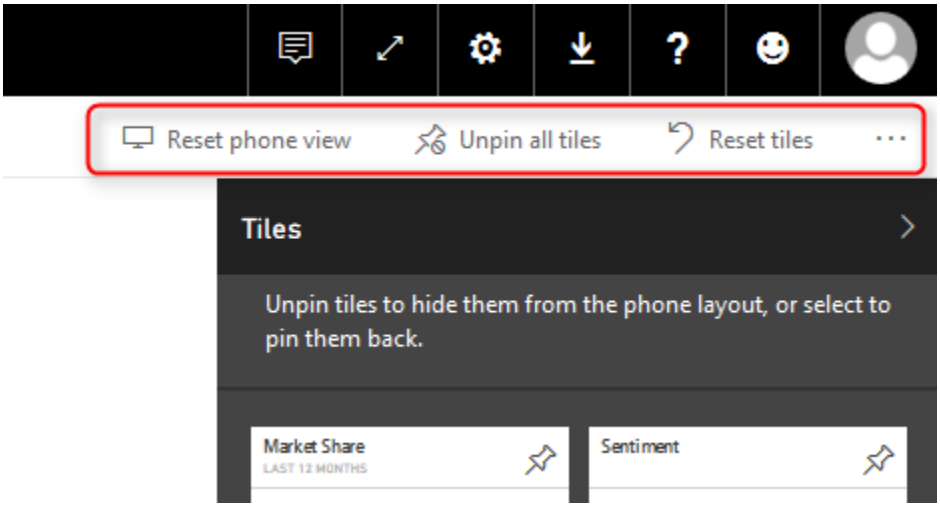
This feature is a great step forward for mobile dashboards because previously dashboards only designed for web, and they automatically set for phone view. Now we can design exactly what we want to show. We can event unpin some of the tiles from the phone view's dashboard. Unpinned tiles will stay in the

Tiles pane in the right-hand side, and you can add them to the dashboard whenever you like.



As you can see in the above screenshot now, you can arrange the view to have two or more (if you can fit in the screen of the phone) tiles in same horizontal position. This is a great view especially when you have only numbers to show, and uses the whole width of the phone rather than having blank spaces around.

You can reset the view anytime you want and design a new dashboard from the beginning

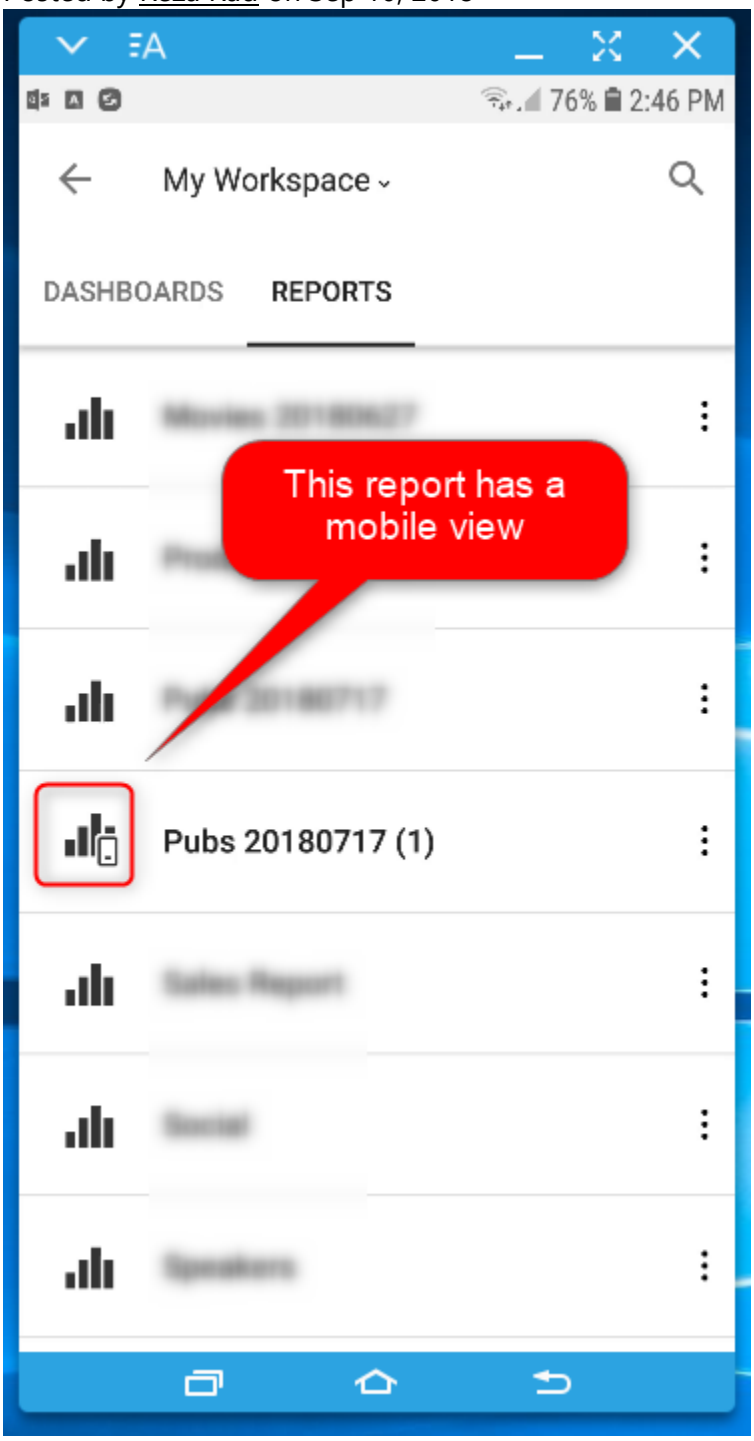


View Reports on Mobile Device

The reports view on mobile devices still needs some more tips and tricks to work with. If you like to learn more how to design reports which are mobile friendly read my blog post here.

Power BI Design Tip; Design for Mobile Devices

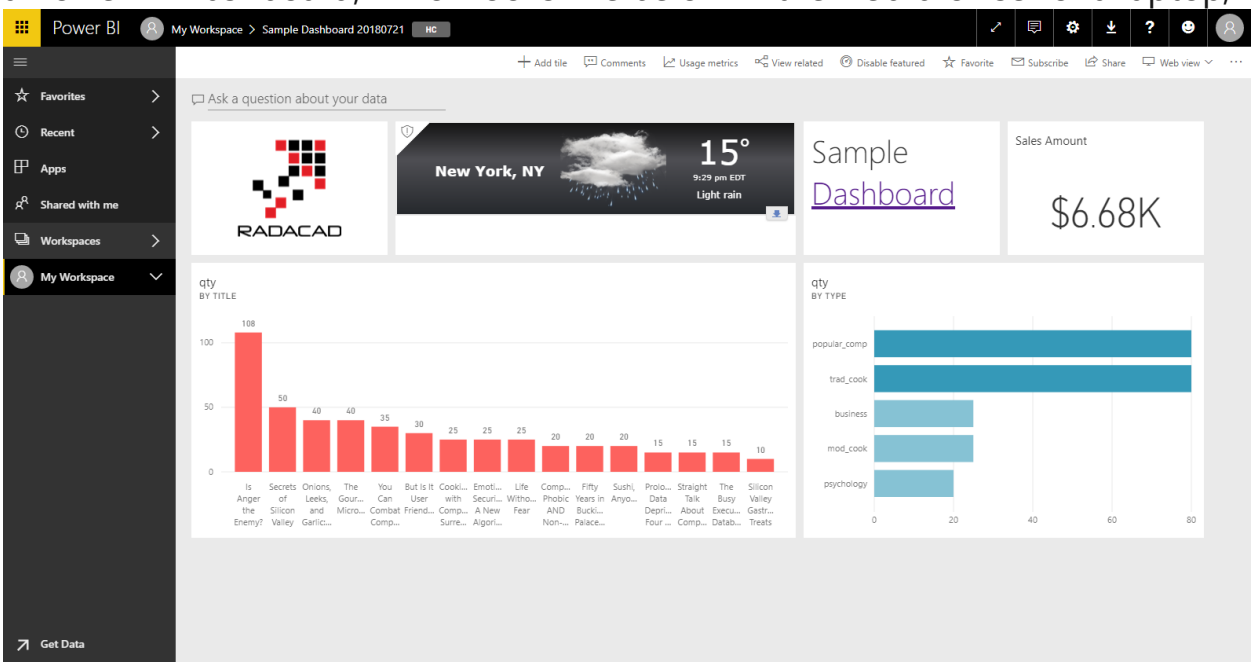
Posted by Reza Rad on Sep 10, 2018



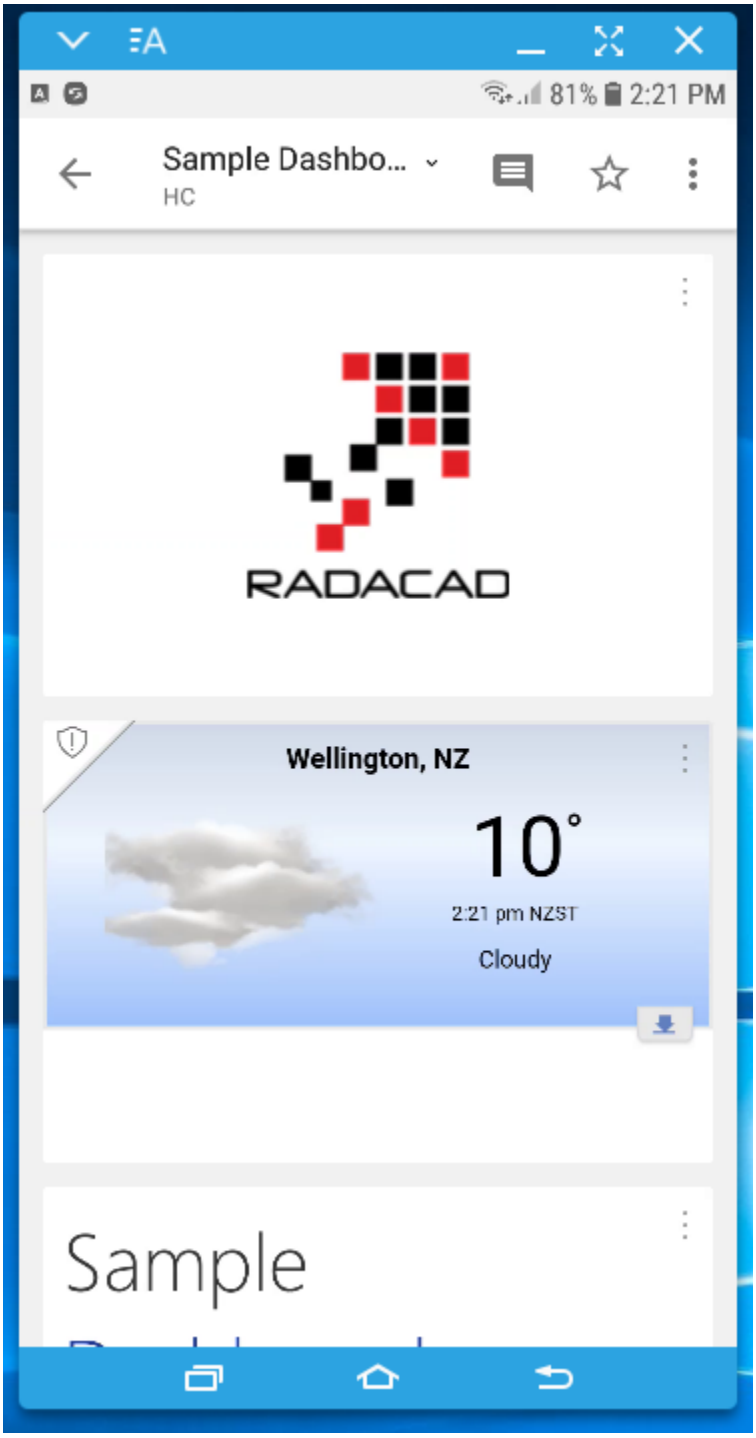
Power BI is a mobile-friendly reporting solution. Every report that you generate can be viewed in the Mobile too. However, it doesn't mean that the report is designed for mobile, or by other words; it doesn't mean that is it a mobile report page. You have to make some changes, and take some extra considerations for your reports to be mobile reports. In this blog post, I'll explain a few simple but very effective tips to take your Power BI report one level further for mobile devices. If you like to learn more about Power BI; read Power BI book from Rookie to Rock Star.

Power BI Dashboard on Mobile Devices

First, let's have a look at Power BI Dashboards in a mobile device. Here I have a Power BI Dashboard, which looks like below in the web browser of a laptop;

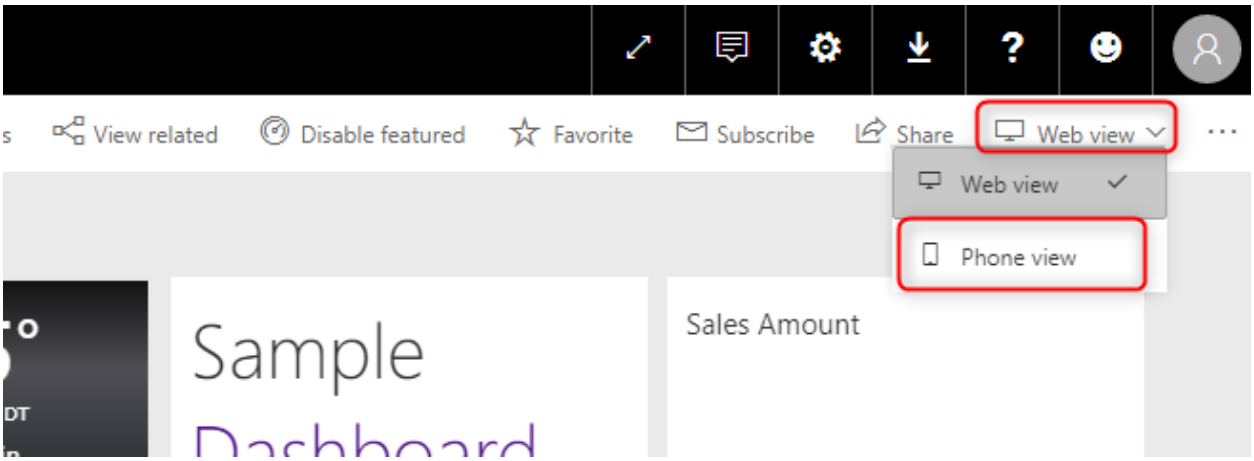


If I look at the same report in Power BI Mobile app, I will see below;

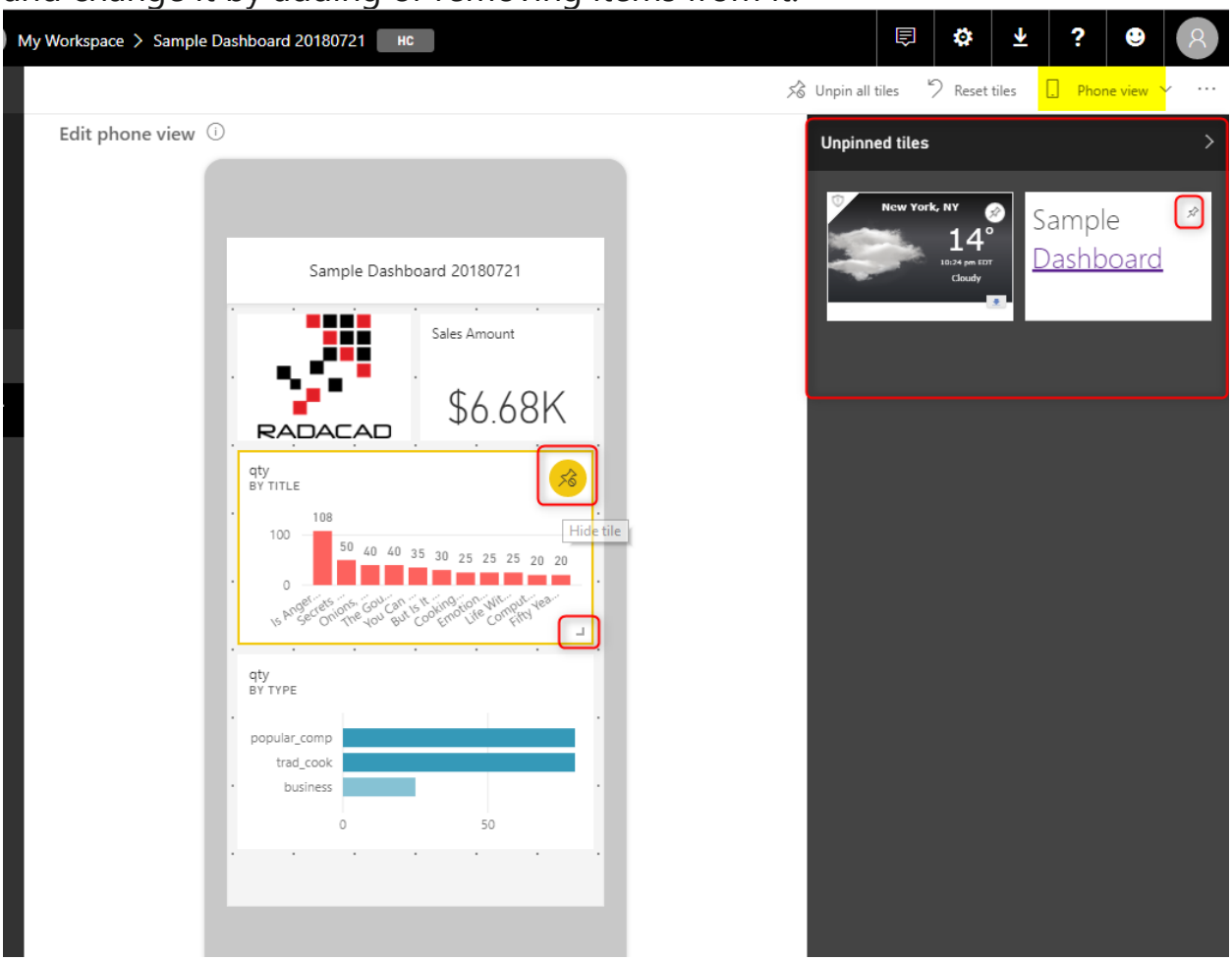


As you can see, the layout of the mobile device for the dashboard is different than the web browser. The reason is that Power BI automatically creates a mobile layout for every dashboard. If you want to modify that layout and

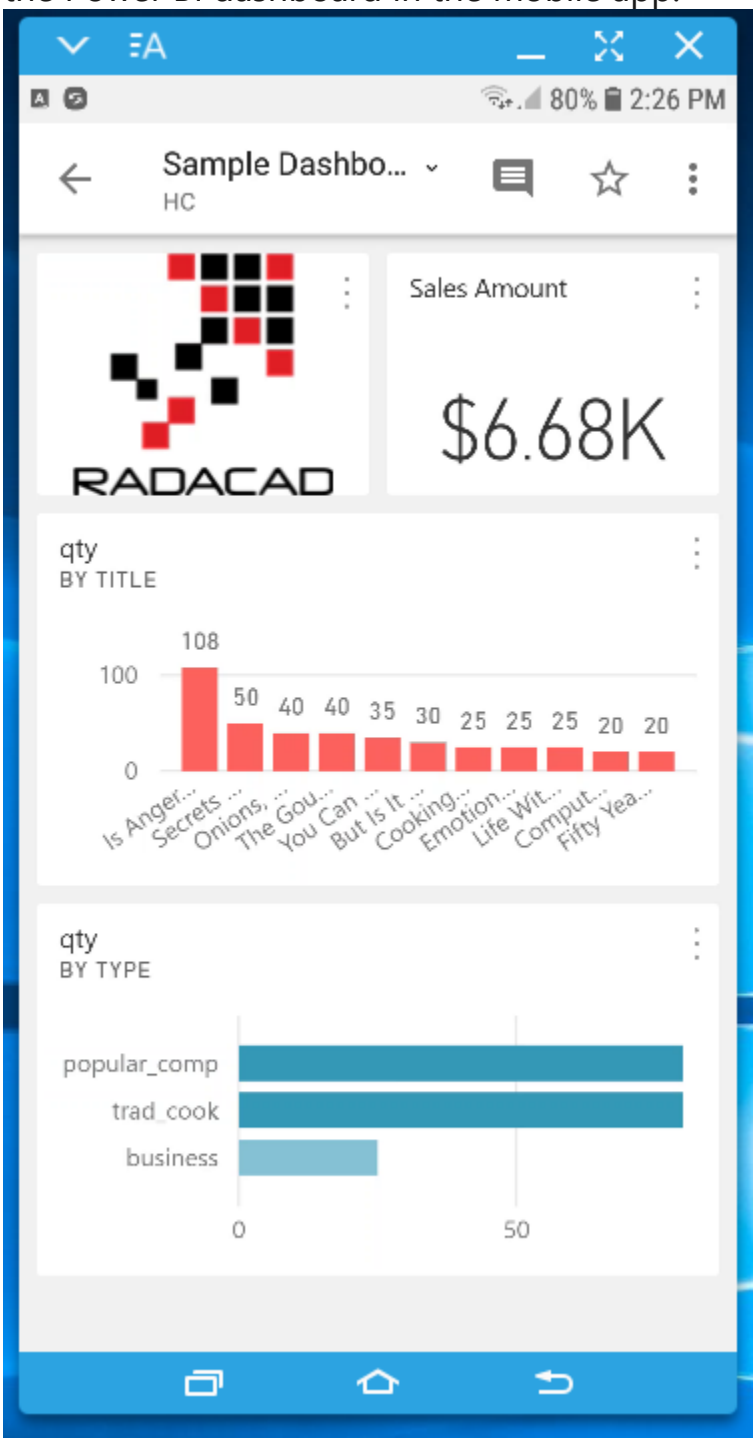
change it, you can go to the Power BI service (through a web browser), and click on Phone View.



Now you will be able to see what the phone view of the dashboard looks like, and change it by adding or removing items from it.



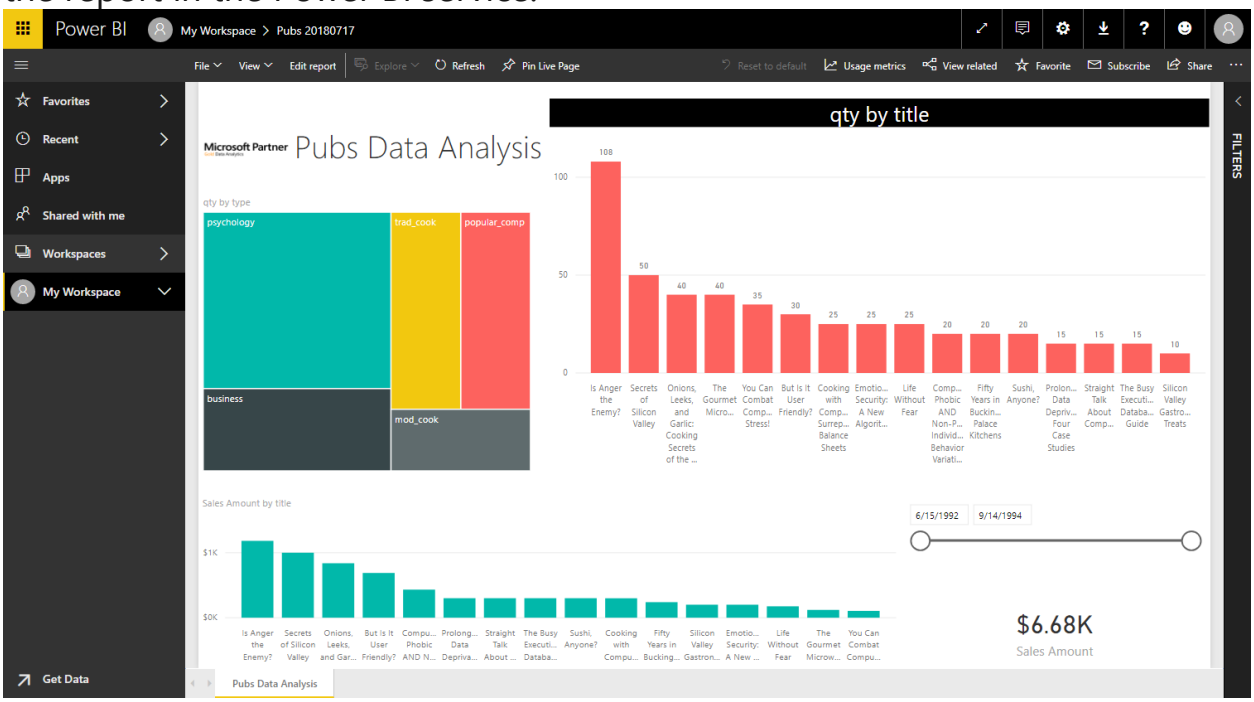
By making changes in this view, you can immediately see the impact of that in the Power BI dashboard in the mobile app.



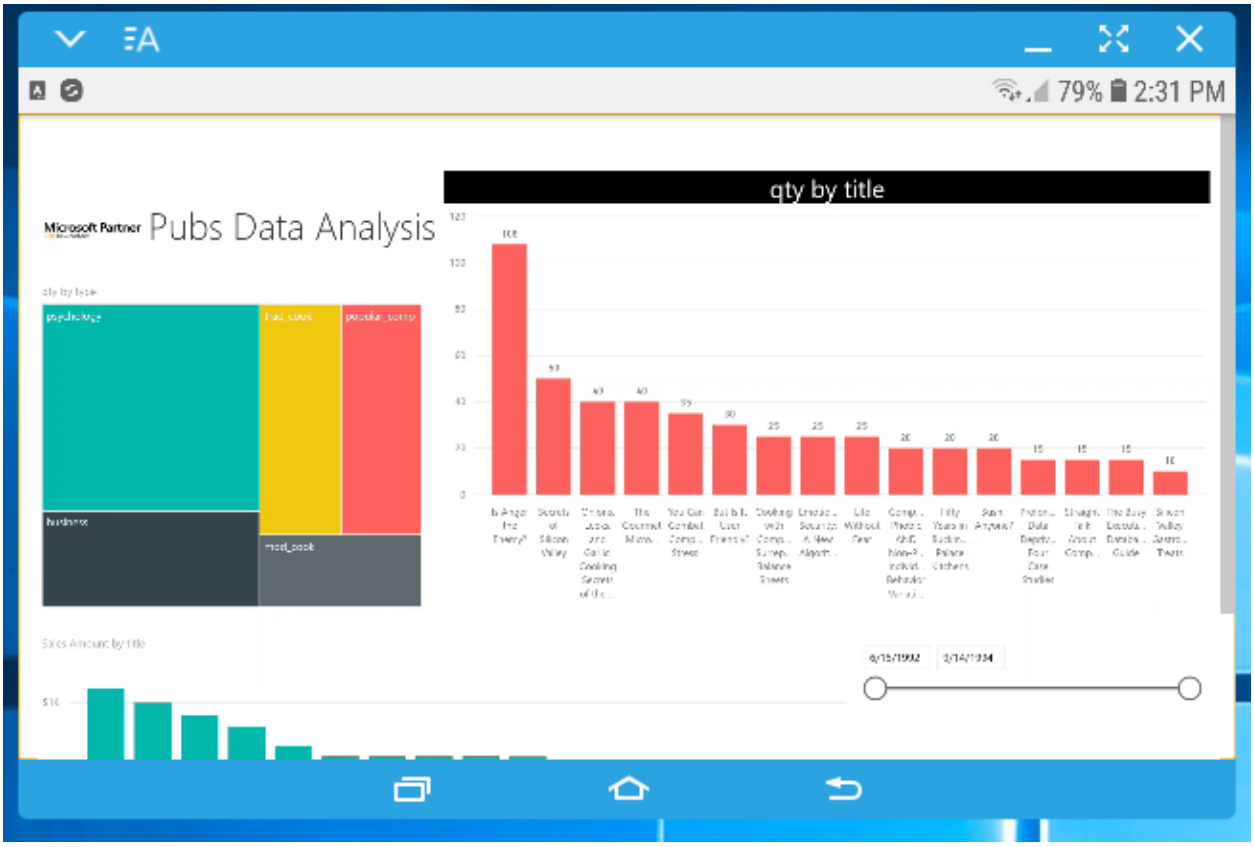
Power BI dashboard has a default phone view, which can be adjusted with going to Phone view.

Power BI Report in Mobile Devices

Power BI reports on mobile devices are a bit different than the dashboard. Let's see how the experience for reports looks like. Below is the screenshot of the report in the Power BI service.



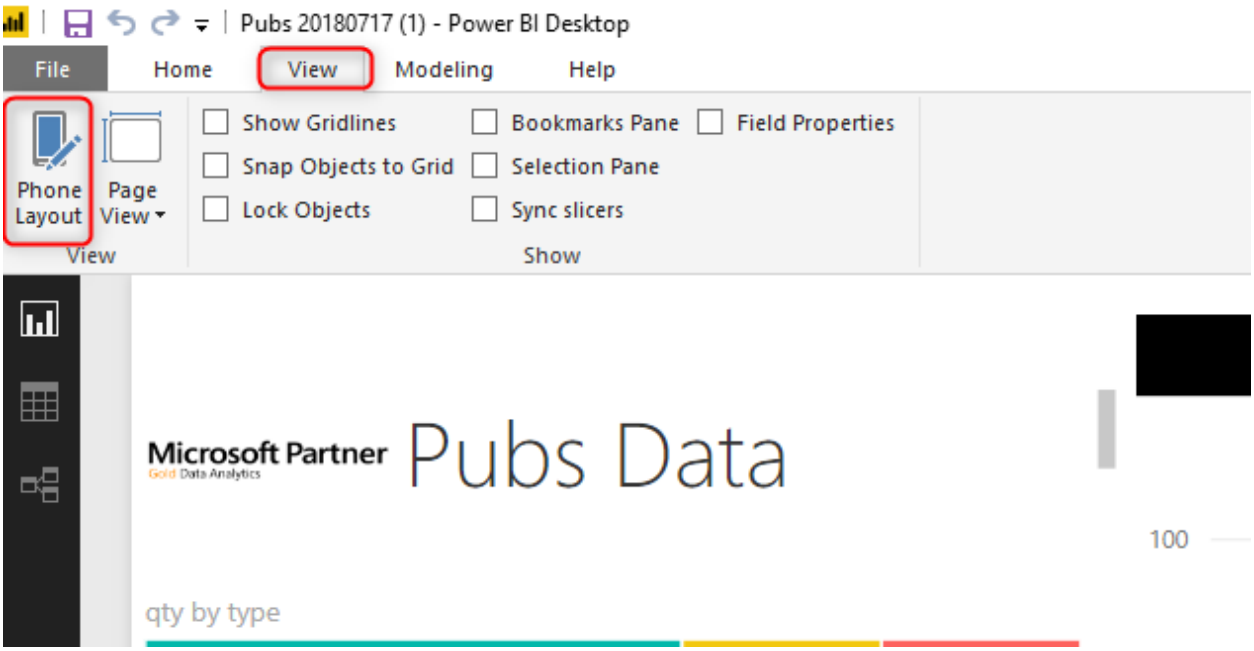
If you open this report in the mobile app of Power BI, it will look like the below screenshot;



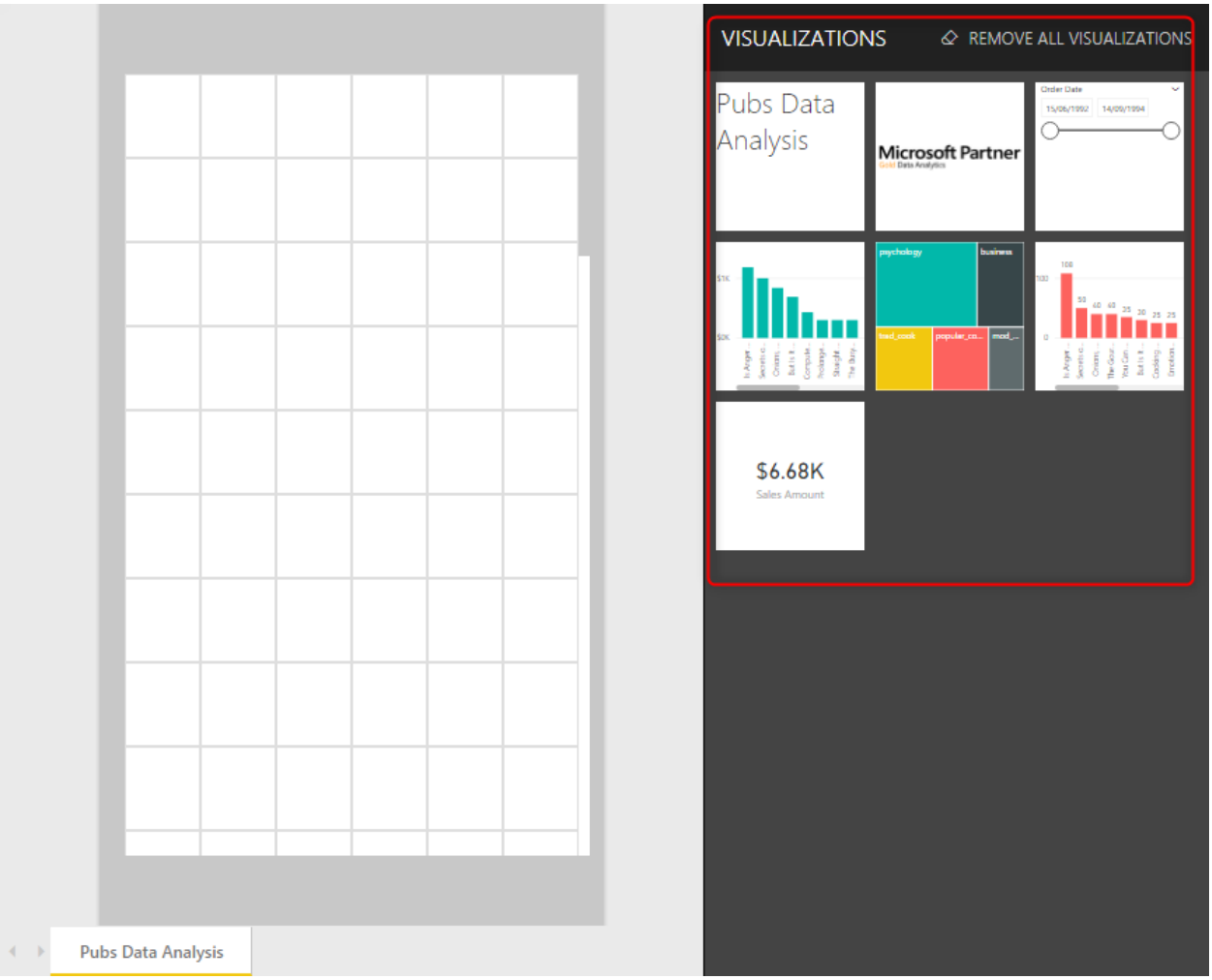
Even if you hold your phone in an upright portrait mode, it will still show the report in landscape mode. You have to turn your phone into landscape mode to see it properly. The reason is that this report is NOT designed for mobile. Power BI reports do not have a default mobile layout. Because this is the default view of the report, most of the people think that this is the mobile view of the report. In this view, as you can see, charts and slicers are smaller (it is a 6-inch small screen compared to a monitor by the way). This is not a good mobile design. You have to design your report to be more appropriate for mobile view. Here is how;

Designing Power BI Reports for Mobile Devices

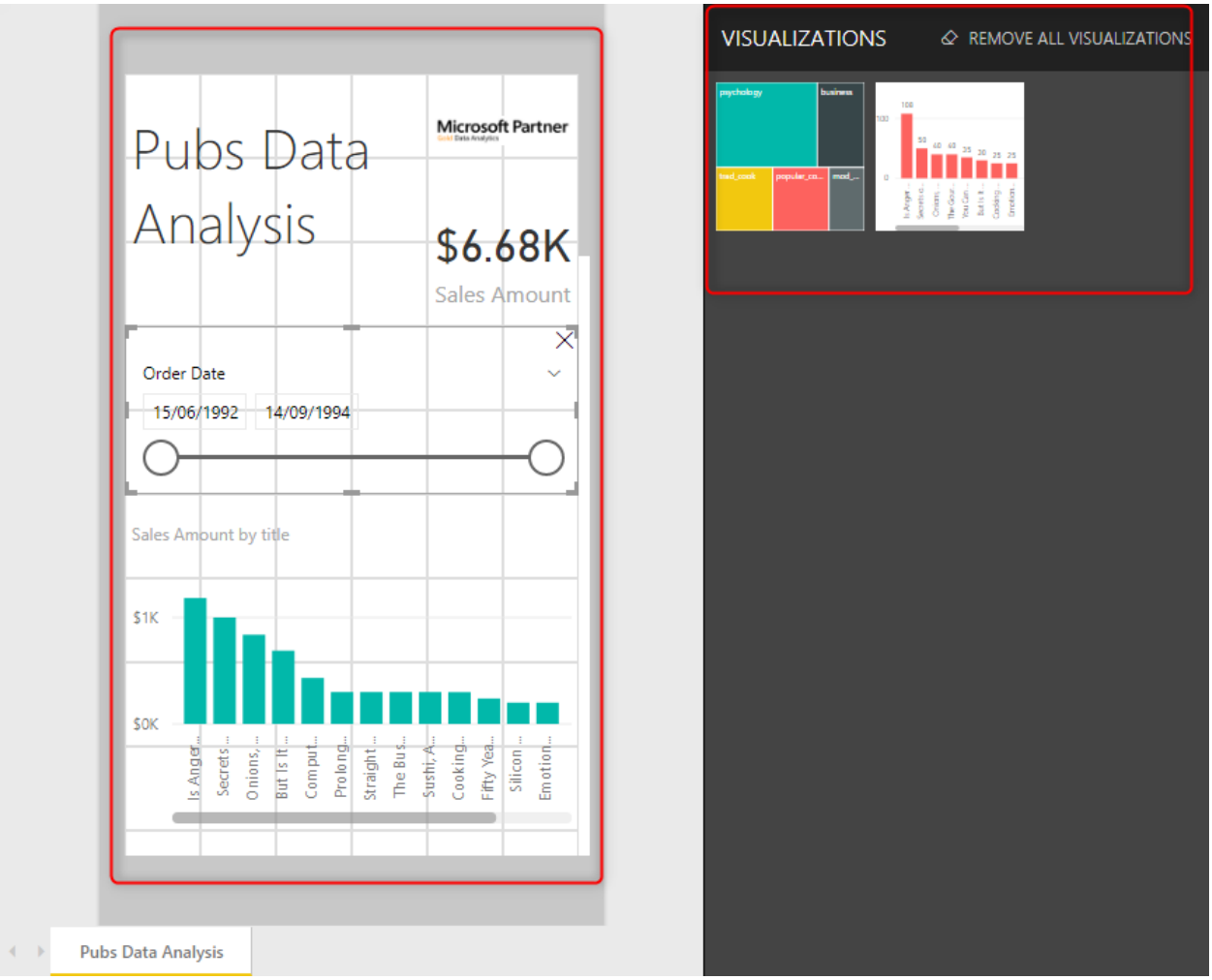
In the Power BI Desktop, Go to View tab, and select Phone Layout.



Now, you will see the Phone layout of the report, which is blank. The Power BI phone layout by default is blank; this is the reason that you have to see it in landscape mode by default. Now you will see the list of all visuals on the page in the right-hand side pane, and you can add them in the phone layout and size them as you want.



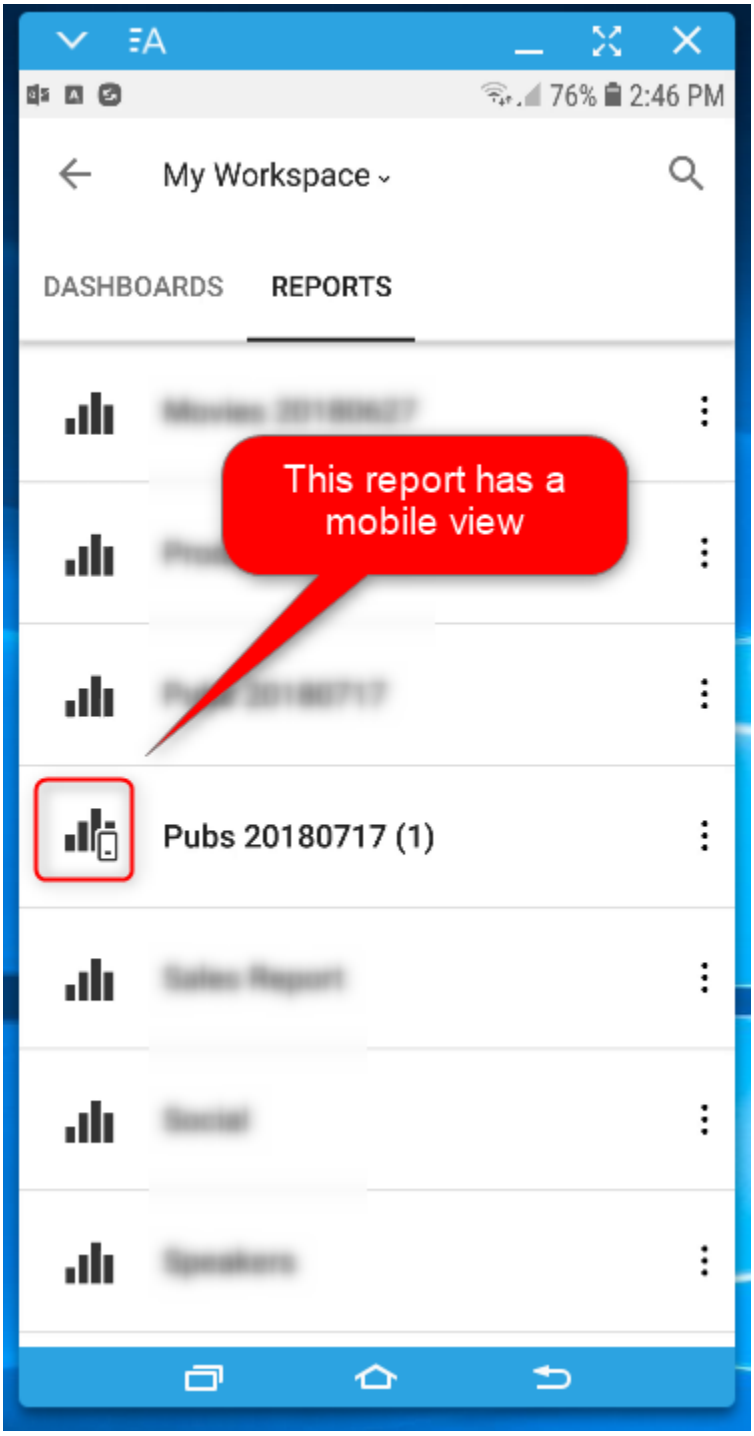
Here is a sample mobile design for this report;



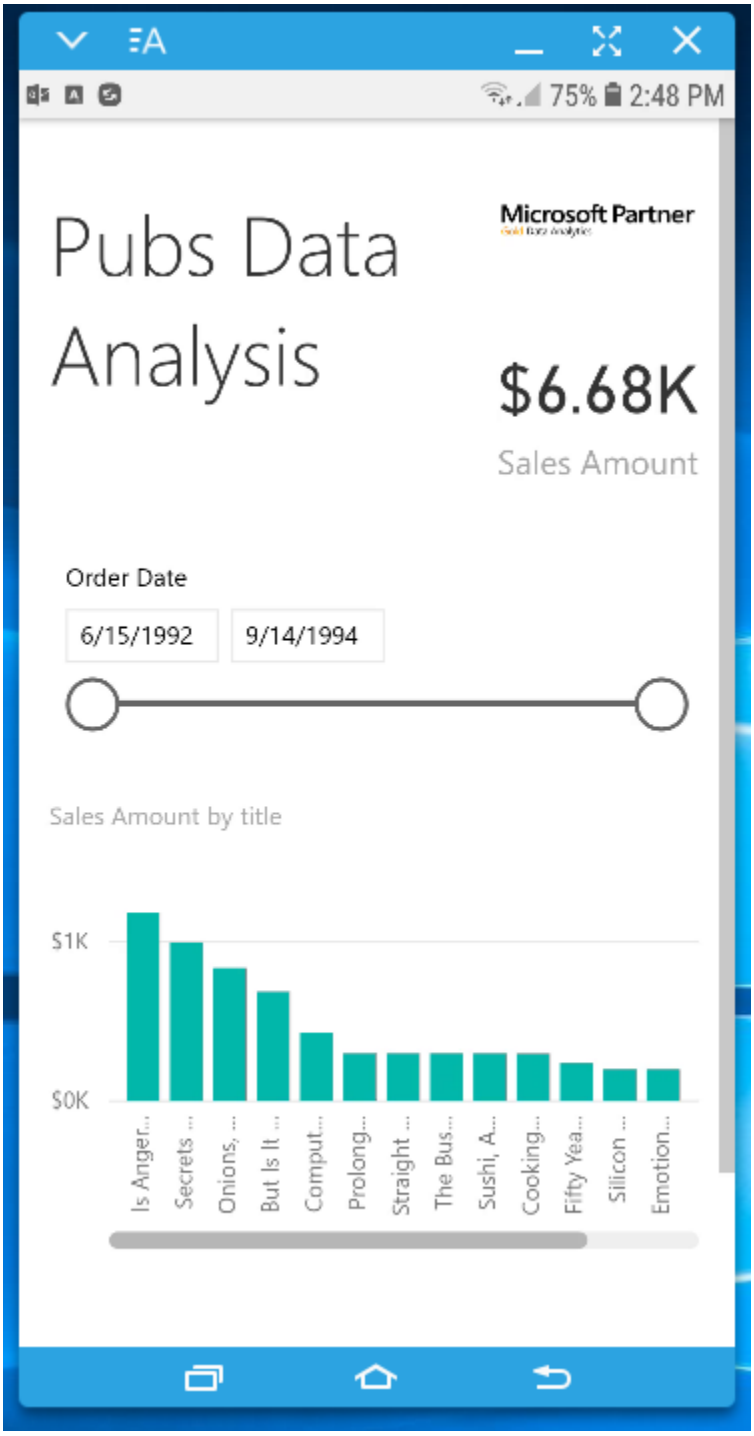
After this design, you can go back to the Desktop layout, and publish the report. The newly published report will now have both views (mobile, and the desktop).

Consider creating the Phone layout for every page in the Power BI report file.

In the list of reports in the mobile app, you will see a small mobile icon, showing that this report has a mobile view too;



When you open the report in the mobile app, you will see it exactly as per design;

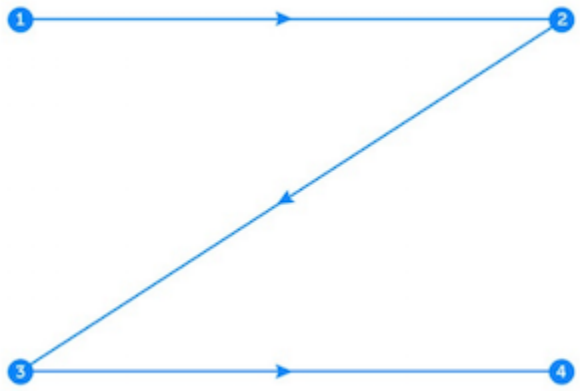


As you can see, the mobile design of this report looks much better than the default view. If you open the same report in a web browser or desktop, you will see the desktop view. Your report has two separate views now.

Power BI report does NOT have a default mobile layout. You have to design the mobile layout of your report for every page.

Considerations of Visual Design

Like many other visual pages, you have to consider a pattern that works best for your users. We are talking about mobile reports here, so some of the visual design hierarchies can be useful. This is not a post that we can go through all UX Design patterns. I give you an example, Z-pattern is one of the most common designs;



What is the Z-Pattern?

A Z-Pattern design traces the route the human eye travels when they read — left to right, top to bottom:

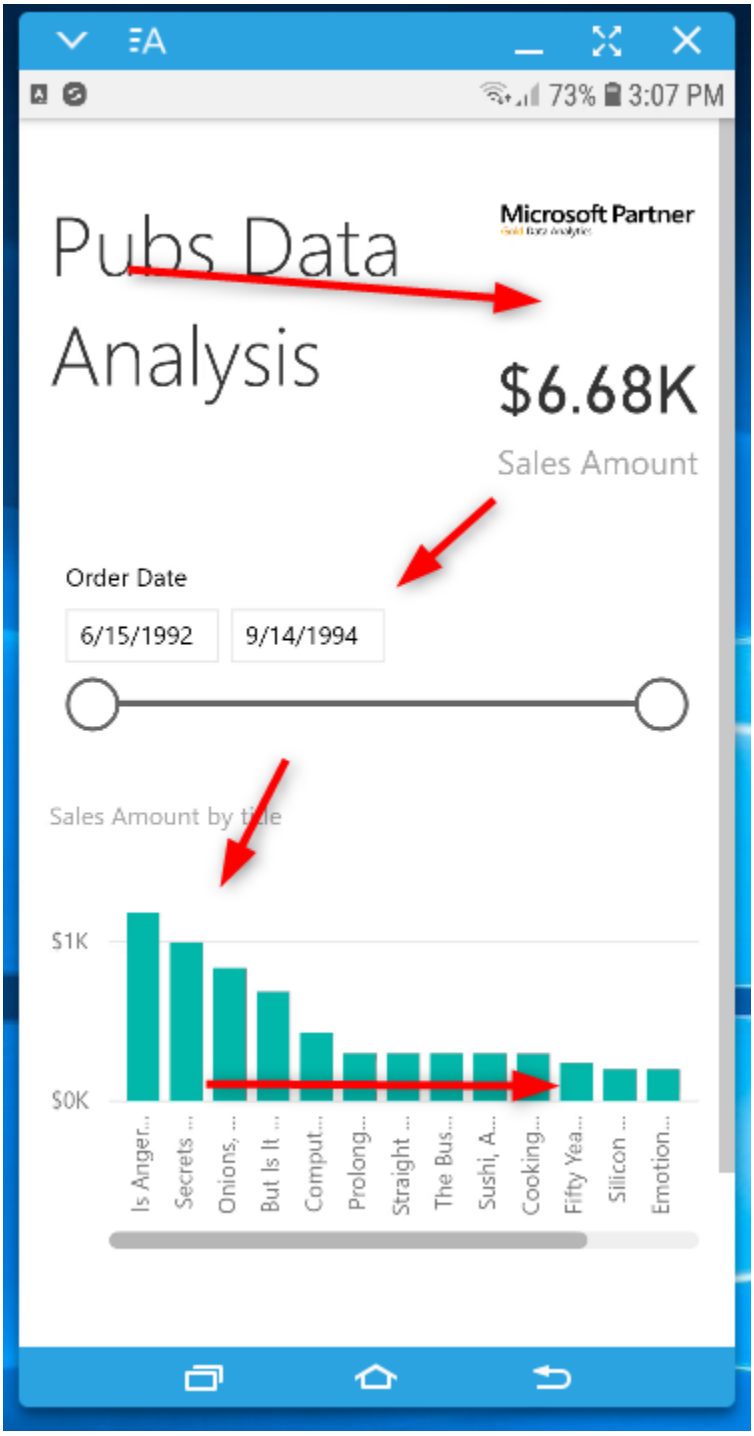
- First, people scan from the top left to the top right, forming an imaginary horizontal line
- Next, down and to the left side of the visible page, creating an imaginary diagonal line
- Last, back across to the right again, forming a second horizontal line

When viewers' eyes move in this pattern, it forms an imaginary "Z" shape like the above screenshot. It's important to note that Z-Pattern designs are not

required to conform to a traditional Z-Shape and the number of Z-Angles along the pattern can vary.

The above part about z-pattern is sourced from an article here: https://instapage.com/blog/z-pattern-layout

Here is how the z-pattern can be followed in a mobile report;



Summary

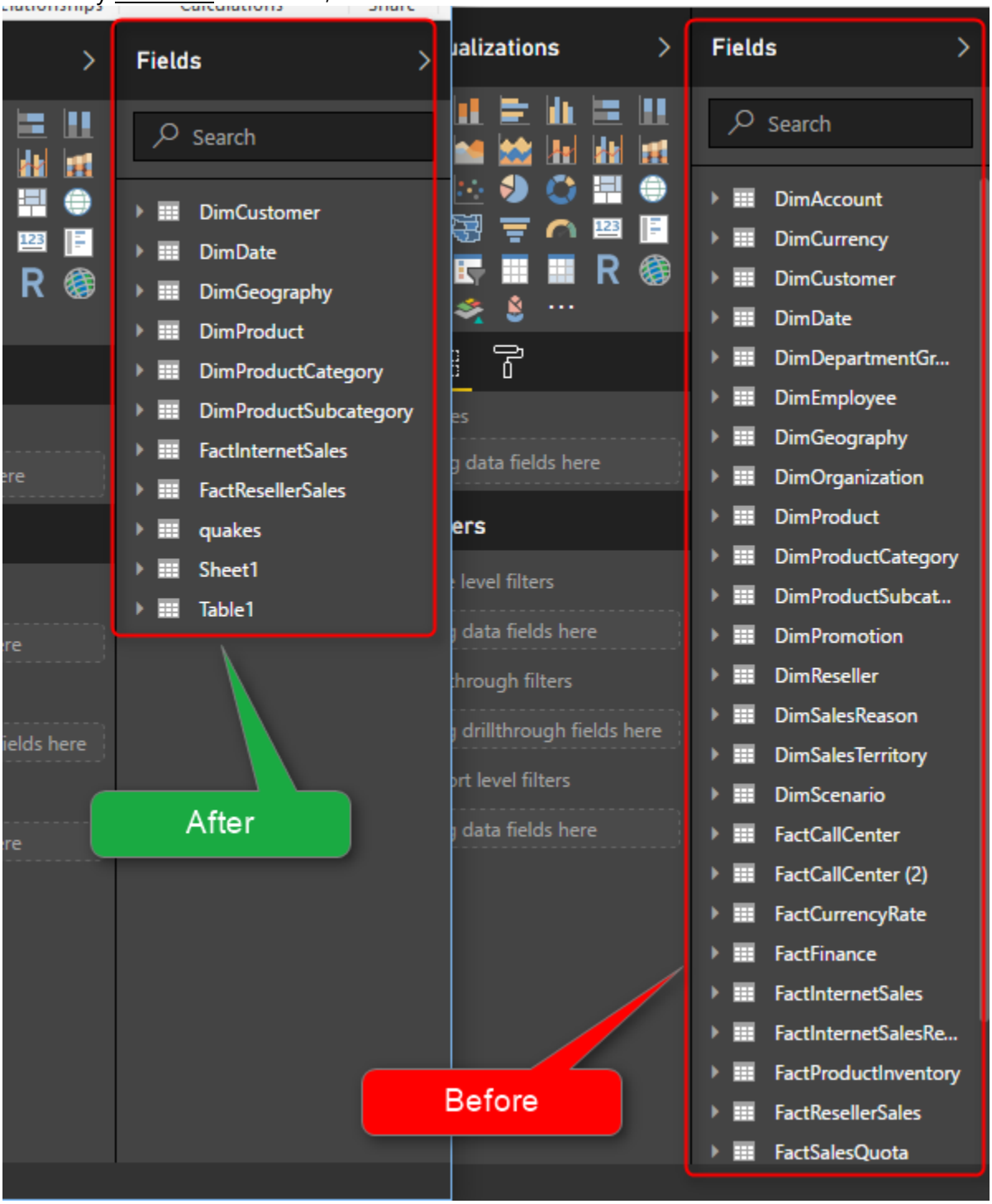
Creating mobile reports in Power BI is very simple. For the dashboard, there is a default view, which you can adjust it to the desired layout. However, for a

Power BI report, you have to create a phone layout for your report. It is recommended to create phone layout for all your report pages. With the increasing usage of mobile devices, and the number of mobile devices much more than desktop devices, this type of usage is something that you cannot overlook.

Part VI: A Tool to Help

Power BI Cleanup Tool; Time Saving with Power BI Helper

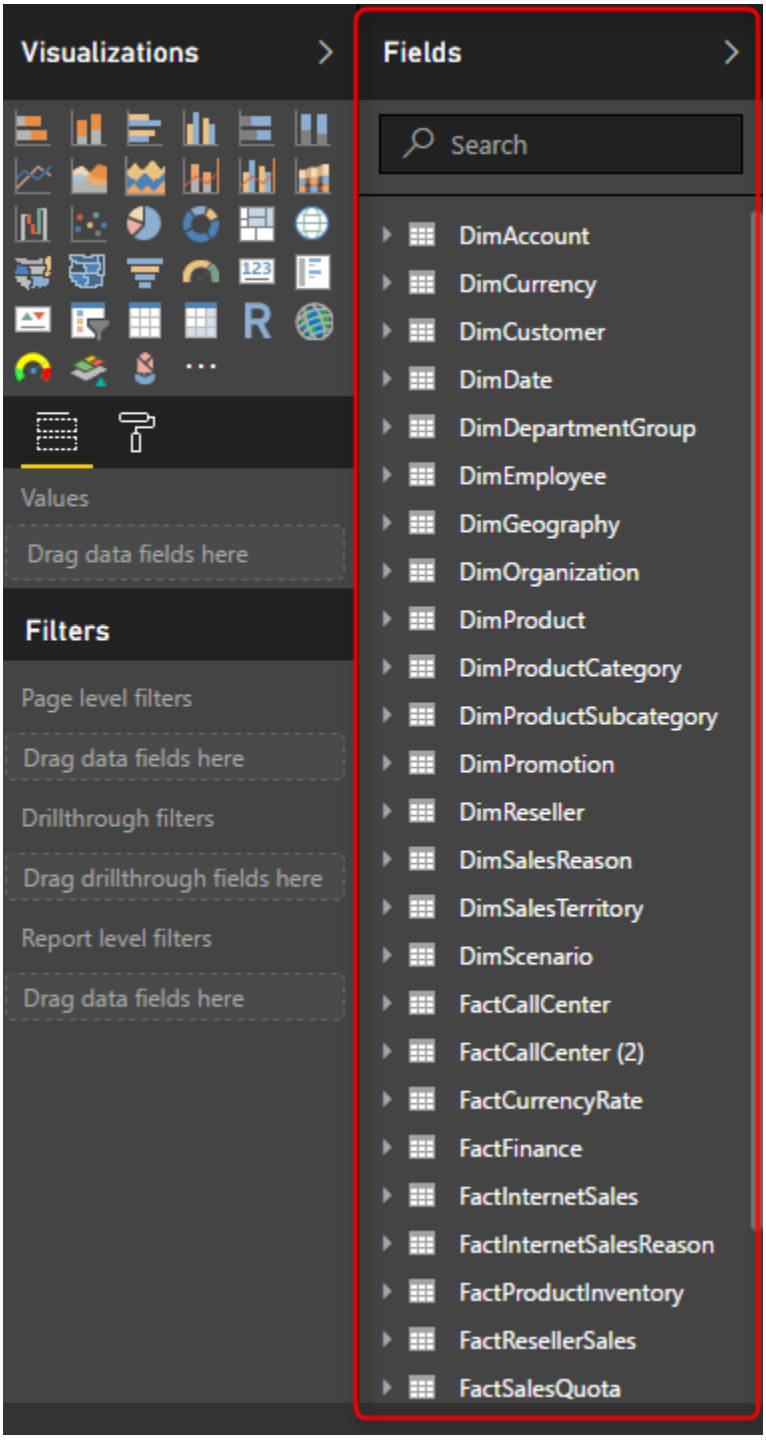
Posted by Reza Rad on Oct 12, 2017



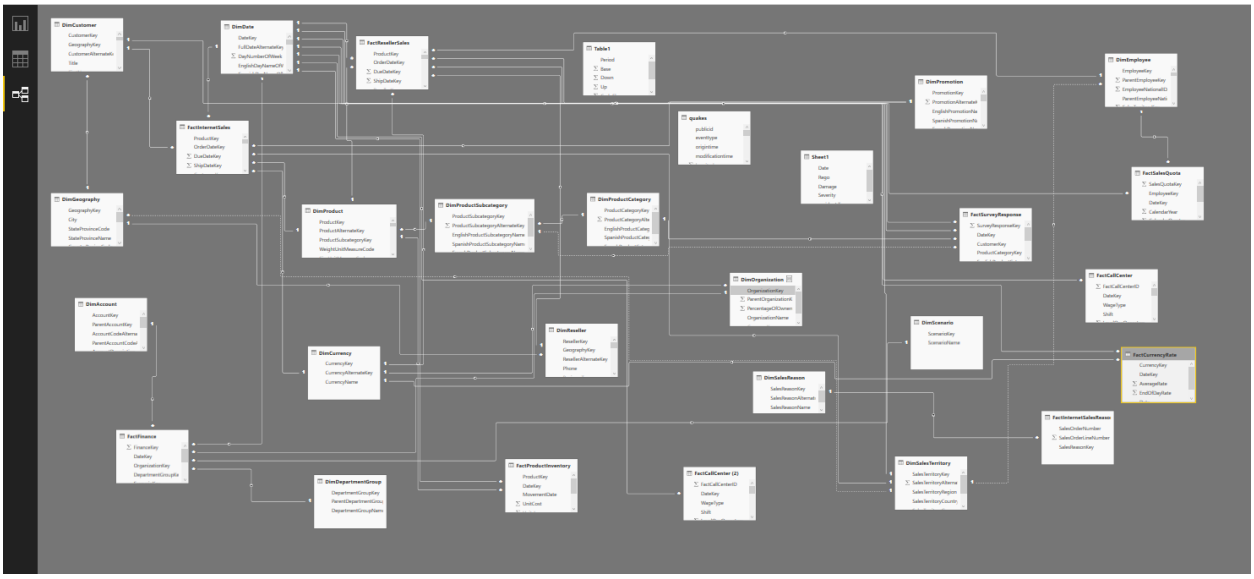
Power BI files can easily get big. You can have 50 tables in a Power BI model, and 25 reports. When Power BI file gets in that size, maintenance is always an issue. It will take lots of time to find out if all of those 50 tables used in reports and visualization or not. In this post, I'm going to share a tool that I use myself that saves you time (and as result money) to clean up your Power BI report much faster. The tool that I am introducing is created by RADACAD team, and this is the very first version of this product. The tool is free to use, and you can download it from below link.

Defining the Problem

You have a Power BI file that has 50, or even 100 tables in it. Such a scenario happens a lot. Even though I always recommend preparing your data to be modeled and bring only what needed. Still, I see many Power BI reports that has hundreds of tables in it. The worst thing about this is that not all of those tables are used in the report! Many people think that having more tables in your model is better because it enables them to analyze data based on every field they want. This is somehow true. However, More tables will make things more complicated and confusing. Look at below Power BI Model;



There are 29 tables in the list above, and each of those tables also has tens of fields in it! It gets even worse when you look at the relationship model;



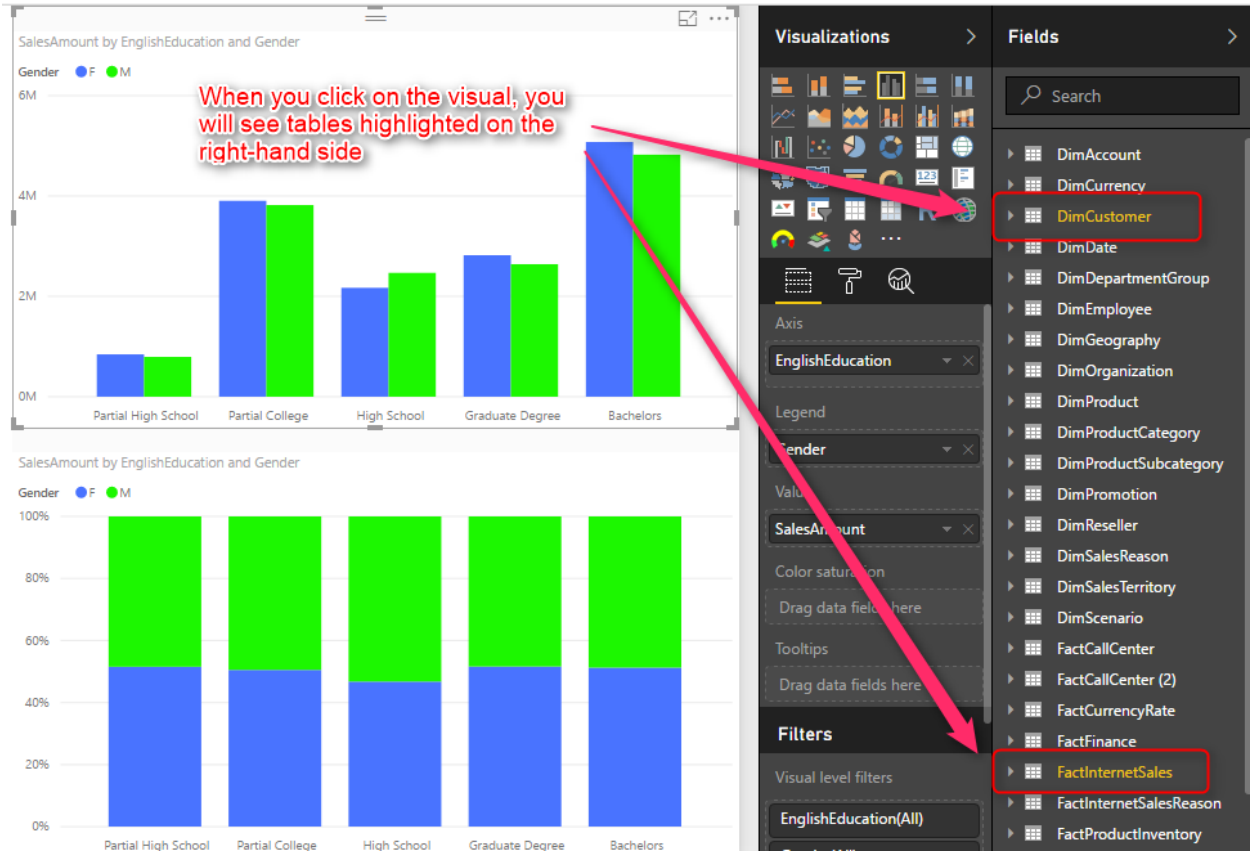
It is a nightmare, isn't it?! You never want to maintain such a model. Especially if you just introduced to a project, and you see such a complicated model. The problem is that not all of these tables and fields are used in the reporting!

Not all of these tables and fields are used in the reporting! This Data Model needs clean up.

So the problem is cleaning up the model, and your Power BI report might already have more than 20 report pages. This sample report also has 20+ report pages!

Finding Tables/Fields that are used in Visualizations

Normally when I see a model like above, the first action I take is to look at tables that are not used to remove them, or at least hide them. At the moment in Power BI Desktop to find which fields are used in a visual, you can click on the visual, and you will see tables highlighted on the right-hand side, so it means these tables and fields are used in the visual.



However, when you have 20+ report pages, and on each page, you have 6+ charts, then it is taking you a lot of time to do so! So, now the problem is; *Finding tables/fields that are used in the visualization (or reporting)*

Introducing a Tool: Power BI Helper

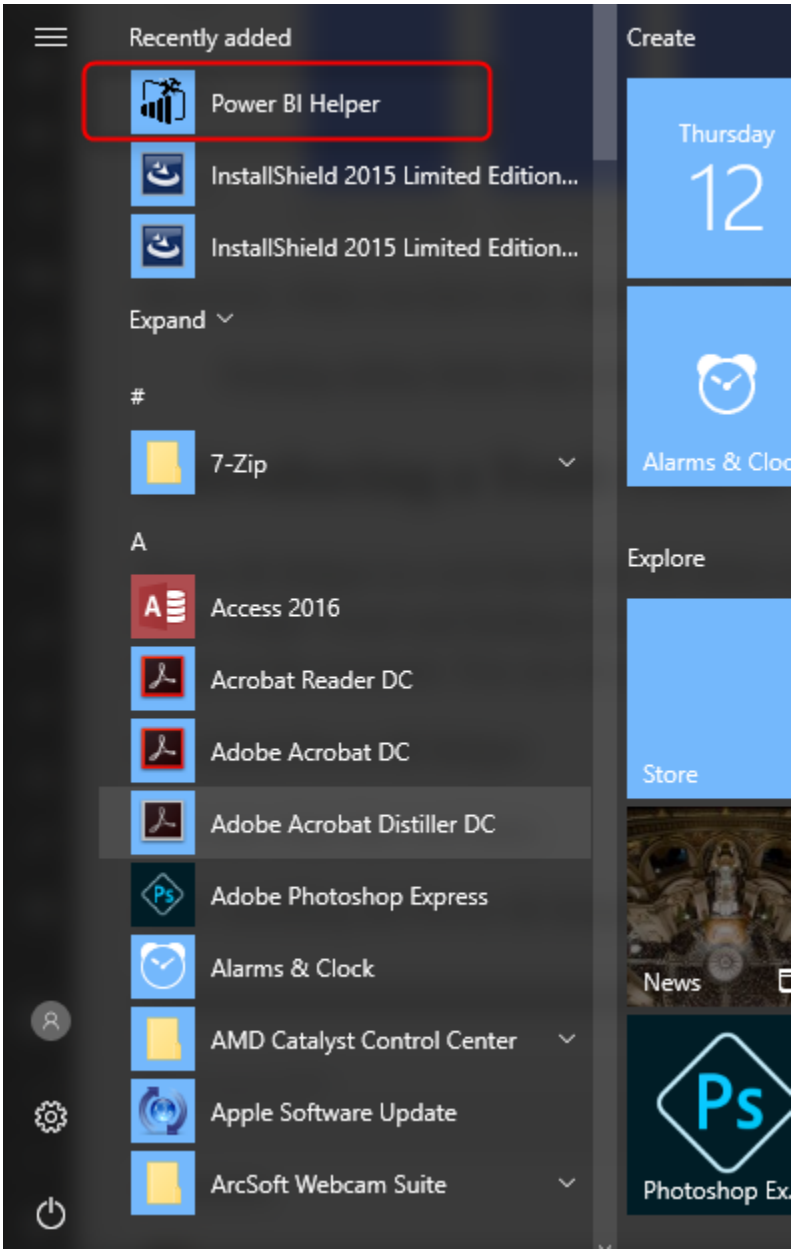
Power BI Helper is a tool that finds all tables and fields that are USED in the visualization and reporting side. It makes your job much easier. Instead of

clicking on every single visual and finding out that which tables are not used at the end, this tool does that for you very fast! This tool is built by RADACAD team and licensed free to use at the moment. You can download it from this link:

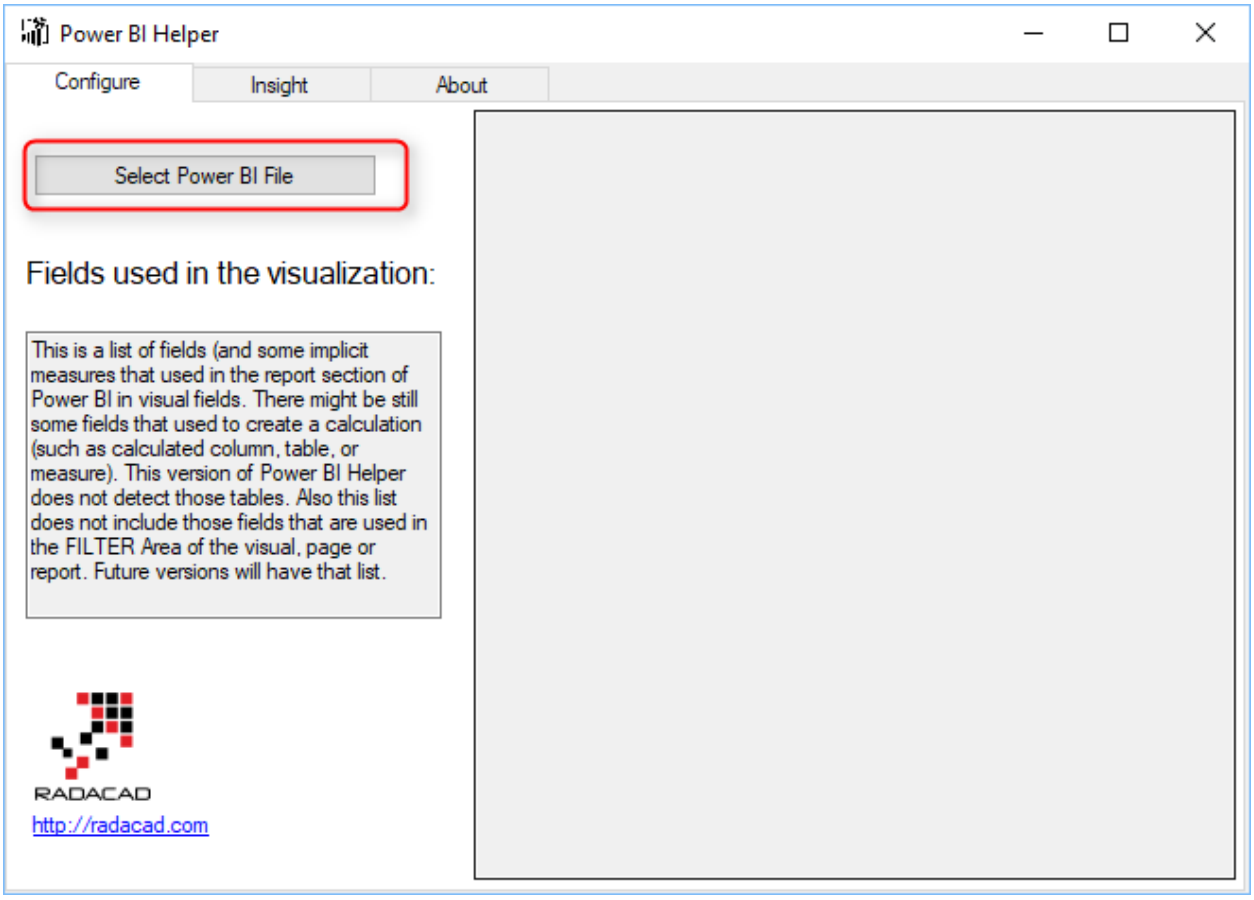
Download Power BI Helper

Let's see what this tool does;

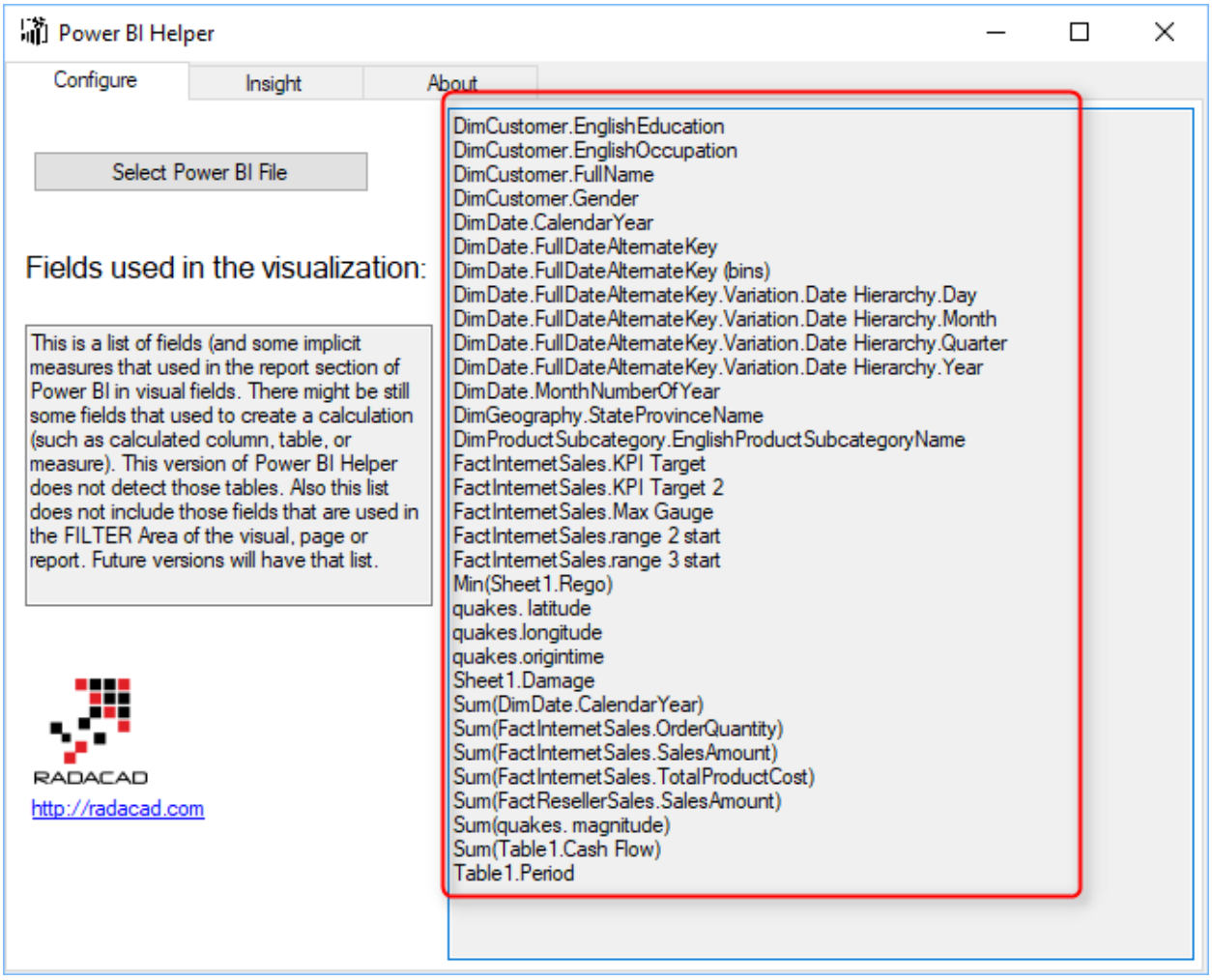
After installing the Power BI Helper, Open Power BI Helper either from your Desktop, or Programs.



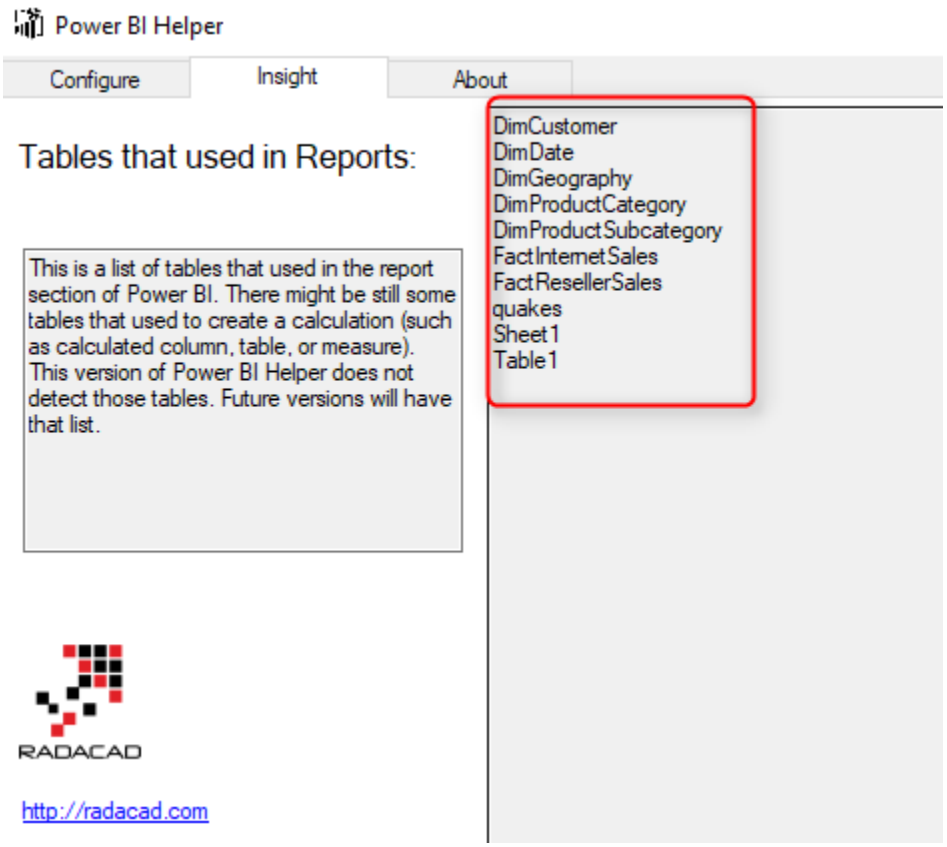
When the application is opened, click on Select Power BI File;



Select the *.pbix file here, and then you will see the list of all fields used in the visualization section of reports;



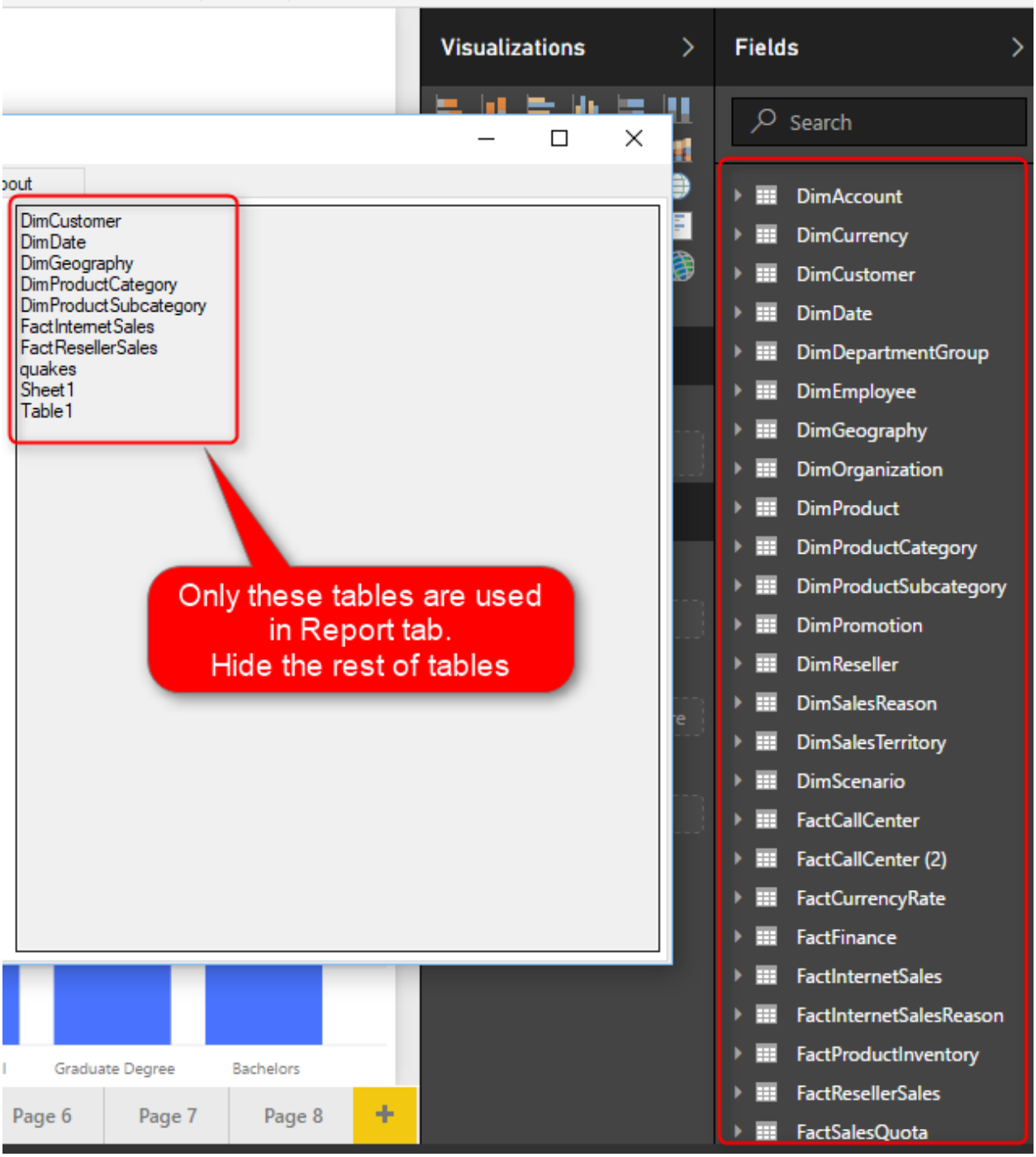
Also; if you go to the Insight tab, you will see the list of Tables that are used in the report. These are tables that at least one of their fields used in any of reports (for visualization or even for filtering);



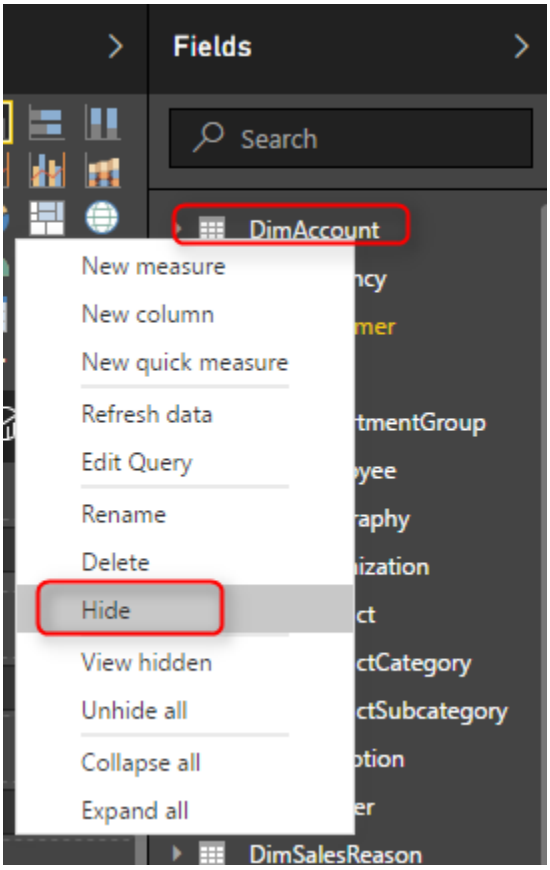
So; Problem Solved! Now you have the list of tables that are used in the report. You can see only 10 out of the 29 tables are used in the Power BI report!

How to Use This Result

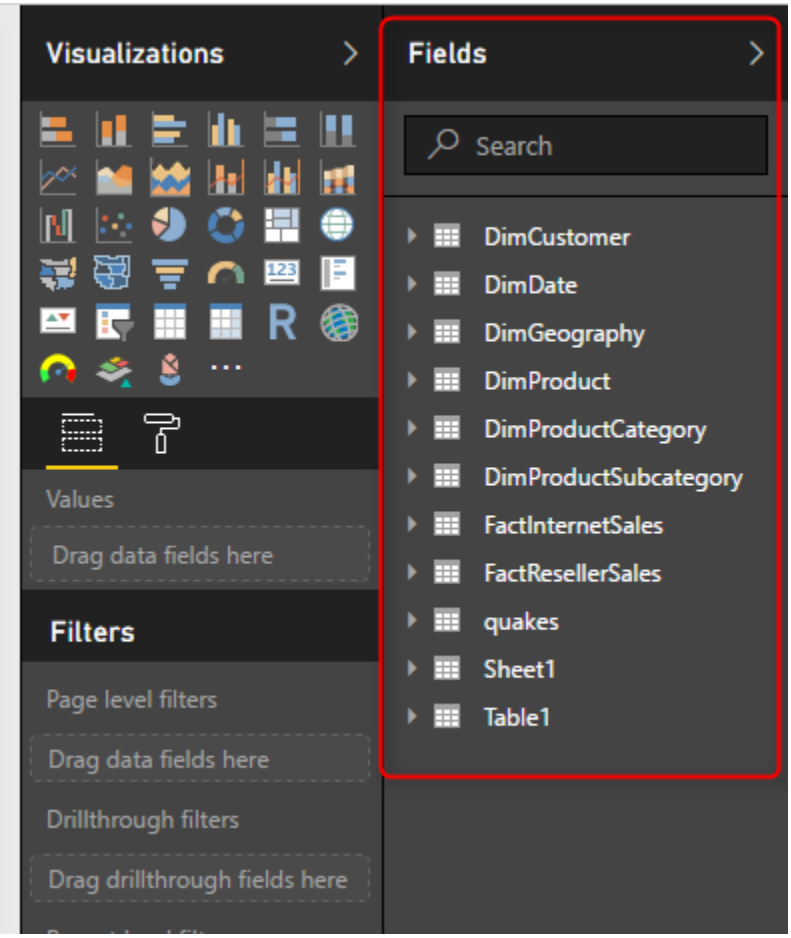
Only tables that you see in the list above are used in the reporting section. This means you can easily right click and hide all other tables.



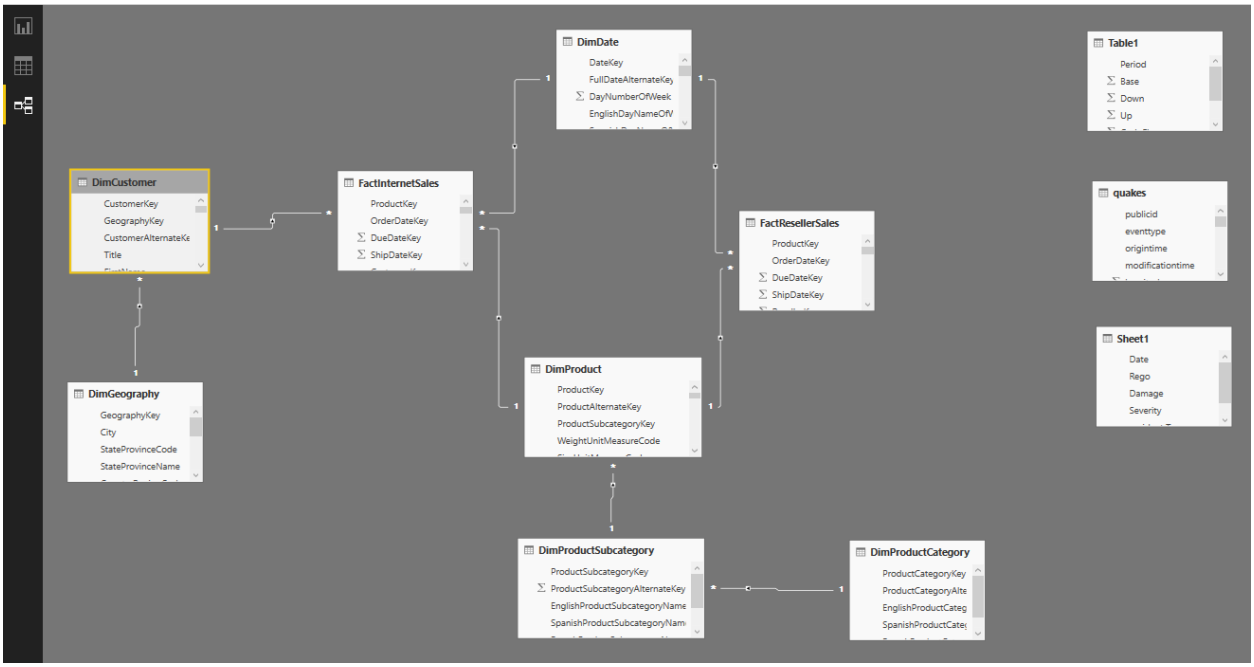
Hiding a table does not remove it from the model. However, It will remove it from the list of fields in the Report tab, and avoid confusion for report developer.



You may also want to remove tables that are not used as well. Now, here is the tricky part; this tool is just at the very first version. It is versioned 0.1! So still many features to be added, and we hope to provide frequent update releases on that. Power BI Helper doesn't tell you if those tables are used in a relationship or not, and it doesn't tell you if fields from those tables are used to create some calculations (such as a calculated column, table, or measure). Next versions of this tool will have those features. For now, you have to do that check manually. However, having the list of tables that are used only helps a lot. I can find tables that are not used easier, and then remove them from the model. So my model now ended up as this number of tables in the report area;



Much cleaner, isn't it. Even after removing extra tables, you get much cleaner model as below;



This model is now much easier to maintain, and much more efficient.

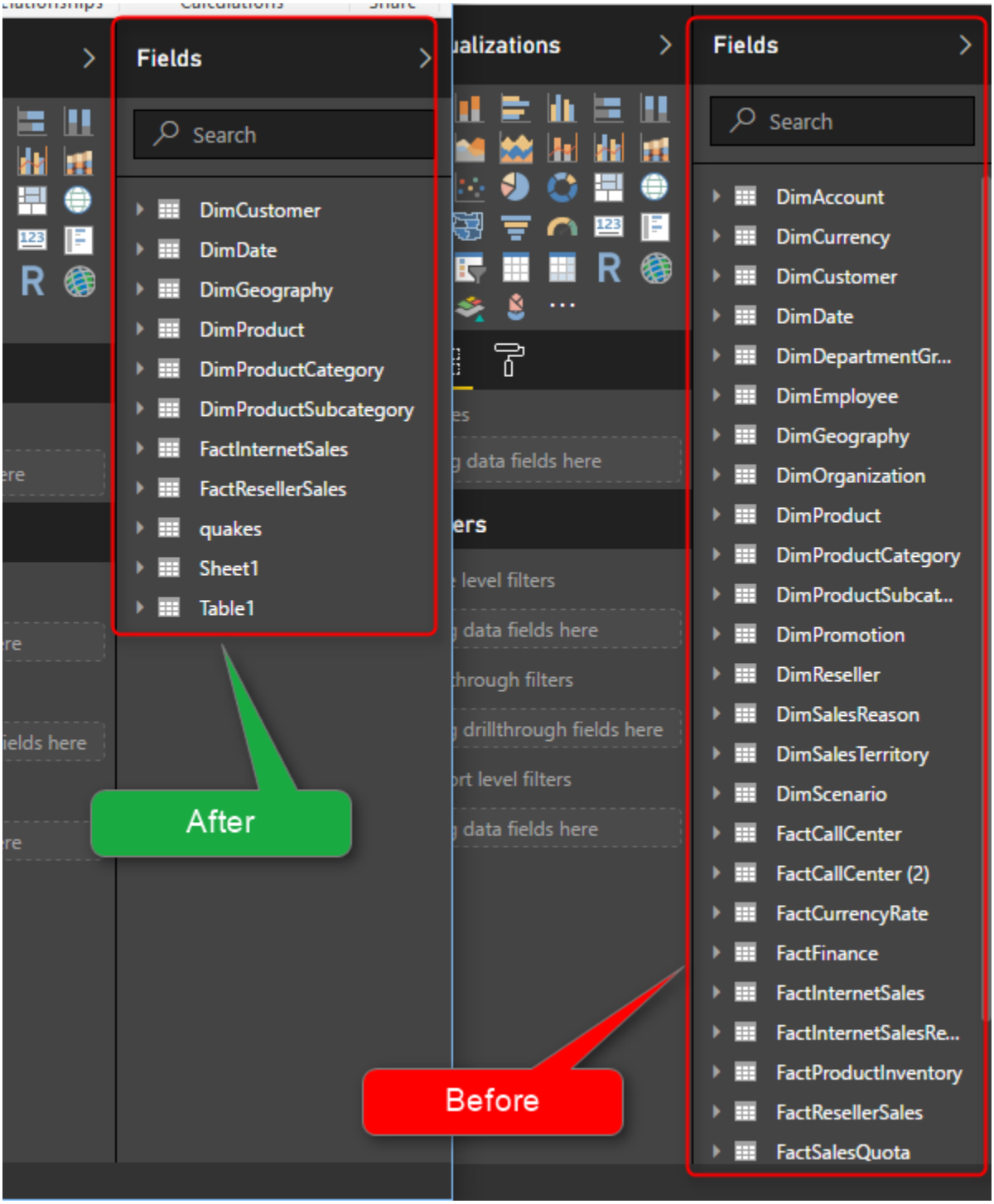
What Power BI Helper version 0.1 Does?

This product is still in version 0.1 (means the very first version); This tool helps in below scenarios;

- Identify fields that are used in the Fields section of visualizations
- Identify tables that are used in the Fields or Filter sections of report tab

Providing such result then will help you to hide extra tables from the report.

Or even remove them (this part needs some extra manual investigation as of now).


Fields
Search
DimCustomer
DimDate
DimGeography
DimProduct
DimProductCategory
DimProductSubcategory
FactInternetSales
FactResellerSales
quakes
Sheet1
Table1
After
Fields
Search
DimAccount
DimCurrency
DimCustomer
DimDate
DimDepartmentGr...
DimEmployee
DimGeography
DimOrganization
DimProduct
DimProductCategory
DimProductSubcat...
DimPromotion
DimReseller
DimSalesReason
DimSalesTerritory
DimScenario
FactCallCenter
FactCallCenter (2)
FactCurrencyRate
FactFinance
FactInternetSales
FactInternetSalesRe...
FactProductInventory
FactResellerSales
FactSalesQuota
Before

Upcoming Features

For the very first version; We have many limitations! These limitations will be lifted in future versions. Some of these limitations which will be added as a feature in next versions of Power BI helper are;

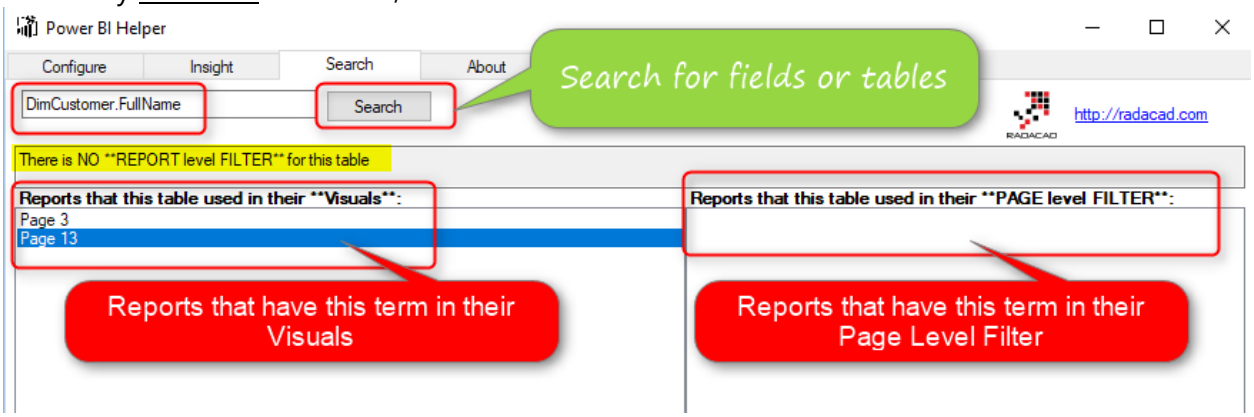
- List of fields used in the Filter area
- List of tables or fields used to create a calculation (calculated table, column, or measure)
- List of tables or fields used to create a relationship with other tables
- Details of what fields or tables used in a specific report or visual
- Diagram view and dependency view of reports and visuals with tables and fields from the model
- Applying Changes to the PBIX file (Like hiding tables, adding some descriptions)

Summary

In this post, I introduced a tool to you that saves you some time for cleaning up a Power BI report. I use this tool myself whenever I get a new piece of a project in my consulting services. This tool is free to use, still the first version. So please download it and let us know how it works for you. All of your suggestions are most welcome.

Searching a Field or Table in Power BI Visualization: Power BI Helper

Posted by Reza Rad on Oct 20, 2017



Last week, we announced the very first version of Power BI Helper. Power BI Helper is a tool that helps clean up a Power BI solution. This week we have an updated version with a new interesting feature: Searching for a Field or Table in all visualizations in the PBIX file. The additional feature is helpful for further cleaning up your Power BI Solution. Searching a field or table into all reports is helpful, because if that report page or visual is not necessary, then you can easily spot related items to that. Let's look at this feature in details.

Defining the Problem

Consider a Power BI report with many pages. This report might have more than 20 or 30 pages of visualizations. Also on each page, you might have 4, 5, or even more visuals.

In the previous blog post, you've learned that you can use Power BI Helper to identify tables and columns that are used through the PBIX file. However, if you want to find all reports, and visuals that a particular field or table is used, you still need to do a lot of manual searches.

Without proper documentation, it is hard to find all pages and visuals that a particular field or table used in.

If you want to find out in which reports you used the ProductCategoryTable, there is no way to understand it easily in Power BI. You have to search every single report page. You have to check for these:

- Report Pages that this field/table used in the FILTER criteria in Page Level Filter
- Report Pages that this field/table used in the Visual fields
- Report Pages that this field/table used in the Visual Level Filter

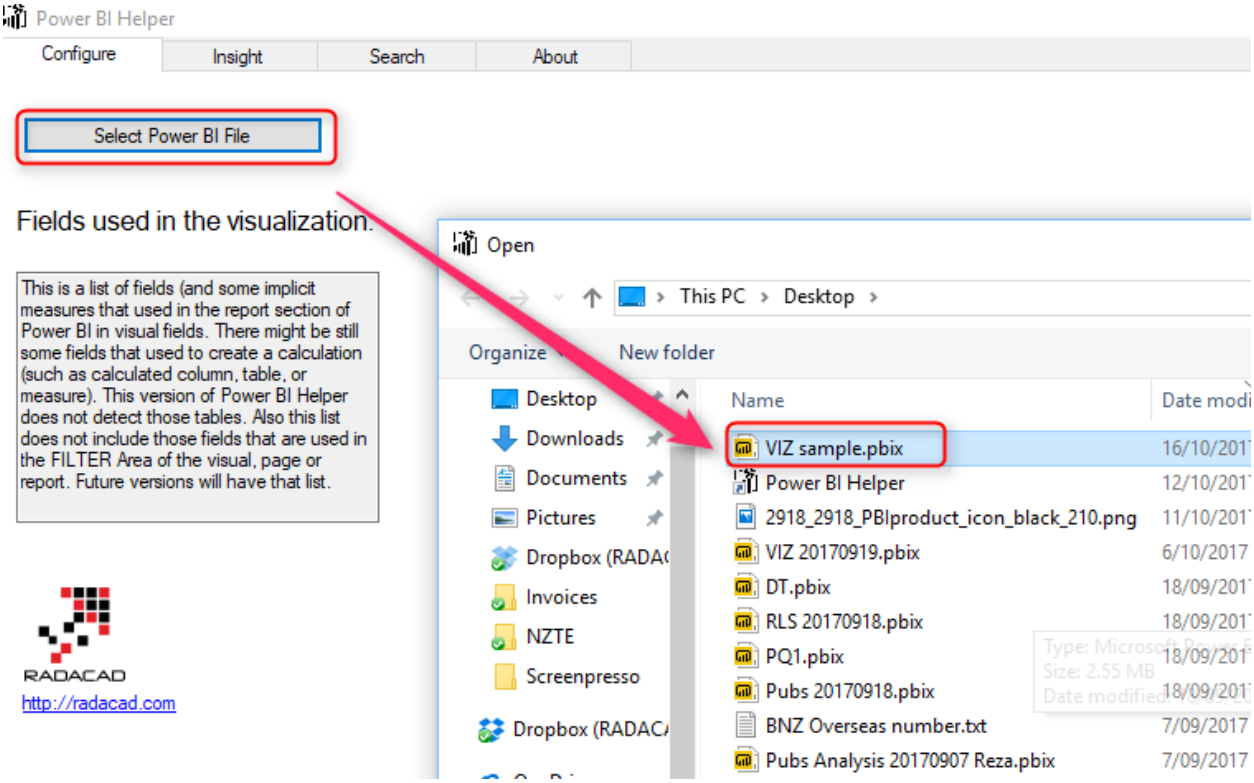
Finding all this information take a long time. You would know it if you have developed the solution yourself. Even, after a while working on a project, you might forget where you have used particular fields or tables. Power BI Helper is the tool that can help you to find this information. And if you don't know it already; Power BI Helper is a free tool.

Download Power BI Helper

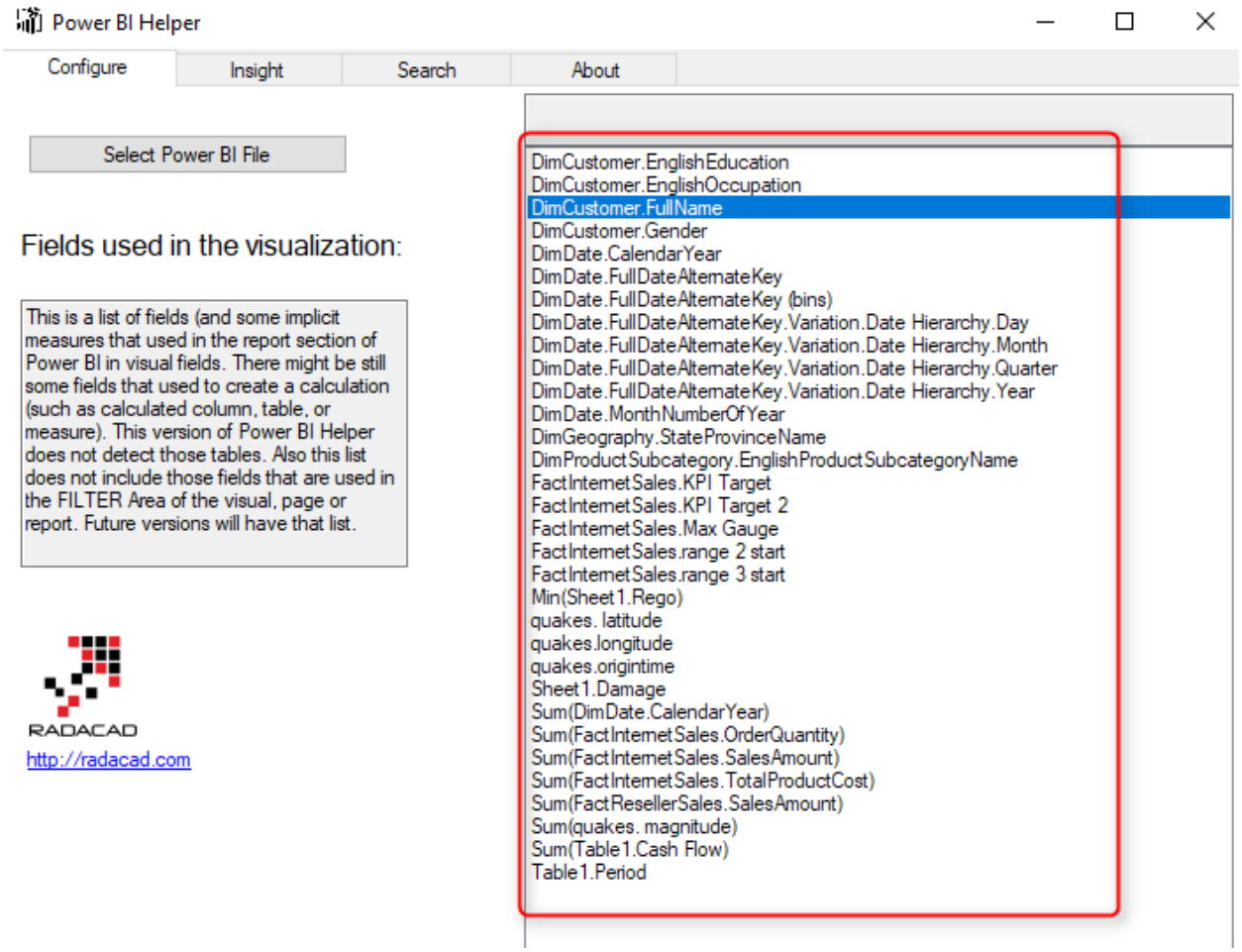
Let's now have a look at this functionality in Power BI Helper.

Search for Field or Table in Power BI File

In Power BI Helper, you can go to the Search tab, and enter the name o table or fields that you are searching for. You need first to select the PBIX file you want to work with;

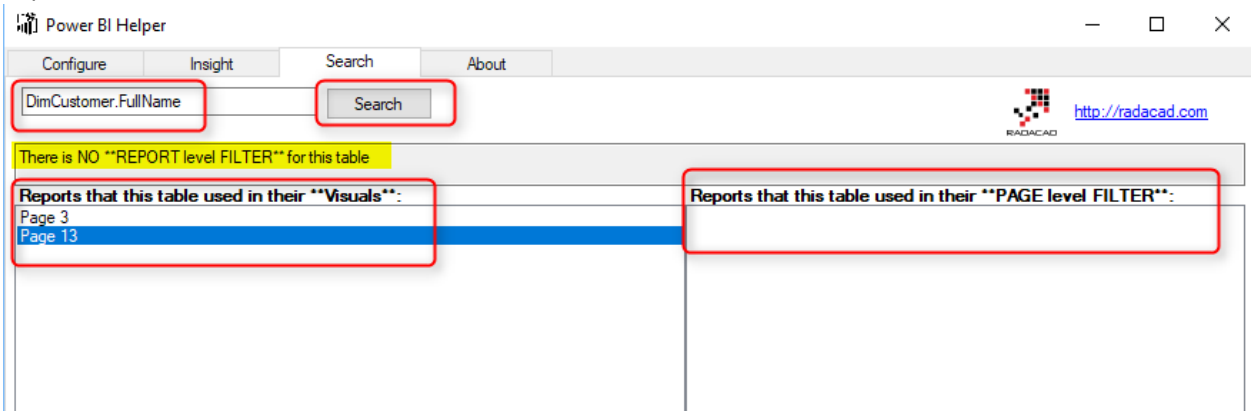


After selecting the file, you will have the list of fields used in all reports on this page;



Searching for Fields

After selecting a field from this list, you can go to the Search tab, and click on the Search button. You will then see a list of all reports that this field is used in;



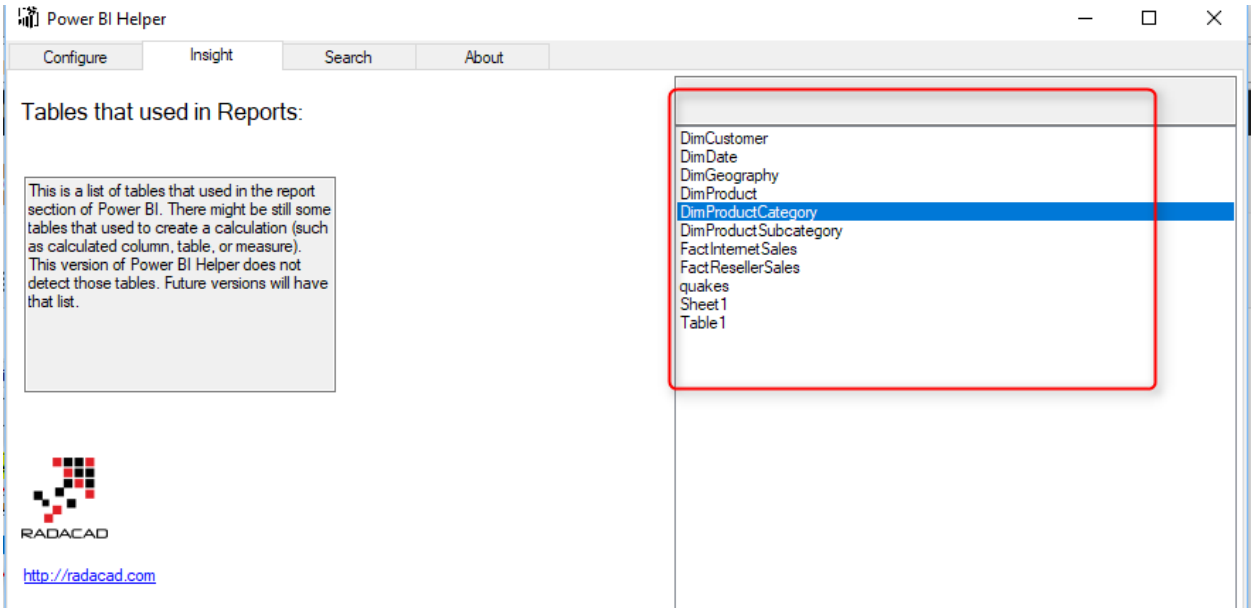
This page will give you three information related to the search term;

- Is there any Report Level Filter for this field or table
- List of all report pages that this field or table used in their "Visual" fields.
- List of all report pages that this field or table used in their "Page Level Filter."

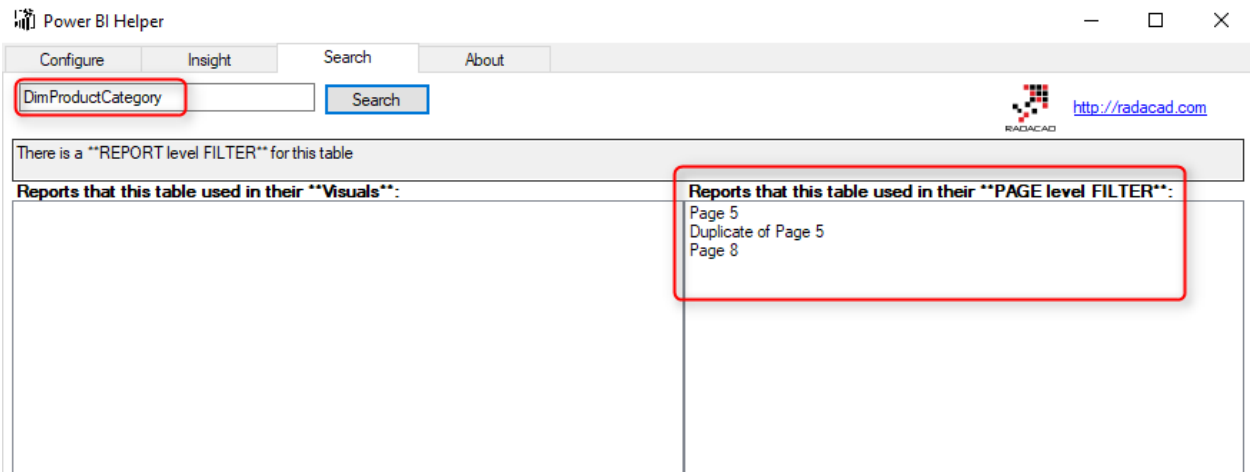
You can see in the example above; DimCustomer.FullName is not used in any report-level filter, or page level filter. It is only used as visual in Page 3, and Page 13.

Searching for Tables

You can do this search for a table as well. You can select a table in the Insight tab.



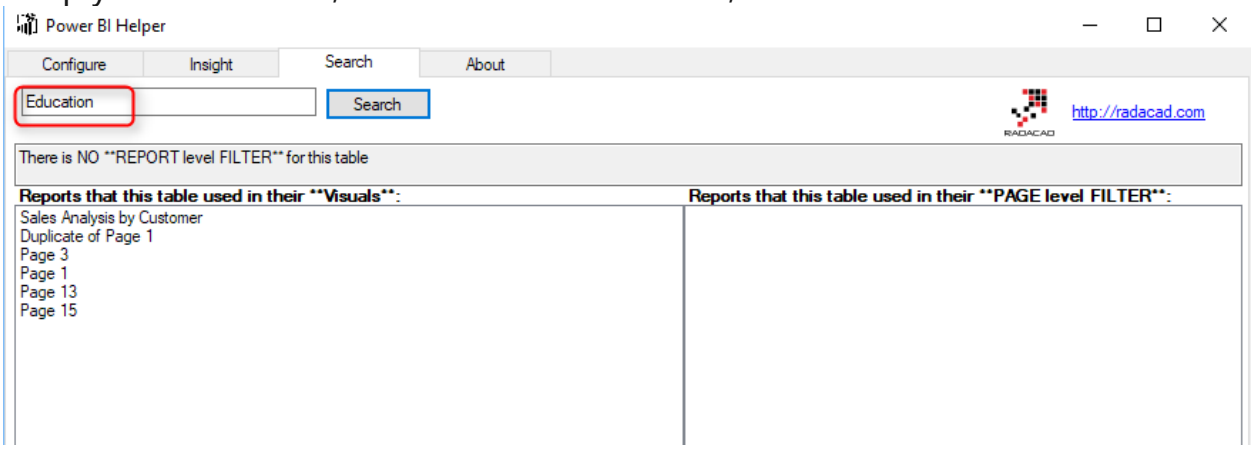
Then in the Search tab, you can get information about where this table is used;



In this example; DimProductCategory is only used as a page level filter in three pages; Page 5, Duplicate of Page 5, and Page 8. There is no visual that uses fields of this table.

Searching for a text part in the title of Field or Table

You can even search for a free text form field name, or table name yourself. Simply enter the text, then the click on Search;



Summary

This is the version 0.2 of Power BI Helper, and still, long list of upcoming features exists. The feature of searching makes your documentation part easier. It will help new developers in your Power BI project to get along with your model and report faster, rather than spending lots of time and money to

get familiar with it. Let us know if you have any suggestions for upcoming features.

Other modules of the book

Congratulations on completing the first book of Power BI from Rookie to Rock Star series. You are in the right track, but still more to do. Here are other modules that you can read:

- **Book 1: Power BI Essentials**
- Book 2: Visualization with Power BI
- **Book 3: Power Query and Data Transformation in Power BI**
- **Book 4: Power BI Data Modelling and DAX**
- **Book 5: Pro Power BI Architecture**

Power BI Training

Reza runs Power BI training courses both online and in-person. RADACAD also runs Advanced Analytics with R, Power BI, Azure Machine Learning and SQL Server courses ran by Dr. Leila Etaati. Our courses run both online and in-person in major cities and countries around the world.

Check the schedule of upcoming courses here:

http://radacad.com/events

http://radacad.com/power-bi-training