

Sum Product

NEWSLETTER #138 - May 2024

www.sumproduct.com | www.sumproduct.com/thought



Want to join our book club? We have two books coming out soon and thought you might want to know! But that's not all, as we provide our usual array of tips, tricks and other extravaganza, including reviewing how to sum a dynamic range.

All the regulars are here. We have the usual Beat the Boredom Challenge, Charts & Dashboards tips, Excel for Mac, Visual Basics, Power Pivot Principles, Power Query Pointers, *lots* of Power BI Updates and Excel Updates too. We even complete our A to Z of Keyboard Shortcuts this month and round off with more Excel functions where we finally get into the second half of the alphabet. We've hit N!!

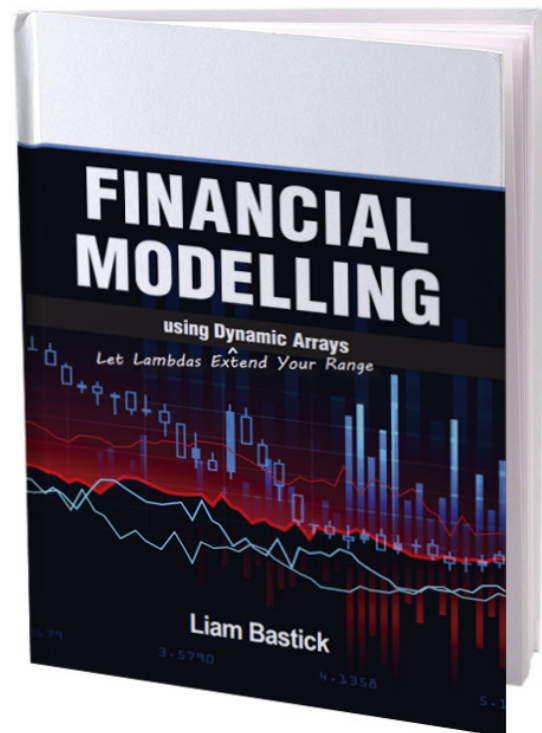
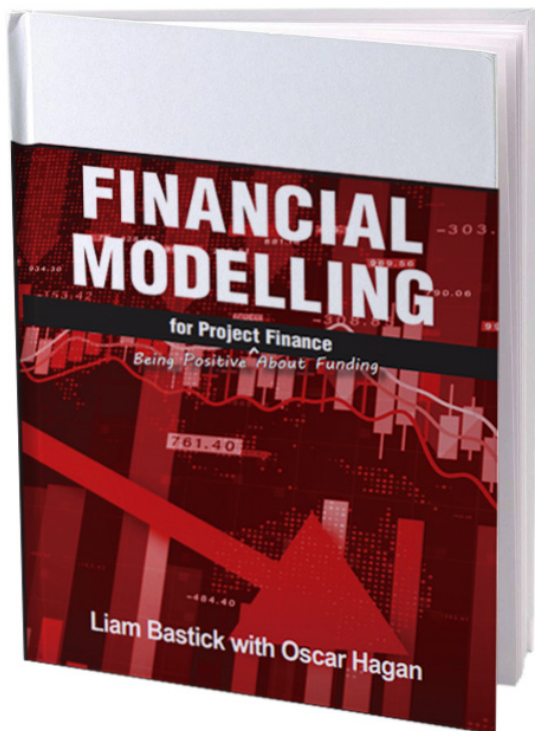
As always, happy reading and remember: stay safe, stay happy, stay healthy.

Liam Bastick, Managing Director, SumProduct



Brought Two Book

Just thought we'd give you a sneak peak: SumProduct is pleased to announce not one but TWO new books coming out very soon. Books 4 and 5 in the Financial Modelling series will be out later in 2024 – more details to be announced very soon!!



We're very excited about both of these books. Indeed, the Dynamic Arrays edition is our longest book yet with over 600 pages of tips and tricks.



Summing a Dynamic Range

As many of our readers at this time of year prepare quarter-end reports, we thought we'd provide some useful information. We often want to sum data for a period of time, e.g. sales for the last quarter, year to date costs and rolling budgets / forecasts. When we create these calculations "statically", i.e. the range is specified explicitly.

For example, we might have something like the following example:

	A	B	C	D	E	F	G	H	I	J	K
1											
2											
3				YTD		Jan	Feb	Mar	Apr	May	Jun
4	Sales		150			10	20	30	40	50	
5											
6				=SUM(F4:J4)							
7											

Here, we have created a static formula for the year-to-date sales using the calculation

=SUM(F4:J4)

Next month, we would have to update this to

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2												
3				YTD		Jan	Feb	Mar	Apr	May	Jun	Jul
4	Sales		210			10	20	30	40	50	60	
5												
6				=SUM(F4:K4)								
7												

=SUM(F4:K4)

We can't simply sum the range in case other users populate row 4 with forecast estimates, etc. There is an alternative, and I thought I would go up to date and use Excel 365's **XLOOKUP** function.

As a reminder, **XLOOKUP** has the following syntax:

XLOOKUP(lookup_value, lookup_vector, results_array, [if_not_found], [match_mode], [search_mode])

This function seeks out a **lookup_value** in the **lookup_vector** and returns the corresponding value in the **results_array**. It may seem complex, but most of the time you will only require the first three arguments:

- **lookup_value**: this is required and defines what value you want to look up
- **lookup_vector**: this reference is required and is the row or column of data you are referencing to look up **lookup_value**
- **results_array**: this is where the corresponding item is you wish to return and is also required (even if it is the same as **lookup_vector**). This does not have to be a vector (i.e. one row or one column of cells): it may be an array (with at least two rows and at least two columns of cells). The only stipulation is that the number of rows / columns must equal the number of rows / columns in the column / row vector – but more on that later.

For the record, the remaining arguments are:

- **if_not_found**: this optional argument allows you to replace the usual return of #N/A with something more informative like an alternative formula, text or a value
- **match_mode**: this argument is optional. There are four choices:
 - **0**: exact match (default)
 - **-1**: exact match or else the largest value less than or equal to **lookup_value**
 - **1**: exact match or else smallest value greater than or equal to **lookup_value**
 - **2**: wildcard match. You should use the special character **?** to match any character and ***** to match any run of characters.

What's impressive, though, is that for certain selections of the final argument (**search_mode**), you don't need to put your data in alphanumerical order! As far as I am aware, this is a first for Excel

- **search_mode**: this argument is also optional. There are again four choices:
 - **1**: search first to last (default)
 - **-1**: search last to first
 - **2**: what is known as a binary search, first to last (requires **lookup_vector** to be sorted). Just so you know, a binary search is a search algorithm that finds the position of a target value within a sorted array. A binary search compares the target value to the middle element of the array. If they are not equal, the half in which the target cannot lie is eliminated and the search continues on the remaining half, again taking the middle element to compare to the target value, and repeating this until the target value is found
 - **-2**: another binary search, this time last to first (and again, this requires **lookup_vector** to be sorted).

Let's have a look at **XLOOKUP** versus everyone's favourite function (except me!), **VLOOKUP**:

	B	C	D	E	F	G	H	I	J	K	L	M	N
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													

Example

Data

Student	ID
Graham	1333
Alice	1331
Mitch	1392
Wendy	1867
Xiu	3589
Brian	2364
Toby	3717

Solution

Student	Xiu	
XLOOKUP	3589	=XLOOKUP(H52,F41:F47,G41:G47)
VLOOKUP (3 args)	3717	=VLOOKUP(H52,F41:G47,COLUMNS(F39:G39))
VLOOKUP (4 args)	3589	=VLOOKUP(H52,F41:G47,COLUMNS(F39:G39),FALSE)

You can clearly see the **XLOOKUP** function is shorter:

=XLOOKUP(H52,F41:F47,G41:G47)

Only the first three arguments are needed, whereas **VLOOKUP** requires both a fourth argument, and, for full flexibility, the **COLUMNS** function as well. **XLOOKUP** will automatically update if rows / columns are inserted or deleted. It's just *simpler*.

We can use this to specify the start and end of our sum range as follows. Consider the following example:

	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	

Data

Month	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21	Nov 21	Dec 21
Sales	1,363	9,910	12,661	3,488	7,958	4,807	6,344	12,929	3,632	4,957	2,916	1,860

Solution

First Date	Mar 21	
Second Date	May 21	
Total Sales	24,107	=SUM(XLOOKUP(G18,H12:S12,H13:S13):XLOOKUP(G19,H12:S12,H13:S13))

The formula is "simply"

=SUM(XLOOKUP(G18,H12:S12,H13:S13):XLOOKUP(G19,H12:S12,H13:S13))

This is just two **XLOOKUP** functions joined together within a **SUM** function, specifying the start and end of the range. Indeed, if the First Date is *after* the Second Date **it will still work**. The **SUM** function is not precious and will work in "reverse order" too.

The dates may be varied and the summation updates both automatically and correctly, *viz*.

	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	

Data

Month	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21	Aug 21	Sep 21	Oct 21	Nov 21	Dec 21
Sales	1,363	9,910	12,661	3,488	7,958	4,807	6,344	12,929	3,632	4,957	2,916	1,860

Solution

First Date	Aug 21	
Second Date	Jun 21	
Total Sales	24,080	=SUM(XLOOKUP(G18,H12:S12,H13:S13):XLOOKUP(G19,H12:S12,H13:S13))

Simple!

For those who are getting upset at this point because they don't have access to Excel 365 and / or the **XLOOKUP** function, do not despair. The old faithful **INDEX(MATCH)** combo still works. It's just clunkier:

	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	

=SUM(INDEX(H13:S13,MATCH(G18,H12:S12,0)):INDEX(H13:S13,MATCH(G19,H12:S12,0)))

We hope you find it of sum use...

Beat the Boredom Challenge

With many of us currently "working from home" / quarantined, there are only so Zoom / Teams calls and virtual parties you can make before you reach your (data) limit. Perhaps they should measure data allowance in blood pressure millimetres of mercury (mmHg). To try and keep our

readers engaged, we will continue to reproduce some of our popular **Final Friday Fix** challenges from yesteryear in this and upcoming newsletters. One suggested solution may be found later in this newsletter. Here's this month's...

This month's Final Friday Fix is about creating a universal option list for the whole workbook. For this challenge, we want to create a dashboard to track the accommodation and catering services for one of our made-up clients:

- a Dashboard worksheet shows which customer group is staying in which room and on what date
- a Catering sheet which displays the number of guests in each room and, by date, who will be using catering services (this is simply generated by an **INDEX MATCH** formula from their data, or you could use an **XLOOKUP** formula instead).

The client wants to be able to view by whole month, 14-day or 7-day in both reports at any time. Similar to the screenshot below, we just need to input the 'Start Date', and click on the option to view as '7 days', so that the list will be generated for the whole week to see which group of customers will be coming:

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								

Whilst we are in the Catering sheet, the list is also updated accordingly, so that we may see how many we need to prepare catering for:

Start Date	Viewing Option						
1/11/2019	<input type="radio"/> Whole Month <input checked="" type="radio"/> 7 days <input type="radio"/> 14 days						

Room	Fri	Sat	Sun	Mon	Tue	Wed	Thu
	01-Nov-19	02-Nov-19	03-Nov-19	04-Nov-19	05-Nov-19	06-Nov-19	07-Nov-19
Room 01	1	1			1	1	1
Room 02	1	1			1	1	1
Room 03	1	1			1	1	1
Room 04	1	1			1	1	1
Room 05	1	1			1	1	1
Room 06	1	1			1	1	1
Room 07	1	1			1	1	1
Room 08	1	1			1	1	1
Room 09	1	1			1	1	1
Room 10	1	1			1	1	1
Unit 1	1	1	1		1	1	1
Unit 2	4	4			4	4	4
Unit 3					4	4	
Unit 4					4	4	
Suite Room 01					1	1	
Suite Room 02					1	1	

If we choose '14 days', the list becomes longer

Room	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu
	01-Nov-19	02-Nov-19	03-Nov-19	04-Nov-19	05-Nov-19	06-Nov-19	07-Nov-19	08-Nov-19	09-Nov-19	10-Nov-19	11-Nov-19	12-Nov-19	13-Nov-19	14-Nov-19
Room 01	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 02	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 03	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 04	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 05	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 06	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 07	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 08	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 09	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Room 10	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C				Group D	Group D
Unit 1	Group E	Group E	Group E	Group E	Group E	Group E	Group D	Group D	Group D				Group D	Group D
Unit 2	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D				
Unit 3				Group D	Group D									
Unit 4				Group D	Group D			Group C	Group C	Group C				
Suite Room 01				Group D	Group D									
Suite Room 02				Group D	Group D									

with a corresponding effect in the Catering sheet:

Room	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu
	01-Nov-19	02-Nov-19	03-Nov-19	04-Nov-19	05-Nov-19	06-Nov-19	07-Nov-19	08-Nov-19	09-Nov-19	10-Nov-19	11-Nov-19	12-Nov-19	13-Nov-19	14-Nov-19
Room 01	1	1			1	1	1	1	1				1	1
Room 02	1	1			1	1	1	1	1				1	1
Room 03	1	1			1	1	1	1	1				1	1
Room 04	1	1			1	1	1	1	1				1	1
Room 05	1	1			1	1	1	1	1				1	1
Room 06	1	1			1	1	1	1	1				1	1
Room 07	1	1			1	1	1	1	1				1	1
Room 08	1	1			1	1	1	1	1				1	1
Room 09	1	1			1	1	1	1	1				1	1
Room 10	1	1			1	1	1	1	1				1	1
Unit 1	1	1	1		1	1	1	4	4	4				
Unit 2	4	4			4	4	4	4	4	4				
Unit 3					4	4								
Unit 4					4	4		4	4	4				
Suite Room 01					1	1								
Suite Room 02					1	1								

Similarly, the list will be updated for the whole month if we choose to view 'Whole Month'

Room	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
	01-Nov-19	02-Nov-19	03-Nov-19	04-Nov-19	05-Nov-19	06-Nov-19	07-Nov-19	08-Nov-19	09-Nov-19	10-Nov-19	11-Nov-19	12-Nov-19	13-Nov-19	14-Nov-19	15-Nov-19
Room 01	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 02	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 03	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 04	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 05	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 06	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 07	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 08	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 09	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Room 10	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group C	Group C	Group D	Group D	Group D	Group D	Group D	
Unit 1	Group E	Group E	Group E	Group E	Group E	Group E	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	
Unit 2	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	
Unit 3	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	
Unit 4	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	
Suite Room 01	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	
Suite Room 02	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	Group D	

This kind of viewing option list is like a filter, which may be applied to various problems when you work with Excel.

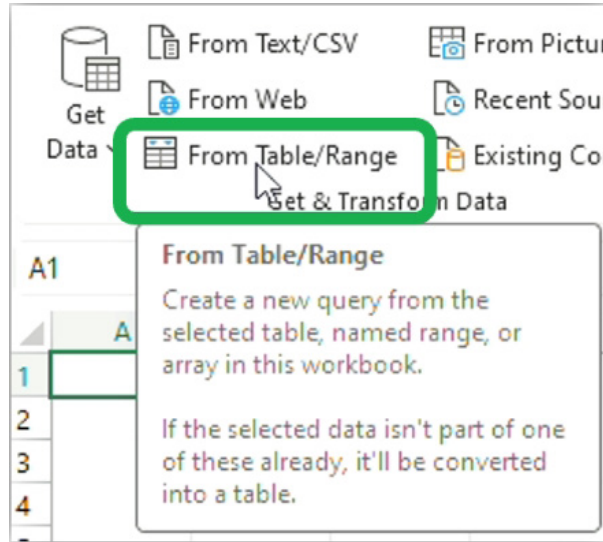
Sounds easy? Try it. One solution *just might* be found later in this newsletter – but no reading ahead!

Excel for Mac

With Steve Kraynak joining the team, we thought we would exploit his knowledge and recant all about Microsoft Excel for Mac. Each month, we'll cover a different topic to help you understand how Excel for Mac is different than Excel for Windows. This month, we continue our discussion

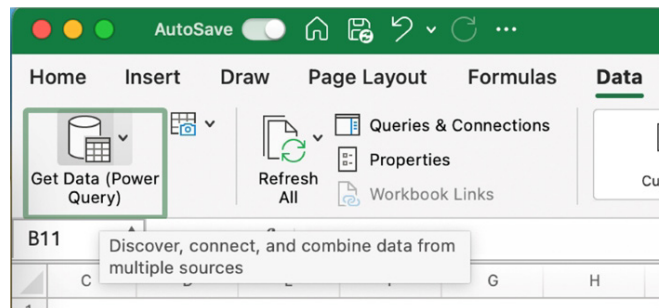
on Power Query. Currently, Power Query on Mac does not have a button on the Data tab to let you start a query from a table or range in the current workbook. No problem! Keep reading to find out how to create such queries without the button.

If you use Excel for Mac, and you've been watching the gradual introduction of Power Query features over the last few years, you know that it doesn't have all the capabilities that it has on Windows. The Excel team has been adding more and more capability to Mac, but it's still missing some key features. One in particular is the 'From Table/Range' button:

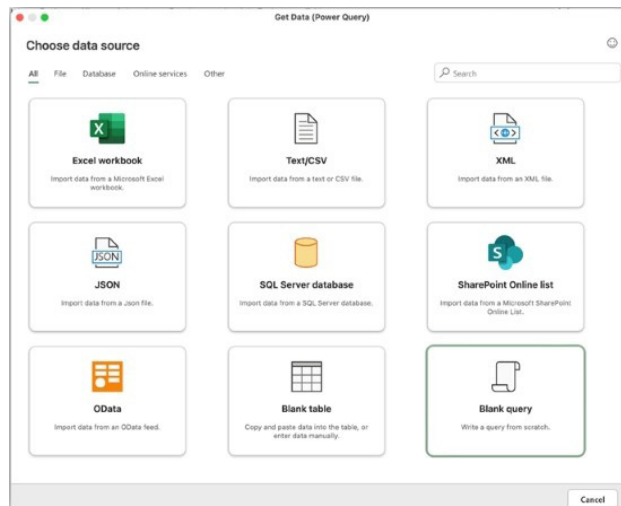


Fortunately, this shouldn't hold you back if you want to pull data from the current workbook into Power Query on Mac. Just follow the simple steps below:

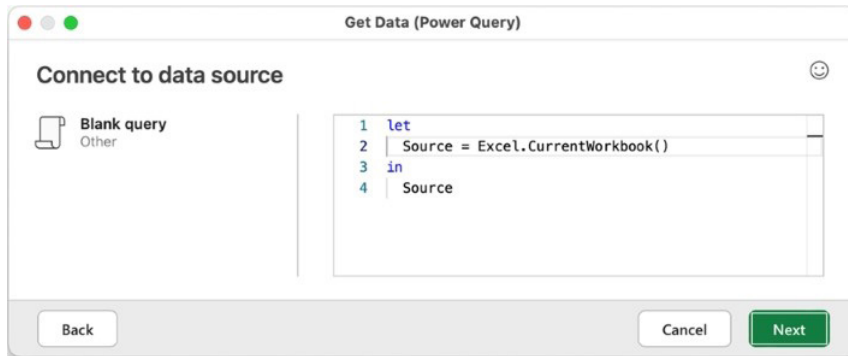
- Go to Data the Data tab of the Ribbon and press 'Get Data' (Power Query)



- In the window that opens, press the Blank Query button



- Where you see two [2] double quotes in the line that says **Source = ""**, replace the "" with **Excel.CurrentWorkbook()** as shown in the screen shot below:



- The code should be as follows (take care, it's case-sensitive):

let

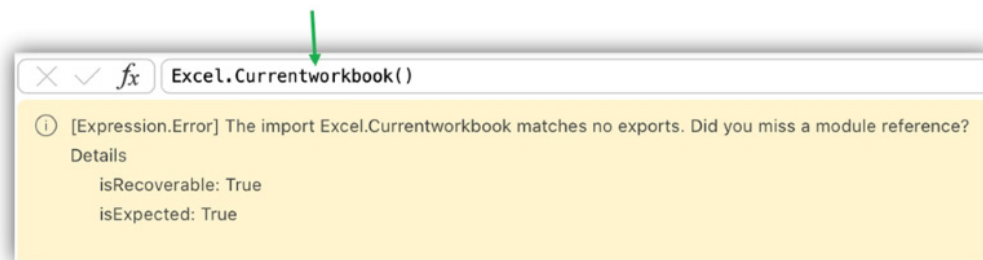
Source = Excel.CurrentWorkbook()

in

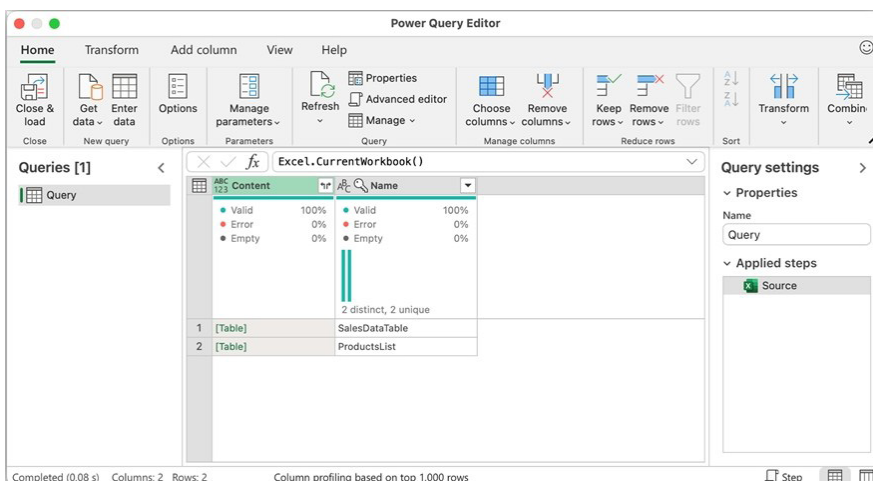
Source

TIP

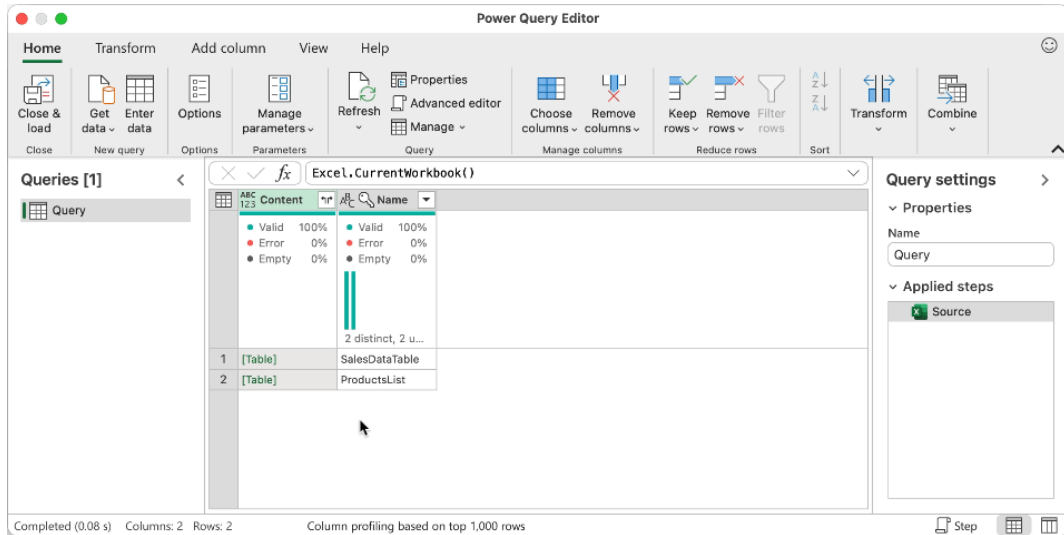
Power Query is case-sensitive, so make sure you type **Excel.CurrentWorkbook()** exactly as shown above. If you see an error like the following, it may be that you've typed it slightly differently [*Ed. i.e. you typed it in wrongly!*]. In the example below, there's a lower-case **W** where it should be upper-case in "**CurrentWorkbook**"



- Press Next. The Power Query Editor window will appear as shown below. There will be two columns in the preview pane, **Content** and **Name**. The **Content** column will just say [Table], which means that each row represents a table or range of data coming from the workbook. The **Name** column shows the name of each table or range. In this example, there's a table called **SalesDataTable** and a range called **ProductsList**



- To get the data from one of the tables or ranges, just press where it says “[Table]” in the row for the table or range you want to get data from. In the example shown here, clicking on [Table] in the row for the **SalesDataTable** adds steps to the query and shows the data that is being imported from that table into the Power Query Editor.



Now you can use all the other features of Power Query to transform your data!

We'll continue next month...

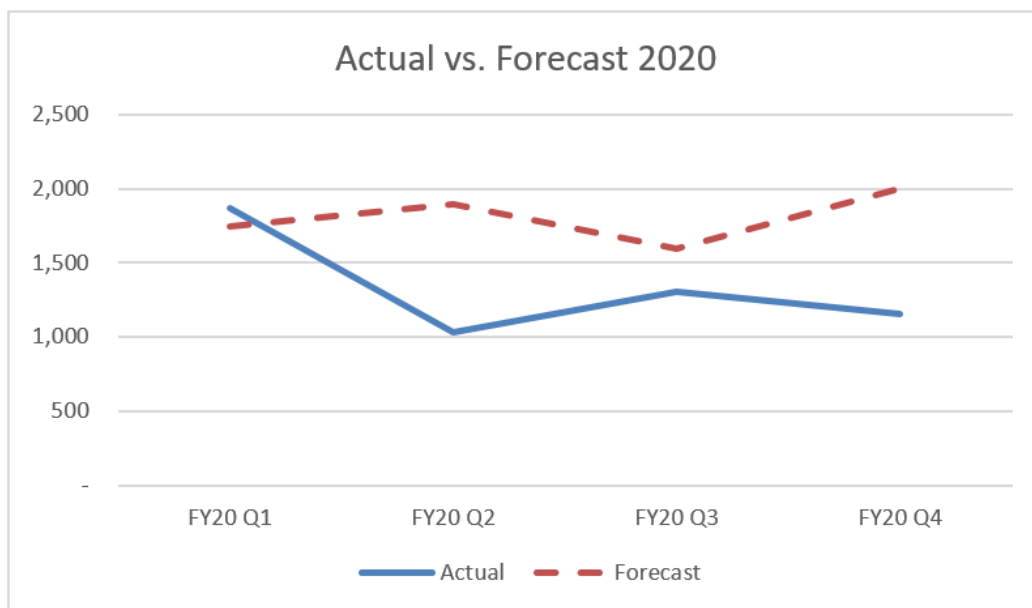
Charts and Dashboards

It's time to chart our progress with an introductory series into the world of creating charts and dashboards in Excel. This month, we show you how to create dynamic chart titles.

Everybody has created quarterly reports, where we have to pump out the same charts again and again with different data. Sometimes, you have all of the charts dynamically linked to your data, but every quarter you have to go through each one and rename them.

Dynamic chart titles are the answer.

To create a dynamic chart title, we first need a chart and some data:



Sample Data Table

	FY20 Q1	FY20 Q2	FY20 Q3	FY20 Q4
Actual	1,866	1,029	1,303	1,153
Forecast	1,750	1,900	1,600	2,000

To make the chart title dynamic we link it to a cell. Before we do that, we have to designate a cell to hold the chart title.

	B	C	D	E	F	G
15						
16						
17						
18						
19						

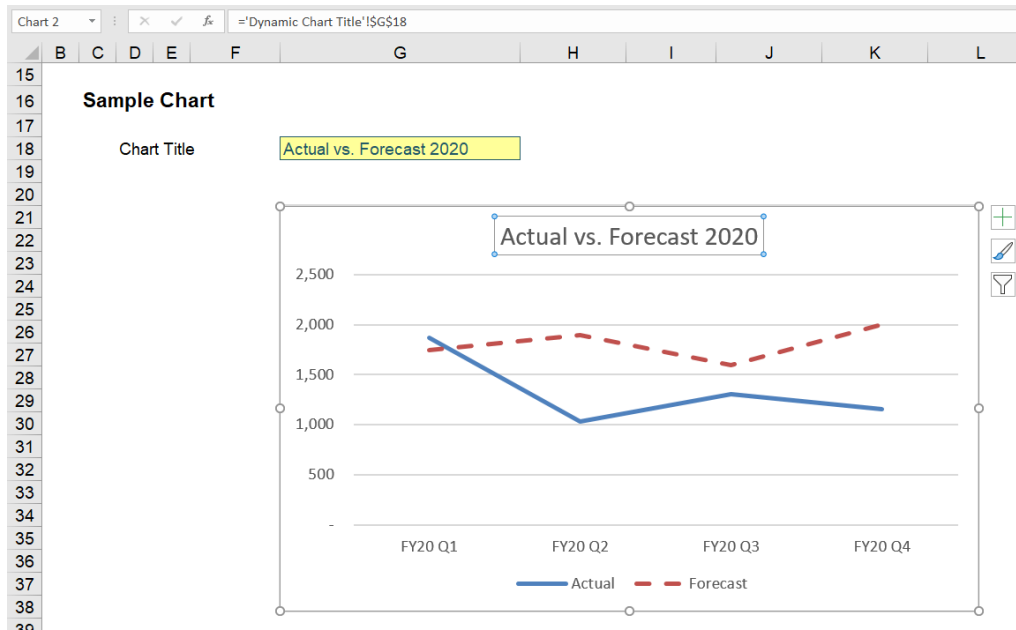
Sample Chart

Chart Title

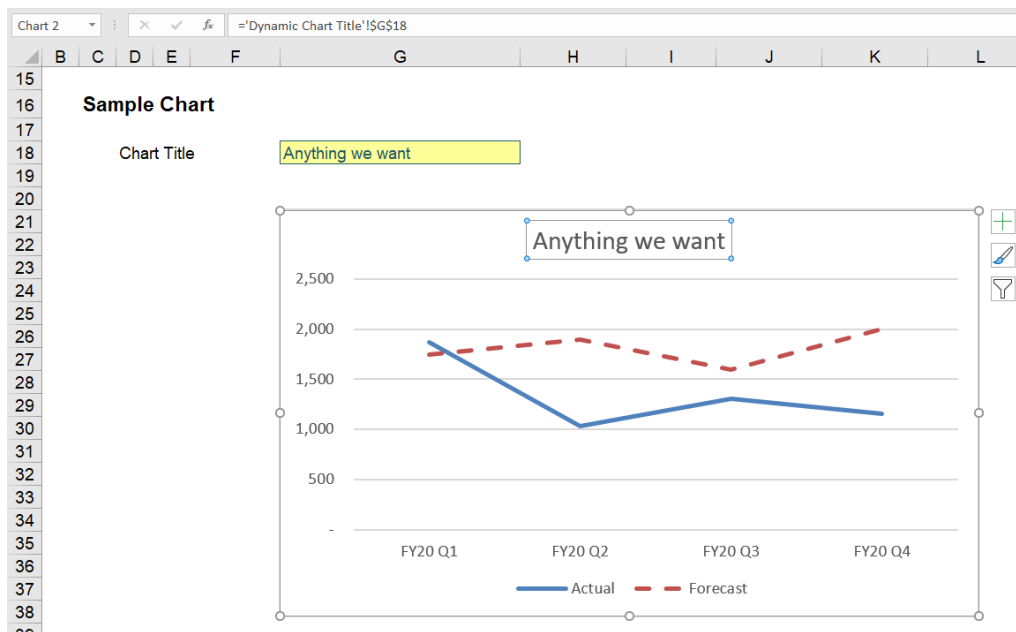
Actual vs. Forecast 2020

The next step is to select the chart title and enter the cell reference into the formula bar, in this case it is:

='Dynamic Chart Title'!\$G\$18



Voila! We can change the title to anything we want and the chart will update automatically.



This may be time consuming at first, but you will soon speed up. Until next month.

Visual Basics

We thought we'd run an elementary series going through the rudiments of Visual Basic for Applications (VBA) as a springboard for newer users. This month we look at declaring constants.

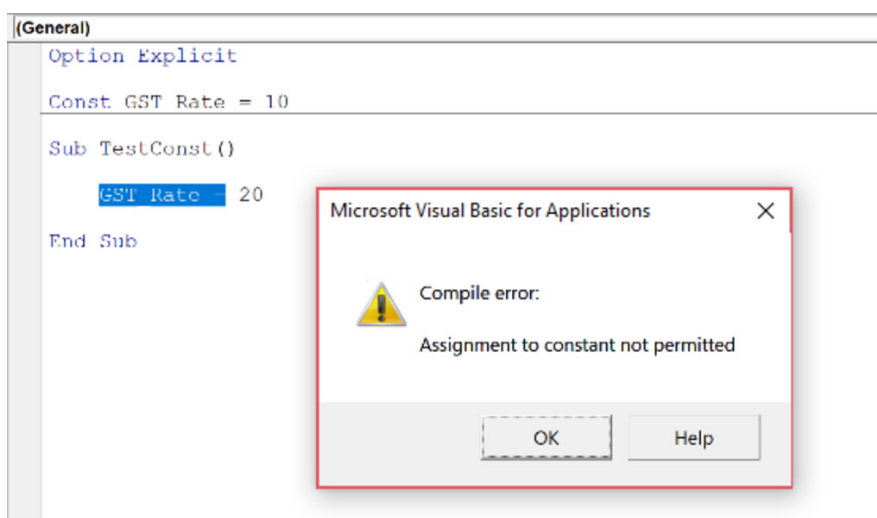
It is highly recommended any values that are passed into formulae, subroutines and / or functions are variables. However, what if the value of that variable does not change? There is a way to make it immutable by declaring it as a constant. This means that it cannot be changed during execution. By declaring constants, they can be easy to access without

hardcoding the information more than once and make code much more readable and facilitate error checking.

Constants are declared in a similar way to **Dim** except using the keyword **Const** – except a constant should always be assigned a value when it is declared.

```
(General)
Const GST_Rate = 10
```

If somewhere in the code, it tries to reassign the value, the VBA Compiler spits an error message before execution.



The compiler determines what the data type is from the type of expression of the constant. However, it is always good form to explicitly state a data type. This is particularly important if you plan on doing arithmetic expressions in your code that results in what is known as a

Long value and having an Integer constant will cause overflow errors. Using the **As** statement in a similar way to the **Dim** statement the data type of the constant may be cast.

```
(General)
Option Explicit
Const TheAnswerToEverything As Integer = 42
```

Multiple constants can be declared on a single line as well:

```
(General)
Option Explicit
Const RankOfHumans As Long = 3, RankOfDolphins As Integer = 2, RankOfMice As String = "One"
```

Now knowing how constants are declared, like variables, the scope of the constants is also put under consideration. This is declared the same way as variables – the subject of our past two articles.

More next time.

Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we discuss how to use an input Table to group text columns into new categories.

This month, we want to look up the following values: Glove, Shoe, Belt (say), in a column, but these values may change. For this example, we are going to use the following text column:

Product Type
Casual Slippers ,
Business Shoes
Heavy Duty Gloves
Heavy Duty Shoes
Shoes Heavy Duty
Gloves (Light)
Gloves (Heavy Duty)
Shoe Business
Leather Belt
Glove and Shoe Leather Set
Leather Shoes
Leather Gloves

What we want to do is create a column that will highlight if any one of the three values from the Lookup table are present in the Product Type column. For example, if the Product Type value is "Leather Gloves", we would want the column to recognise that that value had "Glove" in it. If the Product Type value is "Business Shoes", then we would want the column to recognise "Shoe", and so on.

We have already done something similar to this previously, one involving switching between numbers and text values [here](#) and another involving the **SEARCH** and **SWITCH** functions to look through text values [here](#).

They both involve creating a new column based on data in reference column. However, the difference here is that those two previously outlined methods are not dynamic. The end user would have to manually go into the formula for the calculated column and rewrite the formula, should the criteria change.

This time, we will have the flexibility of redefining the lookup criteria with an external table. To begin we will use the following lookup Table:

Lookup
Glove
Shoe

(OK, so we haven't chosen "Belt" here, but you get the picture!)

The first **DAX** code we are going to write is:

```
=SEARCH(  
    FIRSTNONBLANK(  
        'LookupTable'[Lookup],  
        1  
    ),  
    'Combined Example'[Product Type],  
    ,  
    9999  
)
```

Product Type	SEARCH & FIRSTNONBLANK
1 Casual Slippers ,	9999
2 Business Shoes	9999
3 Heavy Duty Gloves	12
4 Heavy Duty Shoes	9999
5 Shoes Heavy Duty	9999
6 Gloves (Light)	1
7 Gloves (Heavy Duty)	1
8 Shoe Business	9999
9 Leather Belt	9999
10 Glove and Shoe Leather Set	1
11 Leather Shoes	9999
12 Leather Gloves	9

This **DAX** code uses the **SEARCH** and **FIRSTNONBLANK** functions. We have used the value '9999' as the value to return if not found as it is extremely unlikely that we would find a text value we are looking for in the 9,999th character position. The column is only able to detect

the first value in our lookup table 'Gloves', since we are using the **FIRSTNONBLANK** function. We need the function to iterate for each value of the lookup table.

We are going to have to use the **CONCATENATEX** function to force the function to iterate for each row:

```
=CONCATENATEX(
    'LookupTable',
    SEARCH(
        FIRSTNONBLANK(
            'LookupTable'[Lookup],
            1
        ),
        'Combined Example'[Product Type],
        ,
        9999
    )
)
```

Product Type	SEARCH & FIRSTNONBLANK	CONCATENATEX
1 Casual Slippers ,	9999	99999999
2 Business Shoes	9999	999910
3 Heavy Duty Gloves	12	129999
4 Heavy Duty Shoes	9999	999912
5 Shoes Heavy Duty	9999	99991
6 Gloves (Light)	1	19999
7 Gloves (Heavy Duty)	1	19999
8 Shoe Business	9999	99991
9 Leather Belt	9999	99999999
10 Glove and Shoe Leather Set	1	1111
11 Leather Shoes	9999	99999
12 Leather Gloves	9	99999

The **CONCATENATEX** function iterates the function to look for each value in the lookup table, Glove and Shoe.

This method enables the column to highlight when a cell value contains both Glove or Shoe. This is highlighted on the 10th row, it finds 'Glove'

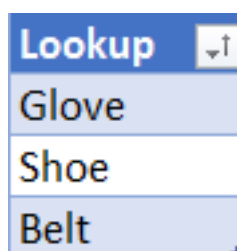
at the first character position, hence 1, and it finds 'Shoe' on the 11th character position, hence 11, resulting in '111'.

The final step is to use the **IF** function so that the function would return with the text value rather than the character position:

```
=CONCATENATEX(
    'LookupTable',
    IF(
        SEARCH(
            FIRSTNONBLANK(
                'LookupTable'[Lookup],
                1
            ),
            'Combined Example'[Product Type],
            ,
            9999
        )
        <> 9999,
        'LookupTable'[Lookup],
        ""
    )
)
```

Product Type	SEARCH & FIRSTNONBLANK	Return with Lookup Table
1 Casual Slippers ,		9999
2 Business Shoes		9999 Shoe
3 Heavy Duty Gloves		12 Glove
4 Heavy Duty Shoes		9999 Shoe
5 Shoes Heavy Duty		9999 Shoe
6 Gloves (Light)		1 Glove
7 Gloves (Heavy Duty)		1 Glove
8 Shoe Business		9999 Shoe
9 Leather Belt		9999
10 Glove and Shoe Leather Set		1 GloveShoe
11 Leather Shoes		9999 Shoe
12 Leather Gloves		9 Glove

The **IF** function checks if the number returned does not equal 9,999 and returns with the lookup table value. Now we can add 'Belt' as criteria into the Lookup table and have the calculated column update automatically.



Updating the Lookup table and refreshing the connection will yield:

Product Type	SEARCH & FIRSTNONBLANK	Return with Lookup Table
1 Casual Slippers ,	9999	
2 Business Shoes	9999	Shoe
3 Heavy Duty Gloves	9999	Glove
4 Heavy Duty Shoes	9999	Shoe
5 Shoes Heavy Duty	9999	Shoe
6 Gloves (Light)	9999	Glove
7 Gloves (Heavy Duty)	9999	Glove
8 Shoe Business	9999	Shoe
9 Leather Belt	9	Belt
10 Glove and Shoe Leather Set	9999	GloveShoe
11 Leather Shoes	9999	Shoe
12 Leather Gloves	9999	Glove

With our new column we can set up slicers to dynamically segregate our data based on text inputs. Let's expand on the concept.

Imagine we have the following data table, noting that this screenshot is not exhaustive:

Product Type	Price	Date	Quantity
Business Shoes	120.00	19/05/2019	3
Heavy Duty Shoes	125.00	17/05/2019	41
Leather Gloves	50.00	13/05/2019	32
Shoe Business	85.00	31/05/2019	7
Dress Shirt	80.00	7/05/2019	32
Leather Gloves	50.00	9/05/2019	1
Hat Leather	90.00	9/05/2019	41
Khakis	80.00	6/05/2019	8
Leather Belt	90.00	26/05/2019	1
T-Shirt	20.00	17/05/2019	25
Heavy Duty Shoes Type 2	160.00	1/05/2019	23
Socks Cotton	15.00	5/05/2019	25
Leather Gloves	50.00	7/05/2019	42
Business Shoes	120.00	20/05/2019	48
Gloves (Heavy Duty)	30.00	28/05/2019	12
Hat Leather	90.00	3/05/2019	50
Leather Belt	90.00	21/05/2019	13
Business Shoes	120.00	5/05/2019	35
Socks	12.00	25/05/2019	2
Shorts	30.00	29/05/2019	9
Leather Gloves	50.00	27/05/2019	29
Heavy Duty Shoes Type 2	160.00	17/05/2019	18
Leather Gloves	50.00	25/05/2019	11
Glove and Shoe Leather Set	140.00	2/05/2019	44
Socks	12.00	3/05/2019	10
T-Shirt	20.00	26/05/2019	37
Khakis	80.00	11/05/2019	20
Gloves (Light)	20.00	16/05/2019	24
Heavy Duty Shoes Type 2	160.00	29/05/2019	22
Socks	12.00	8/05/2019	23
Heavy Duty Gloves	35.00	4/05/2019	35
Leather Gloves	50.00	30/05/2019	31
T-Shirt	20.00	1/05/2019	45

We would like to be able to group the Product IDs by a new category. These categories are detailed in the following table:

Search Term	Category
Shoe	Footwear
Slippers	Footwear
Socks	Footwear
Belt	Clothes
Gloves	Clothes
Shorts	Shorts
Shirt	Shirts
Jeans	Pants
Khakis	Pants
Pants	Pants
Hat	Headgear

In summary, if the Product ID text contains 'Shoe' the new column will display 'Footwear', and if the text contains 'Jeans' the new column will return with 'Pants', etc.

How do we do this? Well, from our last blog, we used the following single column lookup table:

Lookup
Glove
Shoe

This time we can alter our lookup table and have two columns, one column for the Lookup value and the other for the Category name we wish to return:

Lookup	Category
Shoe	Footwear
Slippers	Footwear
Socks	Footwear
Belt	Clothes
Gloves	Clothes
Shorts	Shorts
Shirt	Shirts
Jeans	Pants
Khakis	Pants
Pants	Pants
Hat	Headgear

After loading both tables into Power Pivot, we create a calculated column with the following code:

```
=CONCATENATEX(
    'LookupTable',
    IF(
        SEARCH(
            FIRSTNONBLANK(
                'LookupTable'[Lookup],
                1
            ),
            'DataTable'[Product Type],
            ,
            9999
        )
        <> 9999,
        'LookupTable'[Category],
        ""
    )
)
```

This code is very similar to the code we used last week, with one key difference. Instead of returning with the 'LookupTable'[Lookup], we change it to 'LookupTable'[Category]. This way, the column will be populated with the new category that we wish to assign to each row:

[Category]	fx
	=CONCATENATEX('LookupTable', IF(SEARCH(FIRSTNONBLANK('LookupTable'[Lookup], 1), 'DataTable'[Product Type], , 9999) <> 9999, 'LookupTable'[Category], ""))

	Product Type	Price	Date	Quantity	Category	Sales
1	Business Shoes	120	19/05/2019	3	Footwear	360
2	Heavy Duty Sh...	125	17/05/2019	41	Footwear	5125
3	Leather Gloves	50	13/05/2019	32	Clothes	1600
4	Shoe Business	85	31/05/2019	7		595
5	Dress Shirt	80	7/05/2019	32	Shirts	2560
6	Leather Gloves	50	9/05/2019	1	Clothes	50
7	Hat Leather	90	9/05/2019	41	Headgear	3690
8	Khakis	80	6/05/2019	8	Pants	640

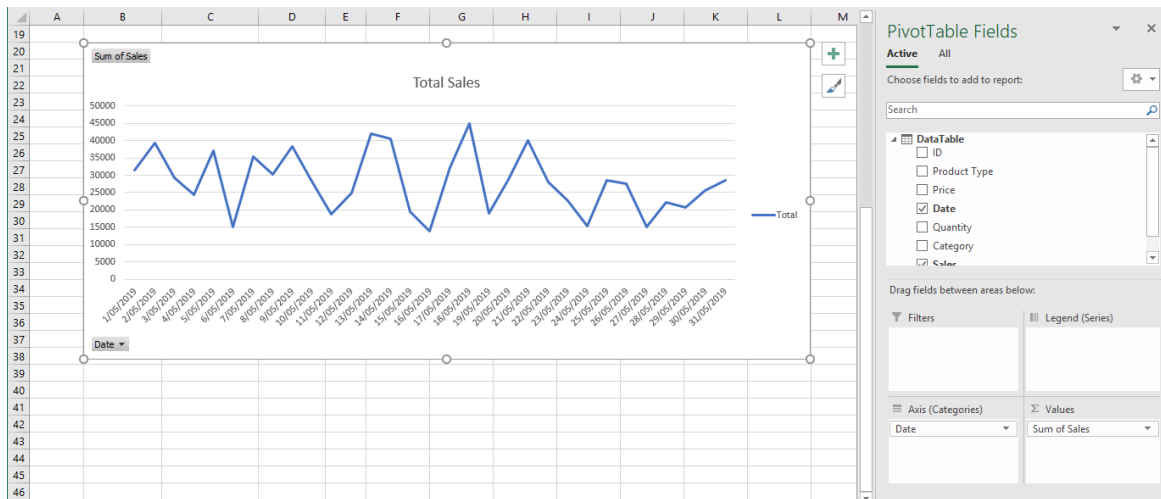
We will also have to create a Sales column that multiplies the Price by the Quantity:

```
= 'DataTable'[Price]*'DataTable'[Quantity]
```

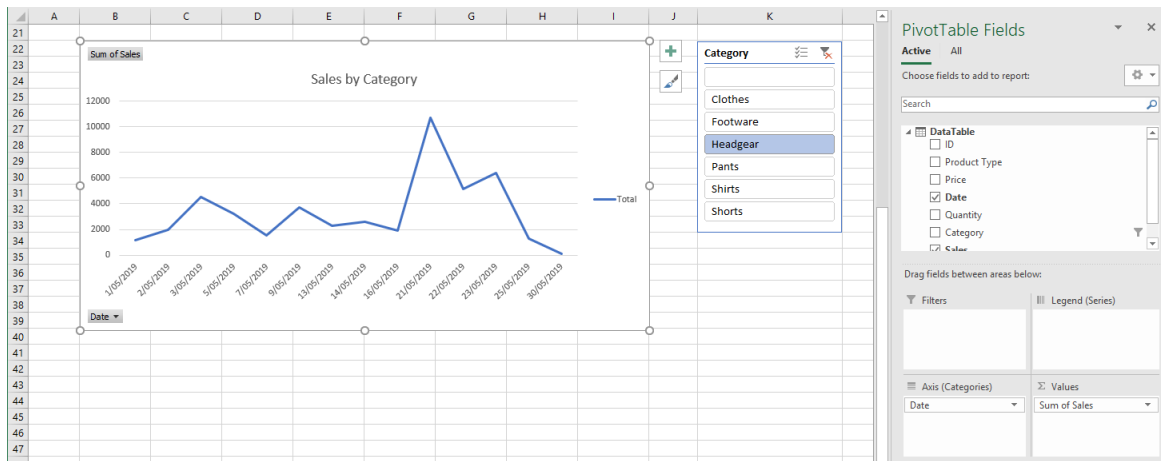
[Sales]	fx
	= 'DataTable'[Price]*'DataTable'[Quantity]

	Product Type	Price	Date	Quantity	Category	Sales
1	Business Shoes	120	19/05/2019	3	Footwear	360
2	Heavy Duty Sh...	125	17/05/2019	41	Footwear	5125
3	Leather Gloves	50	13/05/2019	32	Clothes	1600
4	Shoe Business	85	31/05/2019	7		595

We can now create the following PivotChart:



The next step is to create a Slicer for our new **Category** column:

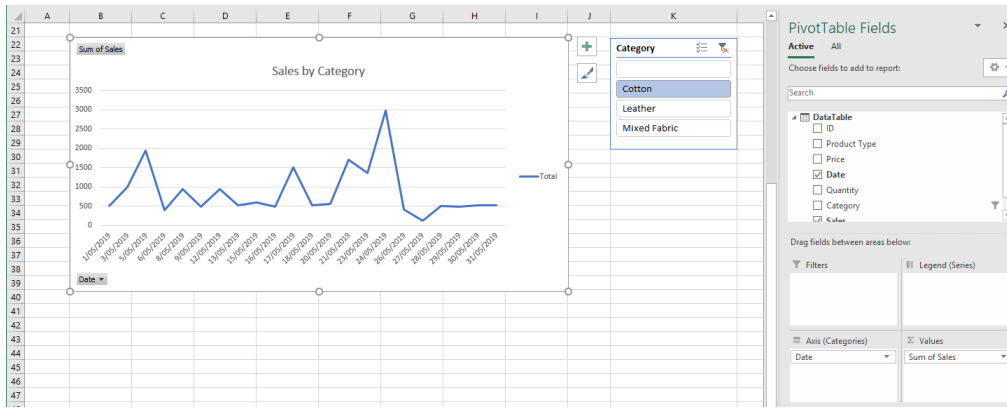


We can now filter our graph to display different categories of our data. The best part is that if we wish to change the categories or lookup values all we have to do is change the values in our lookup table, refresh the links in Power Pivot and our chart will update accordingly.

For example, updating our lookup table to:

Lookup	Category
Light	Cotton
Heavy Duty	Leather
Leather	Leather
Cotton	Cotton
T-Shirt	Mixed Fabric
Shorts	Mixed Fabric
Shirt	Mixed Fabric
Jeans	Mixed Fabric
Khakis	Mixed Fabric
Pants	Mixed Fabric

and refreshing the links in Power Pivot, our PivotChart will be updated as follows:



That's it for this month; more next time.

Power Query Pointers

Each month we'll reproduce one of our articles on Power Query (Excel 2010 and 2013) / Get & Transform (Office 365, Excel 2016 and 2019) from www.sumproduct.com/blog. If you wish to read more in the meantime, simply check out our Blog section each Wednesday. This month, we consider how to deal with import errors.

Imagine we have some employee data that we need to import and clean up. To show the process, let's upload it in its current error-ridden state:

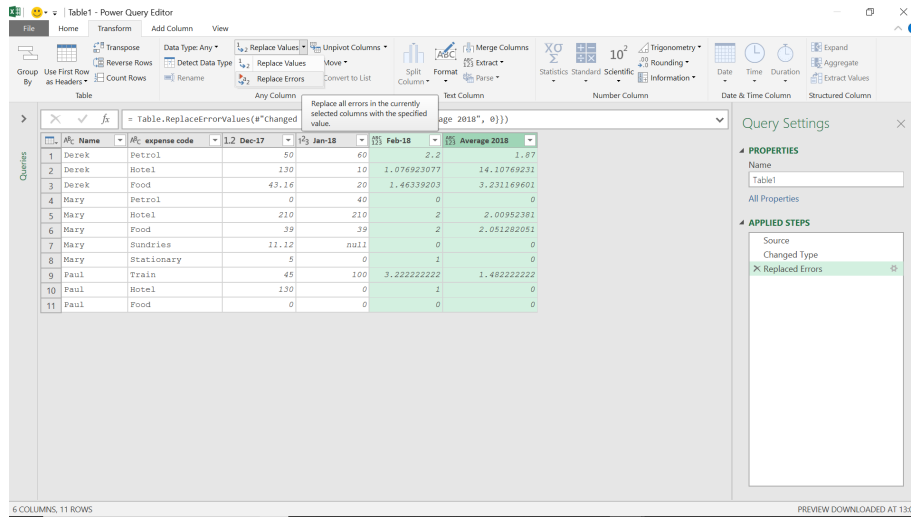
Name	expense code	Dec-17	Jan-18	Feb-18	Average 2018
Derek	Petrol	50	60	2.2	1.87
Derek	Hotel	130	10	1.076923	1.10769
Derek	Food	43.16	20	1.463392	3.23117
Mary	Petrol	0	40	#DIV/0!	#DIV/0!
Mary	Hotel	210	210	2	2.009524
Mary	Food	39	39	2	2.051282
Mary	Sundries	11.12		#VALUE!	#VALUE!
Mary	Stationary	5	0	1	#DIV/0!
Paul	Train	45	100	3.222222	1.482222
Paul	Hotel	130	0	1	#DIV/0!
Paul	Food	0	0	#DIV/0!	#DIV/0!

Ignoring the problems for now, we choose to create a new query from the 'Get and Transform' section of the 'Data' tab, in this case using 'From Table':

The Power Query Editor shows the following query settings:

- Table: Table1
- Source: Changed Type

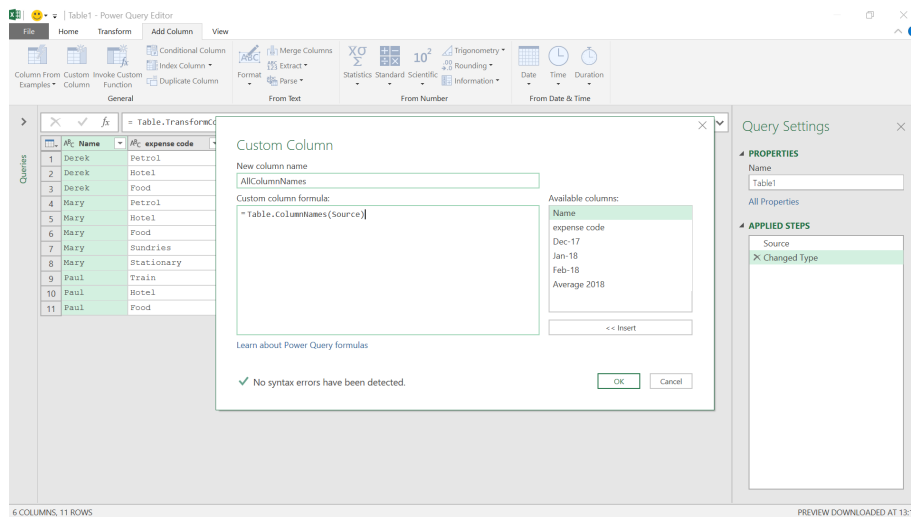
Since we are not going to go back and work out what caused these errors, we simply want to set them to zero [0]:



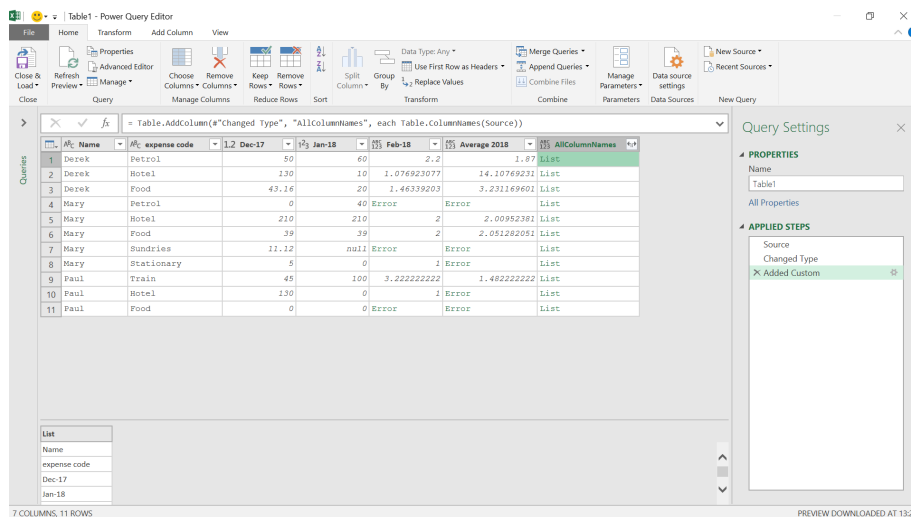
So, we've replaced the errors and we're happy... well not quite. If we look at the M code generated for this step, we see

Table.ReplaceErrorValues(#"Changed Type", {"Feb-18", 0}, {"Average 2018", 0})

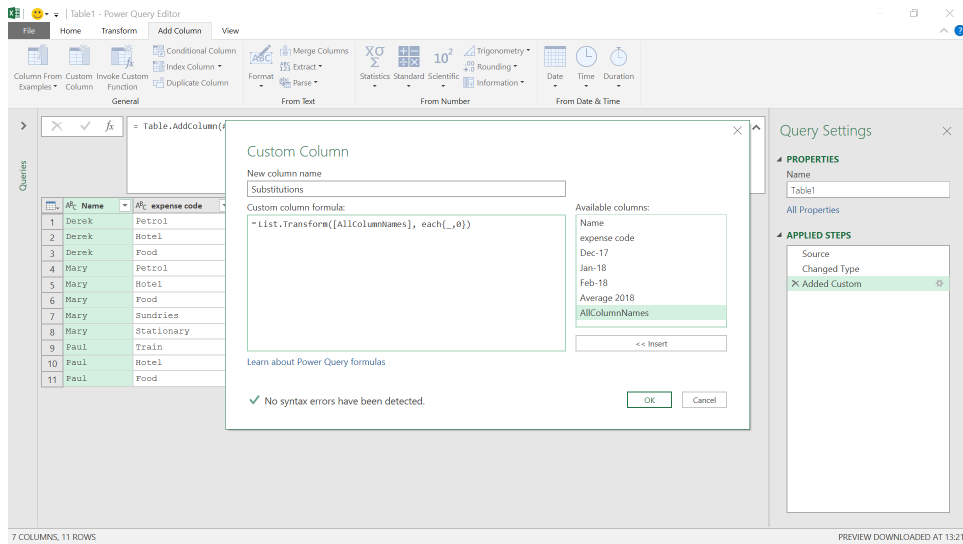
Our column names are referenced. We want it to be more robust than this – we wish to change all errors into zeroes. Furthermore, we also want it to cope if the column names were to be changed. Let's replace the line of M code (above) with some different code. To show what each step will do, we will create the first steps as custom columns, which we will remove at the end when we apply the code directly to the Advanced Editor.



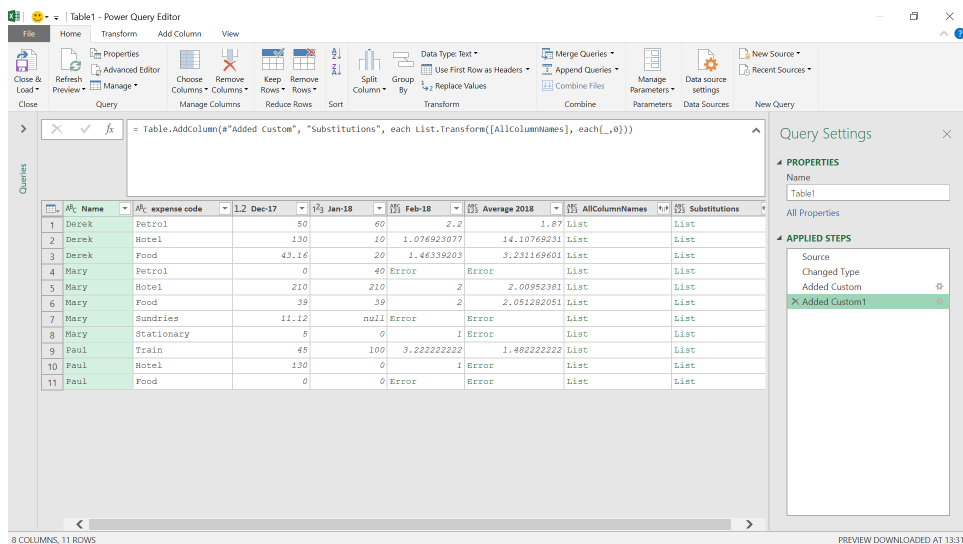
Let's begin by creating a new custom column from the 'Add Column' tab, that will contain all of our column headings.



Now, we want to create a new custom column containing a pairing which says that each column is linked to a zero value. We will use this later to make a substitution.



This gives us our substitution column.



Our final step is to apply the substitution. We are not going to do this as a column, as we now want to create the solution as it would be more useful, and to do that we're going to apply the steps directly to

the Advanced Editor. We're removing any step that references column names (such as 'Changed Type'), since we wish this query to apply to any similar data without worrying about column names.



When we apply these changes, we get the transformed table, viz.

	Name	expense code	Dec-17	Jan-18	Feb-18	Average 2018
1	Derek	Petrol	50	60	2.2	1.87
2	Derek	Hotel	130	10	1.076923077	14.10769231
3	Derek	Food	43.16	20	1.46339203	3.231169601
4	Mary	Petrol	0	40	0	0
5	Mary	Hotel	210	210	2	2.00952391
6	Mary	Food	39	39	2	2.051282051
7	Mary	Sundries	11.12		0	0
8	Mary	Stationary	5		1	0
9	Paul	Train	45	100	3.222222222	1.482222222
10	Paul	Hotel	130		1	0
11	Paul	Food	0		0	0

We should now be able to change the name of a column in the original source without affecting the query.

	Name	expense code	Dec-17	Jan-18	Mar-18	Average
1	Derek	Petrol	50	60	2.2	1.87
2	Derek	Hotel	130	10	1.076923	14.10769
3	Derek	Food	43.16	20	1.463392	3.23117
4	Mary	Petrol	0	40	#DIV/0!	#DIV/0!
5	Mary	Hotel	210	210	2	2.009524
6	Mary	Food	39	39	2	2.051282
7	Mary	Sundries	11.12		#VALUE!	#VALUE!
8	Mary	Stationary	5		#DIV/0!	#DIV/0!
9	Paul	Train	45	100	3.222222	1.482222
10	Paul	Hotel	130		1	#DIV/0!
11	Paul	Food	0		#DIV/0!	#DIV/0!

We've changed **Feb-18** to **Mar-18**. Now we will see what happens in the query...

	Name	expense code	Dec-17	Jan-18	Mar-18	Average 2018
1	Derek	Petrol	50	60	2.2	1.87
2	Derek	Hotel	130	10	1.076923077	14.10769231
3	Derek	Food	43.16	20	1.46339203	3.231169601
4	Mary	Petrol	0	40	0	0
5	Mary	Hotel	210	210	2	2.00952391
6	Mary	Food	39	39	2	2.051282051
7	Mary	Sundries	11.12		0	0
8	Mary	Stationary	5		1	0
9	Paul	Train	45	100	3.222222222	1.482222222
10	Paul	Hotel	130		1	0
11	Paul	Food	0		0	0

The query is working independently of any column name changes. Result!

Until next month.

Power BI Updates

Unfortunately, the previous set of Power BI updates were announced after our newsletter went to print, so we've ended up with two months' worth of updates for this newsletter! There are new updates for Visual calculations, editing your data model in the Power BI Service, and deliver report subscriptions to OneDrive SharePoint amongst many others.

The full list of updates is as follows:

Reporting

- Visual calculations update in Preview
- On-Object Interaction updates
- Mobile layout auto-create in Preview
- Expanding Spatial Data Integration: Shapefile Support in Azure Maps Visual
- Data bars in Matrix subtotal / total conditional formatting
- Data labels alignment
- New visual: 100% Stacked Area chart
- Line enhancements
- Enhanced Q&A with Copilot-generated linguistic relationships

Modelling

- Write **DAX** queries in DAX query view with Copilot in Preview
- Enhanced Row Level Security editor is enabled by default in Preview
- Selection expressions for calculation groups in Preview
- DAX query view improvements in Preview

Service

- Edit your data model in the Power BI Service – updates
- Undo / Redo, Clear all, and New filter cards in Explore
- Deliver report subscriptions to OneDrive SharePoint in Preview
- Storytelling in PowerPoint: improved image mode in the Power BI add-in for PowerPoint
- Storytelling in PowerPoint: continuous slide show auto refresh
- Storytelling in PowerPoint: auto populating the slide title
- Introducing the Fabric metadata scanning sample application
- Dynamic Subscriptions for Power BI and paginated reports

Mobile

- Custom visual SSO support
- Supporting Folders in workspace

- New 'Clear barcode' action in the report footer
- Open Power BI items in full screen mode

Developers

- New title flyout for Power BI Desktop developer mode
- Rename to 'Semantic Model' in Power BI Project files
- System file updates for Git integration
- Hierarchical Identity filter API

Visualisations

- New visuals in AppSource
- Dumbbell Bar chart by Nova Silva
- Date Picker by Powerviz
- Drill Down Combo PRO
- PDF Uploader / Viewer
- Inforiver Premium Matrix
- Financial Reporting Matrix by Profitbase
- Horizon chart by Powerviz
- Drill Down Scatter PRO by ZoomCharts
- Image Gallery
- Horizontal Bar chart
- TrendsMulti-pane Card 1.1

Paginated Reports

- Connect to new data sources from Power BI Report Builder in Preview
- Localised parameter prompts in Power BI Report Builder

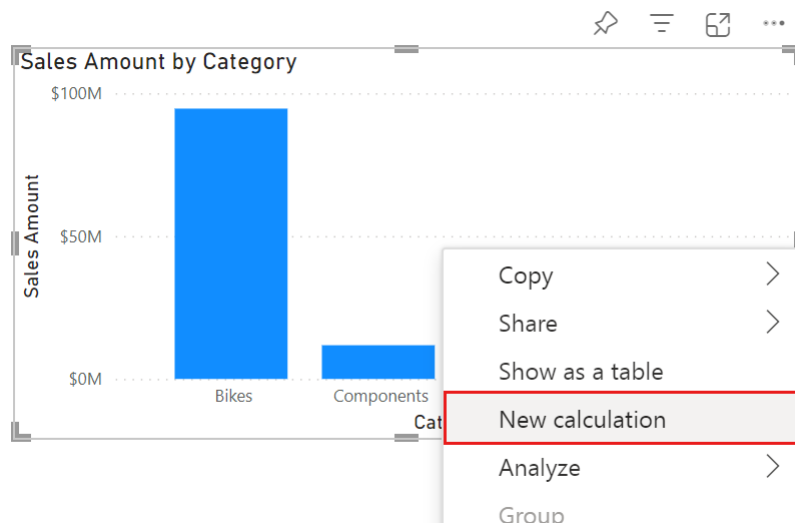
Analytics

- Introducing Copilot pane in Power BI Desktop in Preview.

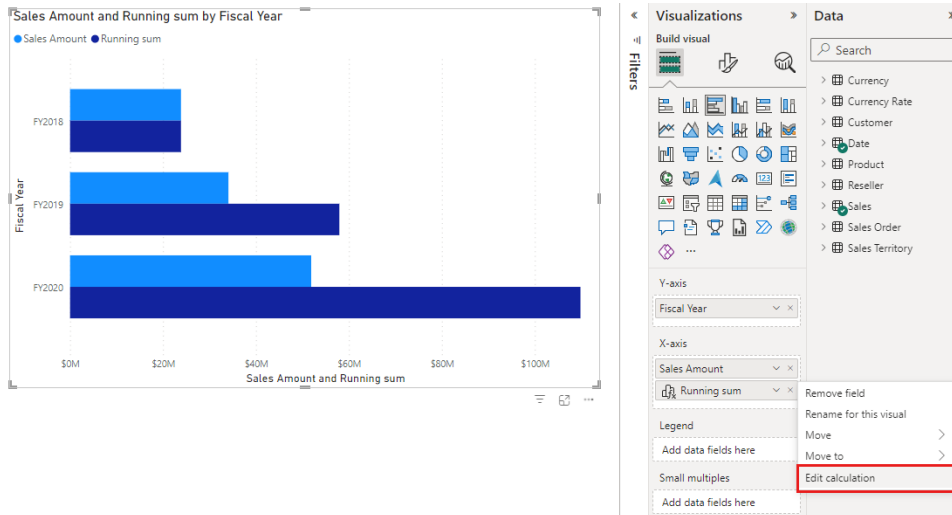
Let's look at each in turn.

Visual calculations update in Preview

You can now add and edit visual calculations in the Service. You may add a visual calculation by selecting 'New calculation' from the context menu on a visual after you publish a report to Power BI Service.



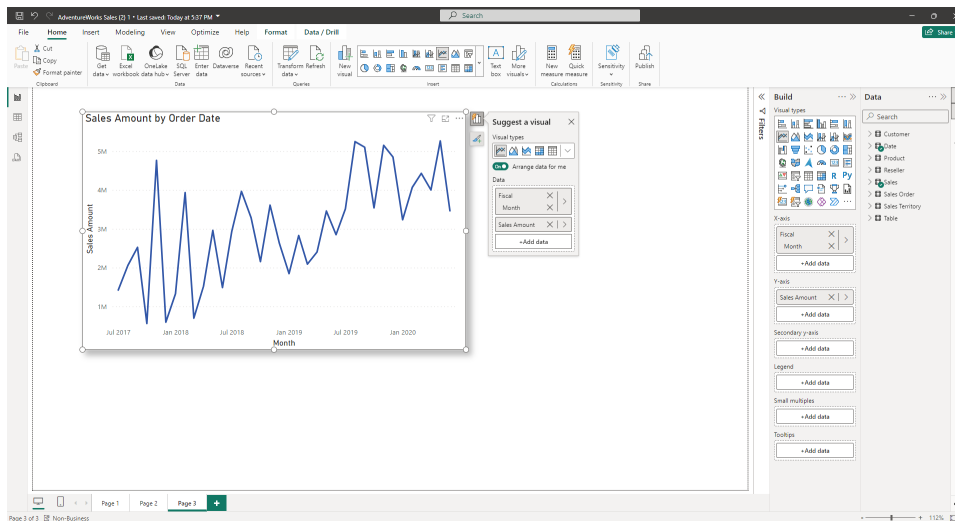
Also, after you publish a report that has visual calculations in it, you can access the visual calculations edit mode by selecting a visual calculation and choosing 'Edit calculation'.



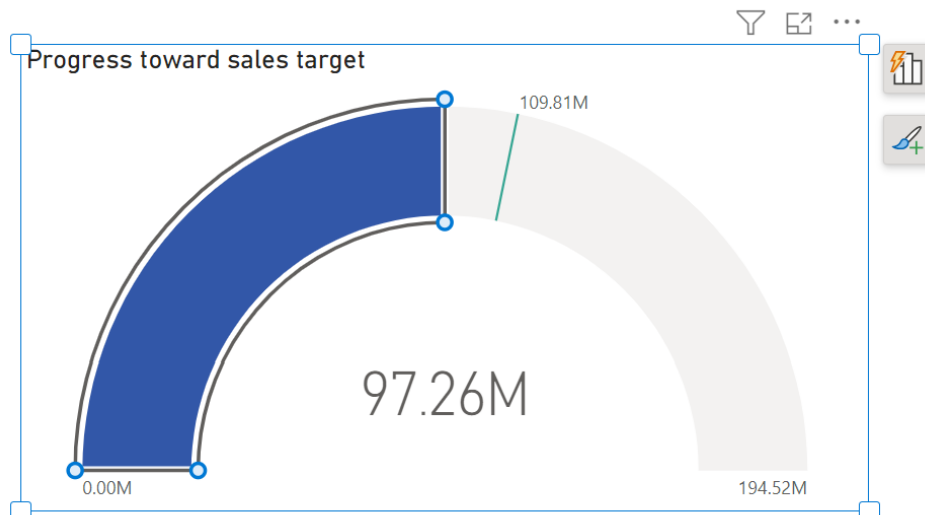
On-Object Interaction updates

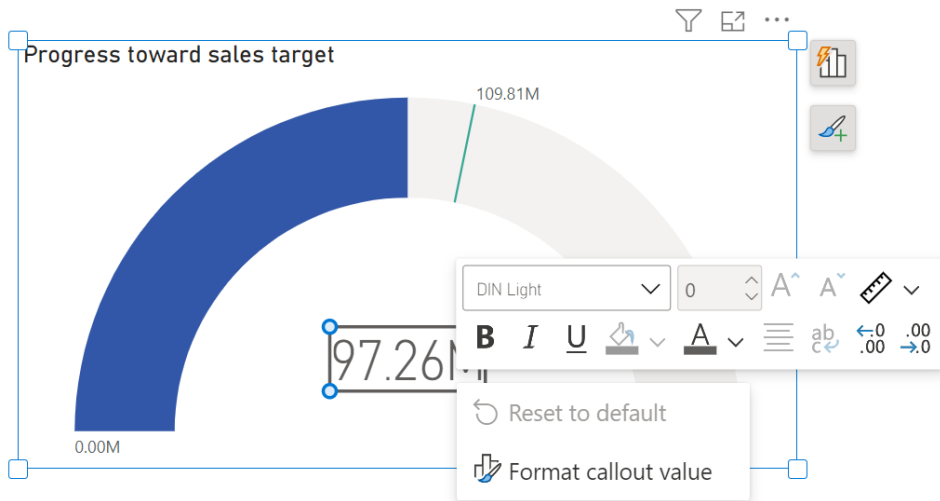
To balance the needs of existing users who prefer to build visuals quickly in the pane, with the needs of new users that need guidance when picking a visual type or appropriate field wells, you no longer must choose one or the other path, both are now available.

This update streamlines the Build pane and moves the visual suggestions feature to be inside the on-object build button only. Need help building your visual? Use the on-object 'suggest a visual' experience, whereas if you already know your way around, use the Build pane as before.



The Gauge visual now supports the new on-object formatting sub selections. Simply double click on your Gauge visual to enter Format mode, then right-click on which part of the visual you'd like to format using the mini-toolbar.





The pane switcher has been renamed to Pane manager and revised in this update. Now, Microsoft has updated the order of the pane listings and added the settings that pertain to the Pane manager directly in this menu.

Customize

Pane manager settings

- Always show pane manager
- Show only one active pane

To save canvas space, automatically collapse active panes when a new one is opened.

Add or remove panes

- Data**

View the data you can use to create visualizations.
- Build**

Add data and build a visual.
- Format**

Customize the size and style of visuals and other report elements.
- Bookmarks**

Add a bookmark to save applied filters, cross-highlighting, and drilling.
- Selection**

Manage the visibility and layering order of objects in your report.
- Performance analyzer**

Assess your report's performance and identify areas for improvement.
- Sync slicers**

Synchronize slicers and control their visibility across report pages.

Mobile layout auto-create in Preview

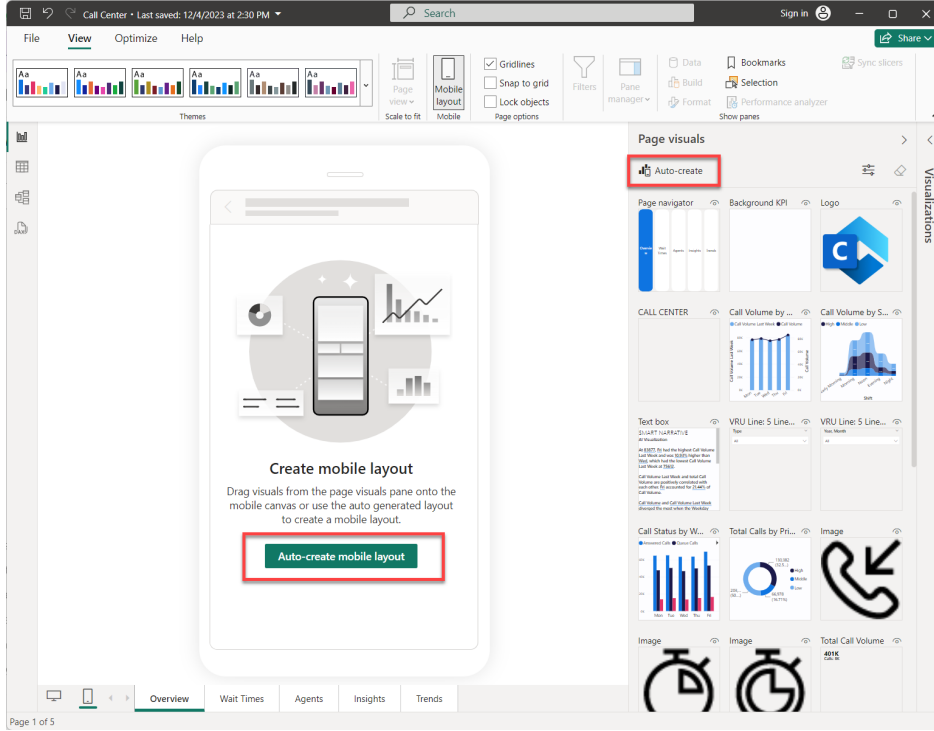
Whilst you may realise that mobile optimised report layouts are the best way to view data in the Power BI mobile applications, you may be well aware that it requires extra work to create said layout. As of this update, you can now generate a mobile-optimised layout with a click of a button. This long-awaited feature allows you to easily create mobile-optimised layouts for any new or existing report page, saving considerable time.

When you switch to the mobile layout view in Power BI Desktop, if the mobile canvas is empty, you can generate a mobile layout just by selecting the 'Auto-create' button. The auto-create engine understands the desktop layout of your report and builds a mobile layout that considers the position, size, type and order of the visuals that the report contains.

It places both visible and hidden visuals, so if you have bookmarks that change a visual's visibility, they will work in the automatically created mobile layout as well.

You may edit the automatically created mobile layout, so if the result is not exactly what you expected, you can tweak it to make it perfect for your needs.

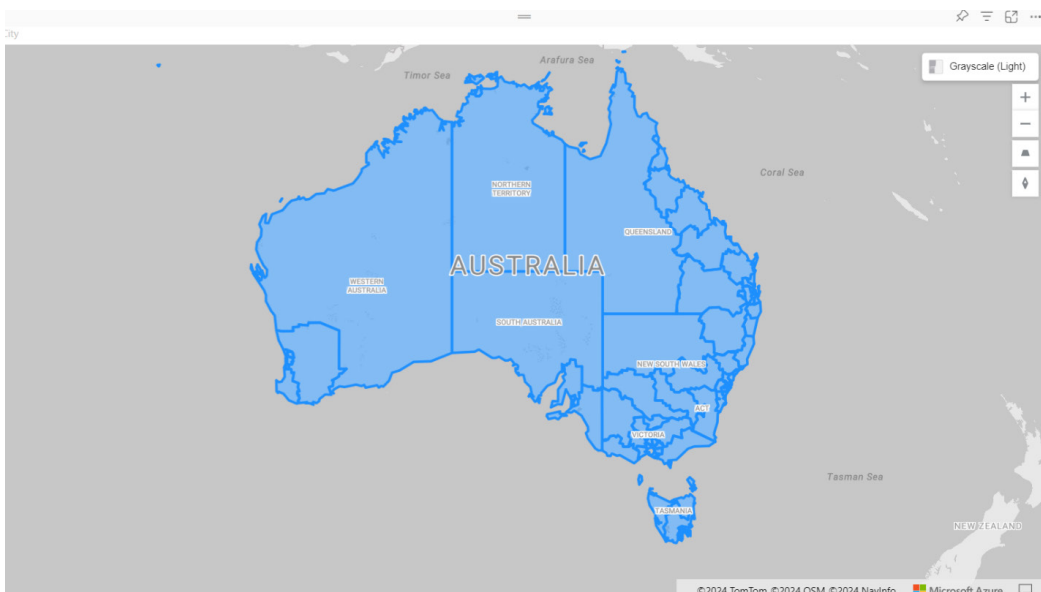
To enable the new mobile layout auto-create capabilities, switch on the 'Auto-create mobile layout' Preview feature in Power BI Desktop: **File -> Options and settings -> Options -> Preview features -> Auto-create mobile layout.**



Expanding Spatial Data Integration: Shapefile Support in Azure Maps Visual

After successfully integrating WKT and KML formats in February, Microsoft has extended their support further to include the Shapefile format. With just two clicks, you may now overlay your spatial data onto

Azure Maps' base map. Whether through file upload or a hosted file, Azure Maps' reference layer enable easy incorporation of your data.



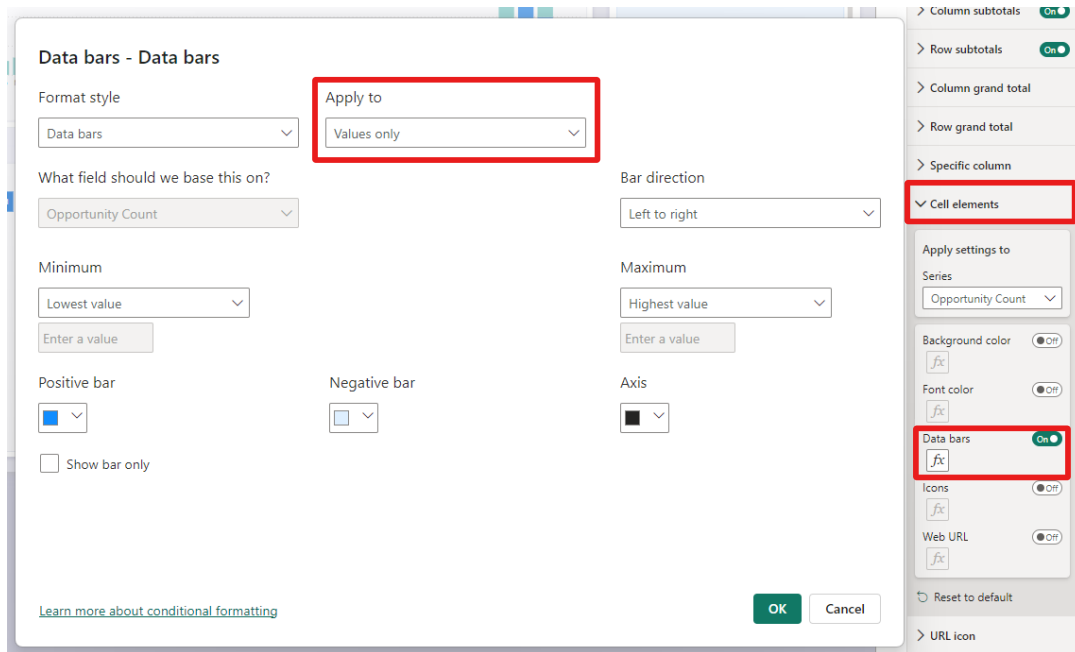
Data bars in Matrix subtotal / total conditional formatting

This Power BI release welcomes the upgrade of the data bars for Matrix and Table to apply them to values only, values and totals, or total only. This enhancement provides better control and reduces unnecessary noise to keep your tabular visuals nice and clean.

You now possess the flexibility to apply data bars to the following options:

- **Values Only:** display data bars based solely on the values within your visual
- **Values and Totals:** extend data bars to include both individual values and their corresponding totals
- **Total Only:** show data bars exclusively for the overall total.

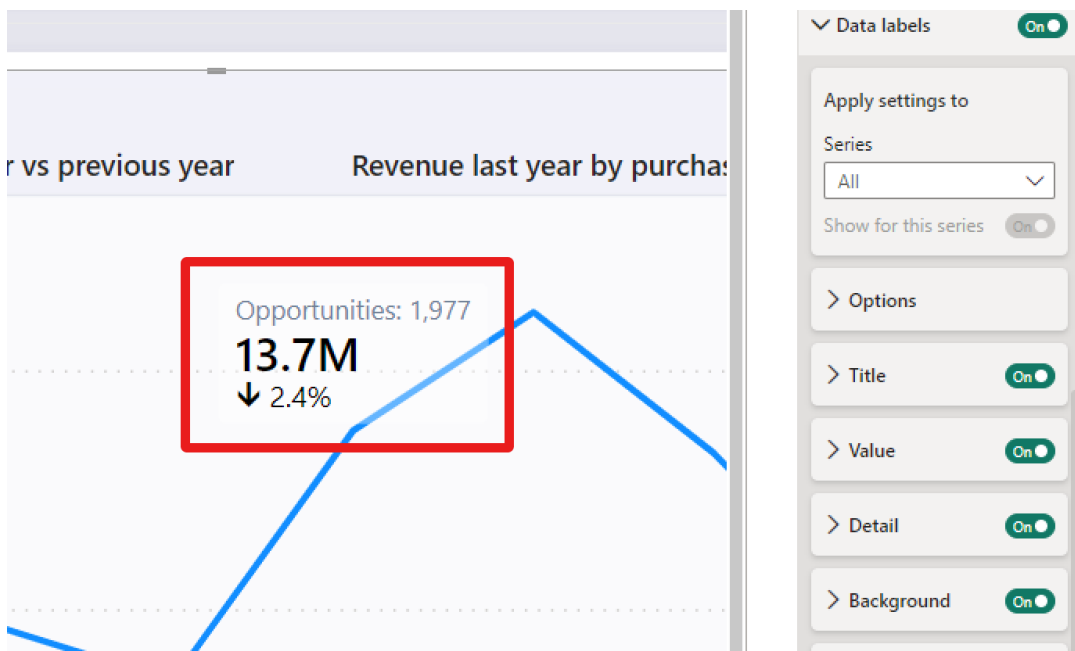
This enhancement provides better control over your tabular visuals, reducing unnecessary noise and ensuring cleaner presentation.



Data labels alignment

Significant improvements have now been made to the data labels in the Power BI charts. Now, when you use a multi-line layout with title, value and detail labels, you have the flexibility to horizontally align them. This means you can create cleaner, more organised visualisations by ensuring that your labels are neatly positioned. To take advantage of this, follow these steps:

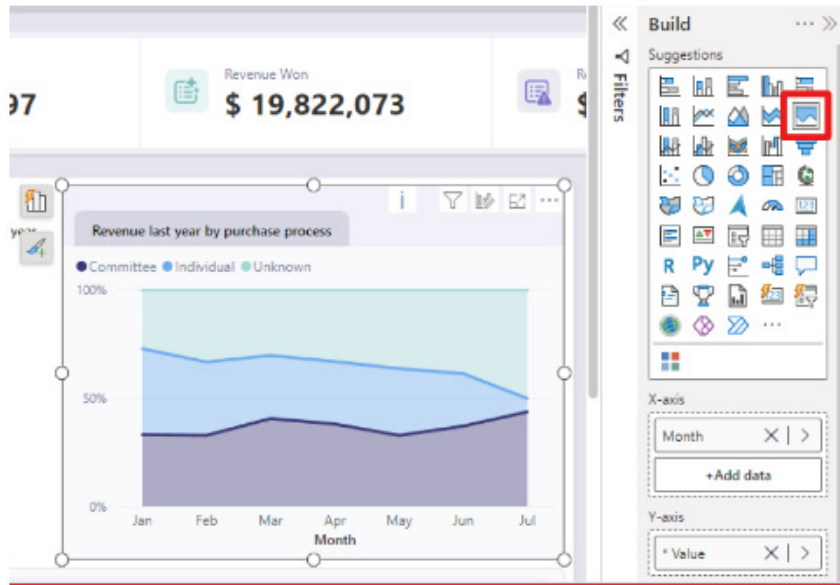
1. navigate to the Data Labels section
2. click on Layout
3. explore the Horizontal alignment options for aligning your labels.



New visual: 100% Stacked Area chart

There is a new 100% Stacked Area chart, now available in the core visuals gallery. These visuals display the relative percentage of multiple data series in stacked areas, where the total always equals 100%. It's useful

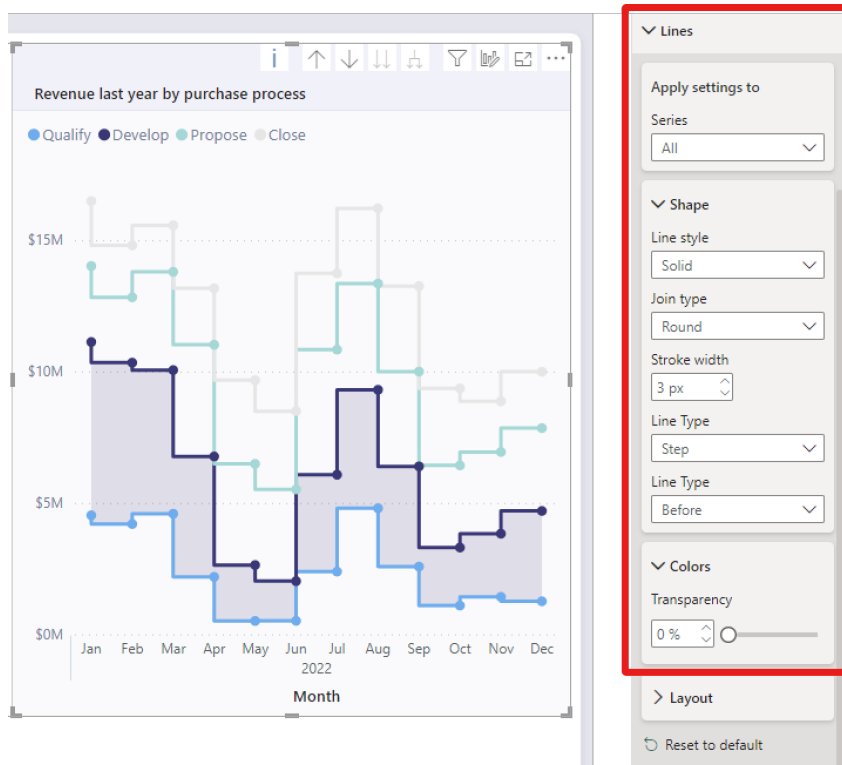
for showing the proportion of individual series to the whole and how they change over time. You may locate it in the visual gallery, on-object dialog or Format pane, right next to the Stacked Area chart.



Line enhancements

There are new line control features for Line charts. You can:

- adjust line colour transparency under **Lines -> Colors -> Transparency**
- control the colour and transparency of each series by selecting them in the 'Apply settings to' dropdown
- use Monotone and the new Cardinal smooth type for full control of smooth lines
- choose from before, centre and after step lines to align your visual with your story.



Apparently, these new line enhancements are just the beginning – there is more to come. I am trying not to get too excited.

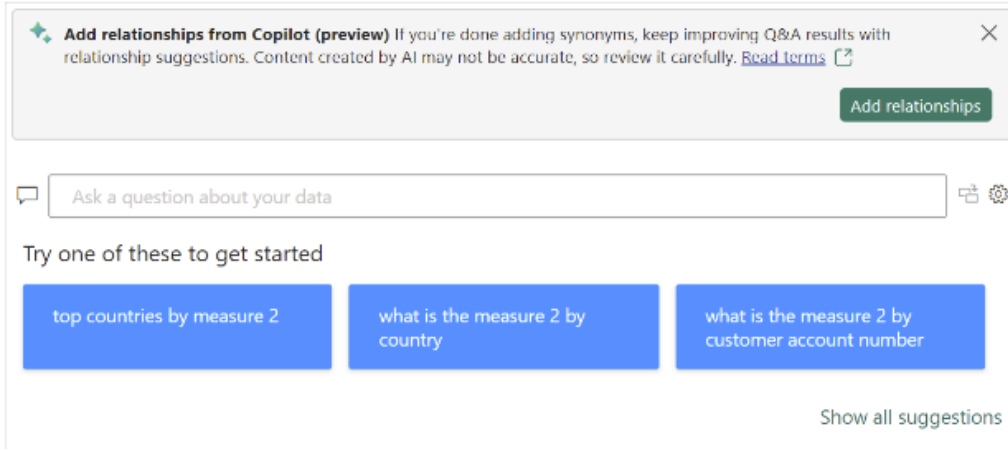
Enhanced Q&A with Copilot-generated linguistic relationships

Improving your linguistic schema is an important step in making sure that the Q&A visual can understand the wide range of questions people might ask about their data. This is why, back in September, Microsoft added a new section into the Q&A setup menu to help you add linguistic relationships to teach Q&A about words which qualify or relate your data.

Coming up with all the different words people might be using to refer to your data can take time and effort, and Power BI has been working on

ways to make that process easier. In November, Microsoft created a method to quickly generate new synonyms for the names of tables and columns in your model; this update sees the same functionality generated for linguistic relationships.

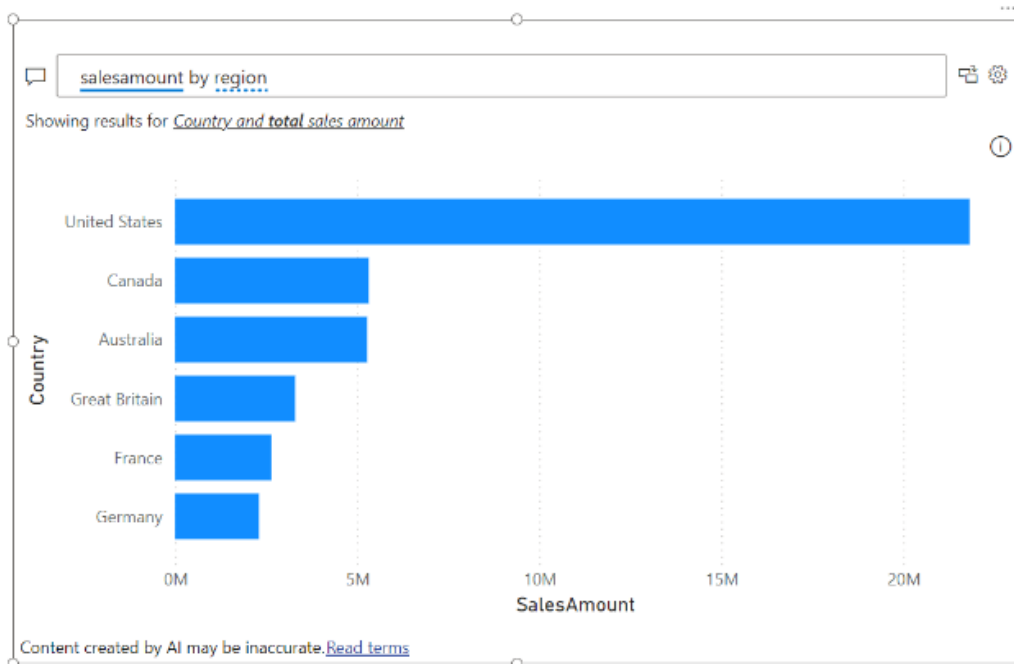
When you open a report with a Q&A visual, if you have Copilot enabled and you've already added synonyms, you'll now see a banner prompting you to get relationships with Copilot as well:



Unlike with synonyms, Copilot-generated relationships will not be used to understand natural language inputs until you have approved them, so do make sure you accept the ones which work for your model.

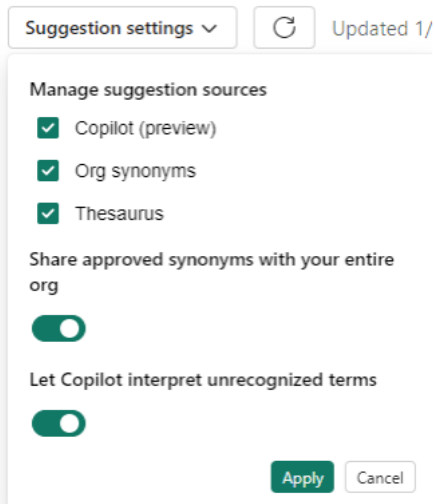
You can also now use Copilot to improve the Q&A engine's term recognition when you ask questions. This new feature will trigger when

you ask Q&A a question which uses words or phrases which Q&A doesn't recognise, but which it detects might be referring to data entities like tables or columns. Then, Copilot will also check those unknown words or phrases to see if there is any reasonable match. If so, Copilot will return the answer as a visual as though a suggested synonym had been applied.



This feature is not a replacement for synonyms. In fact, adding synonyms for the entities in your semantic model is even more important to create good matches, as they increase the surface area to check for similarities. It will widen the range of inputs Q&A will recognise, but like a multiplier, it will improve recognition for well-modelled data much better than it will for poorly modelled data.

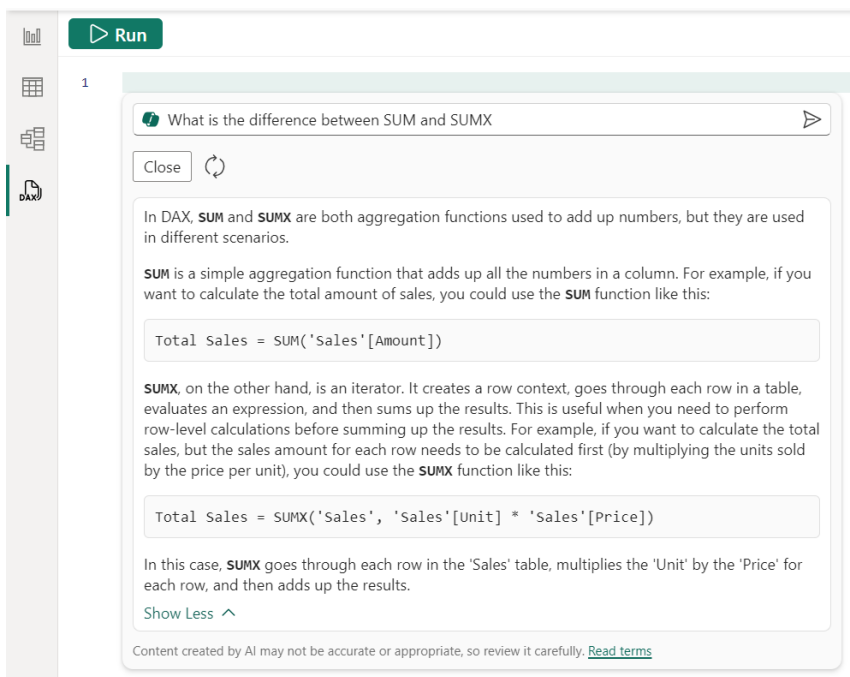
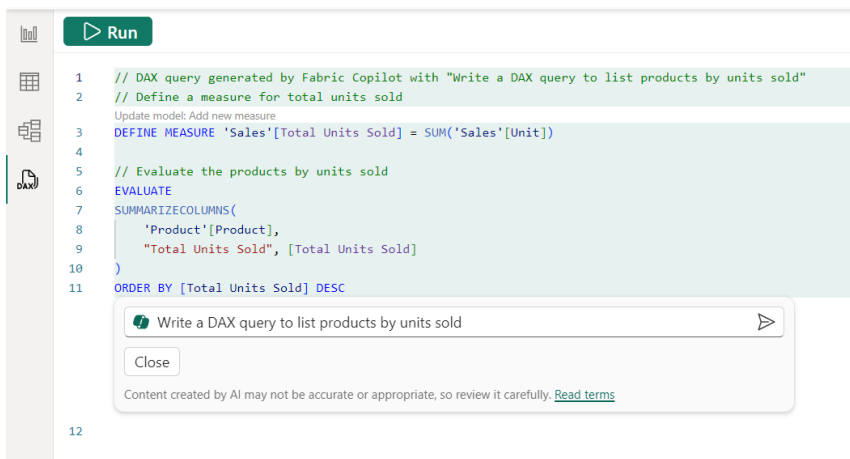
This feature will be automatically enabled when you choose to get synonyms with Copilot, but you can also turn it on or off manually in the suggestion settings menu in the Synonyms tab in Q&A setup.



Write DAX queries in DAX query view with Copilot in Preview

The DAX query view with Copilot is now available in public Preview. You may enable this feature in the Preview section of **File -> Options and settings -> Options**, click on 'DAX query view' and launch the in-line Copilot by clicking the Copilot button in the Ribbon or using the shortcut **CTRL + I**.

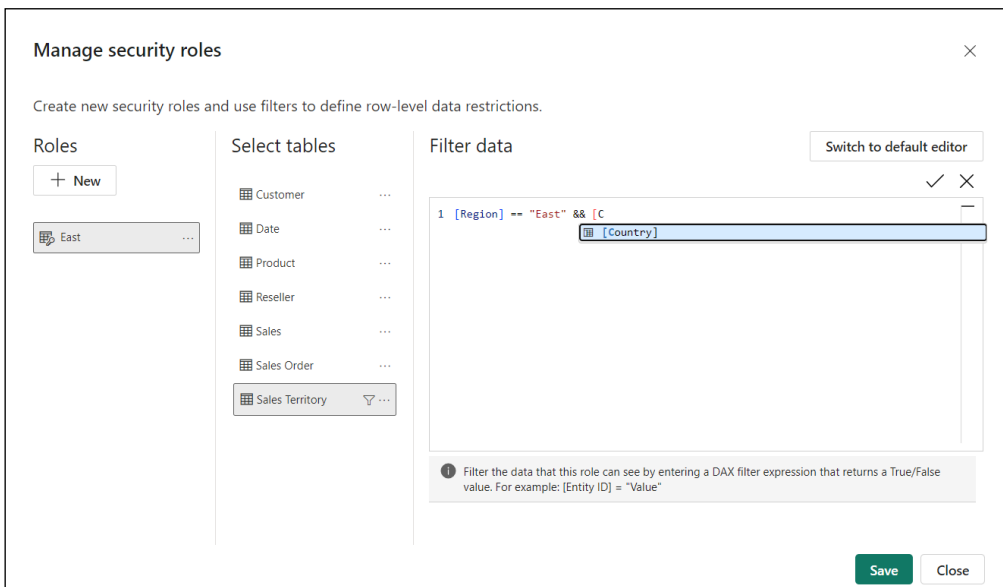
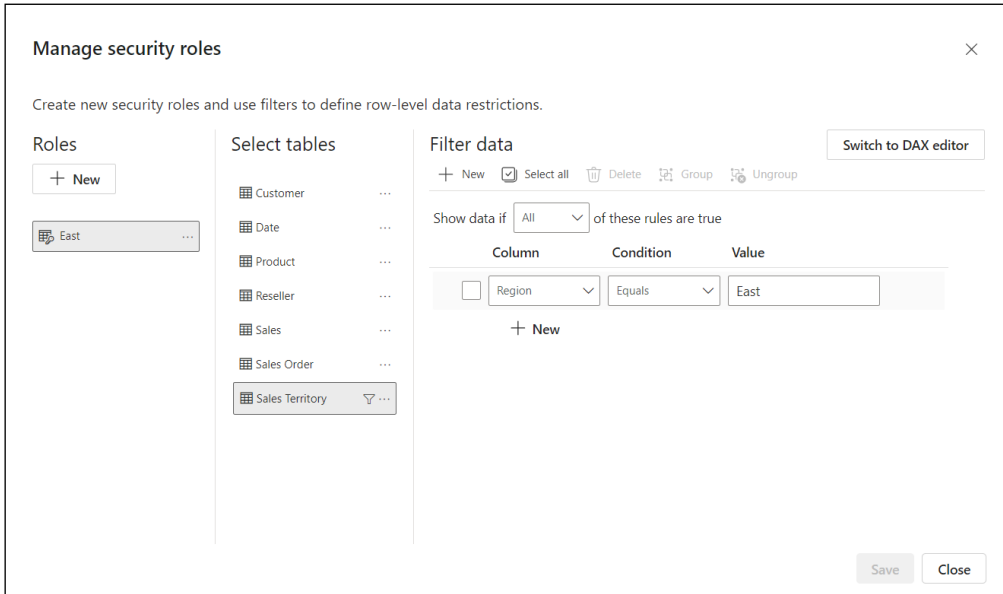
With Fabric Copilot, you can generate **DAX** queries from natural language, get explanations of **DAX** queries and functions, and even get help on specific **DAX** topics.



Enhanced Row Level Security editor is enabled by default in Preview

The enhanced Row Level Security editor is now the default experience in Power BI Desktop. With this editor, you can quickly and easily define Row Level Security (RLS) roles and filters without having to write any DAX. Simply choose 'Manage roles' from the Ribbon to access the

default drop-down interface for creating and editing security roles. If you prefer using DAX or need it for your filter definitions, you can switch between the default drop-down editor and a DAX editor.



Selection expressions for calculation groups in Preview

Calculation groups have become more powerful. With this update, Microsoft has introduced the Preview of selection expressions for calculation groups, which allow you to influence what happens in case the user makes multiple selections for a single calculation group or does not make a selection at all. This provides not only a better way to perform error handling, it also opens interesting scenarios that provide some good default behaviours, e.g. automatic currency conversion. Selection expressions are optionally defined on a calculation group and consist of an expression and an optional dynamic format expression.

This new capability comes with an extra benefit of potential performance improvements when evaluating complex calculation group items.

To define and manage selection expressions for calculation groups, you can leverage the same tools you use today to work with calculation groups. On a calculation group you will be able to specify the following selection expressions both consisting of the Expression itself and a

FormatStringDefinition:

- **multipleOrEmptySelectionExpression:** this expression has a default value of **SELECTEDMEASURE()** and will be returned if the user selects multiple calculation items on the same calculation group or if a conflict between the user's selections and the filter context occurs
- **noSelectionExpression:** this expression has a default value of **SELECTEDMEASURE()** and will be returned if the user did not select any items on the calculation group.

Here's an overview of the type of selection compared to the current behaviour that was shipped before this Preview, and the new behaviour both when the expression is defined on the calculation group and when it's not. The items in bold are where the new action differs from the previous approach.

Type of selection	Current behaviour	New behaviour without a defined selection expression	New behaviour with a selection expression defined
Single selection	Calculation group selection is applied	N/A; no change to behaviour	N/A; no change to behaviour
Multiple selection	Calculation group is not filtered	Calculation group is not filtered	Calculation group evaluates specified multipleOrEmptySelectionExpression
Empty selection	Error	Calculation group is not filtered	Calculation group evaluates specified multipleOrEmptySelectionExpression
No selection	Calculation group is not filtered	Calculation group is not filtered	Calculation group evaluates specified multipleOrEmptySelectionExpression

To illustrate, here are some examples.

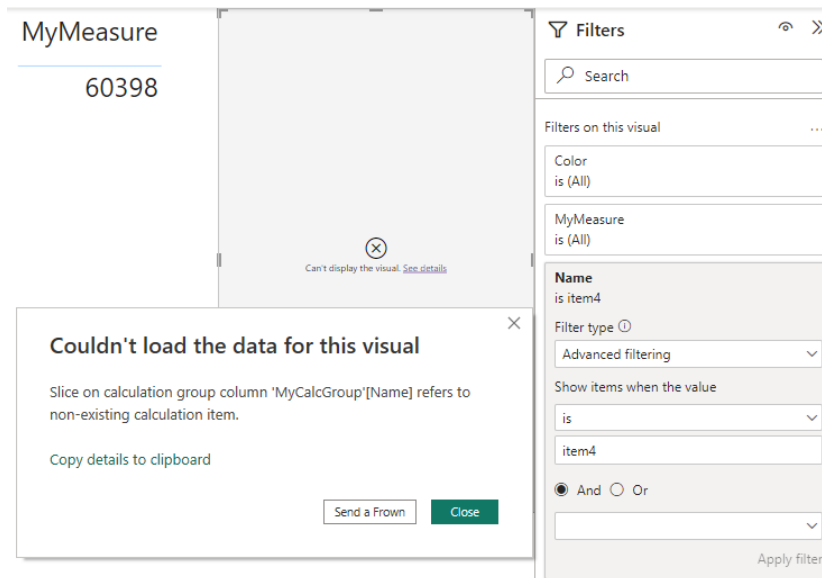
MULTIPLE OR EMPTY SELECTIONS

If the user makes multiple selections on the same calculation group, the current behaviour is to return the same result as if the user did not make any selections. In this Preview, you can specify a **multipleOrEmptySelect**

ionExpression on the calculation group. If you did, then we evaluate that expression and related dynamic format string and return its result. You can for example use this to inform the user about what is being filtered:

```
EVALUATE
{
CALCULATE (
[MyMeasure],
'MyCalcGroup'[Name] = "item1" || 'MyCalcGroup'[Name] = "item2"
)
}
-- multipleOrEmptySelectionExpression on MyCalcGroup:
IF(ISFILTERED ( 'MyCalcGroup' ),\"Filters: \"& CONCATENATEX ( FILTERS ( 'MyCalcGroup'[MyCalcGroup]
), 'MyCalcGroup'[MyCalcGroup],\", \"))
IF (
ISFILTERED ( 'MyCalcGroup' ),
"Filters: "
& CONCATENATEX (
FILTERS ( 'MyCalcGroup'[Name] ),
'MyCalcGroup'[Name],
", "
)
)
-- Returns "Filters: item1, item2"
```

In case of a conflict or empty selection on a calculation group, you might have seen this error before:



With this new behaviour, this error is consigned to history and will evaluate the **multipleOrEmptySelectionExpression** if present on the calculation group. If that expression is not defined, Power BI will not filter the calculation group.

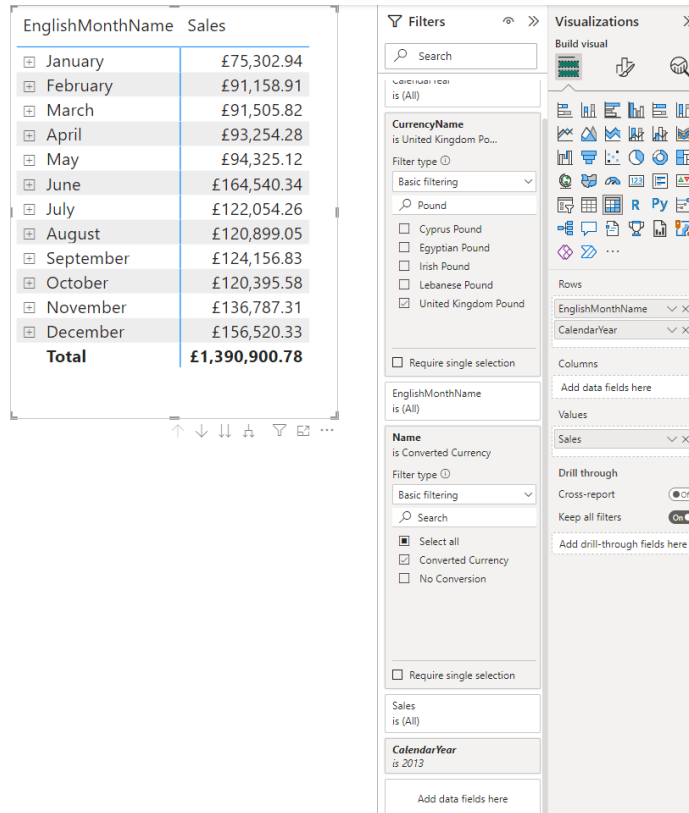
NO SELECTIONS

One of the best showcases for this scenario is automatic currency conversion. Today, if you use calculation groups to do currency conversion, the report author and user must remember to select the right calculation group item for the currency conversion to happen. With this Preview, you are now empowered to do automatic currency

conversion using a default currency. On top of that, if the user wants to convert to another currency altogether, they can still do that, but even if they deselect all currencies the default currency conversion will still be applied.

Current

Note how both the currency to convert to as well as the “conversion” calculation group item is selected.



New

Notice how the user must only select the currency to convert to.

EnglishMonthName	TotalSales
April	£43,583.20
August	£91,513.92
December	£111,623.41
February	£42,308.26
January	£45,979.26
July	£101,919.55
June	£65,833.95
March	£36,462.26
May	£43,702.75
November	£167,347.50
October	£93,221.05
September	£95,838.28
Total	£939,333.39

Filters on this visual

CalendarYear
is 2019

CurrencyName
is United Kingdom Po...

Filter type
Basic filtering

united

United Kingdom Pound

Require single selection

EnglishMonthName
is (All)

TotalSales
is (All)

Add data fields here

DAX query view improvements in Preview

Microsoft released the public Preview of DAX query view in November 2023. With this set of updates, this has been improved as follows:

- re-ordering of query tabs is now available
- the 'share feedback' link has been added to the command bar
- coach marks for DAX query view.

More **INFO DAX** functions have been added too:

- **INFO.STORAGETABLECOLUMNS()**, which is equivalent to **DISCOVER_STORAGE_TABLE_COLUMNS**
- **INFO.STORAGETABLECOLUMNSEGMENTS()**, which is equivalent to **DISCOVER_STORAGE_TABLE_COLUMN_SEGMENTS**
- **INFO.STORAGETABLES()**, which is equivalent to **DISCOVER_STORAGE_TABLES**.

Edit your data model in the Power BI Service – updates

Below are the improvements made to the data model editing in the Service Preview.

AUTODETECT RELATIONSHIPS

Creating relationships for your semantic model on the web is now easier using autodetect relationships. Simply go to the Home tab on the Ribbon and select the 'Manage relationships' dialog. Then, choose 'Autodetect' and let Power BI find and create relationships for you.

Manage relationships

+ New relationship Autodetect Edit Delete Filter

From: table (column)	Relationship	To: table (column)	Status
Product (Manufacturer)	*-1-1	Manufacturer (Manufacturer)	Active
SalesFact (ProductID)	*-1-1	Product (ProductID)	Active
SalesFact (Zip)	*-1-1	LocationDim (Zip)	Active
Sentiment (Manufacturer)	*-1-1	Manufacturer (Manufacturer)	Active
Sentiment (ProductID)	*-1-1	Product (ProductID)	Inactive
Sentiment (zip)	*-1-1	LocationDim (Zip)	Active

Close

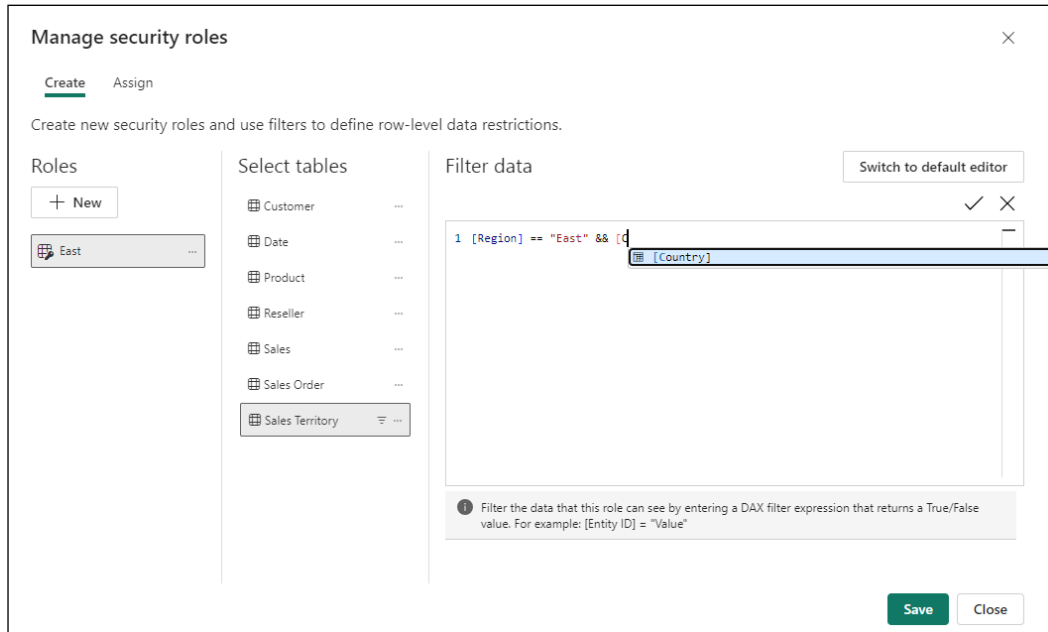
SORT BY COLUMN

Within the web, you can now edit the sort by property for a column in your semantic model.

ROW LEVEL SECURITY

Microsoft has made several improvements to the Row Level Security (RLS) editor in the web. In the DAX editor you can now perform the following actions:

- use IntelliSense to assist in defining your **DAX** expression
- verify the validity of your **DAX** expression by clicking the check button
- revert changes to your **DAX** expression by selecting the X button.

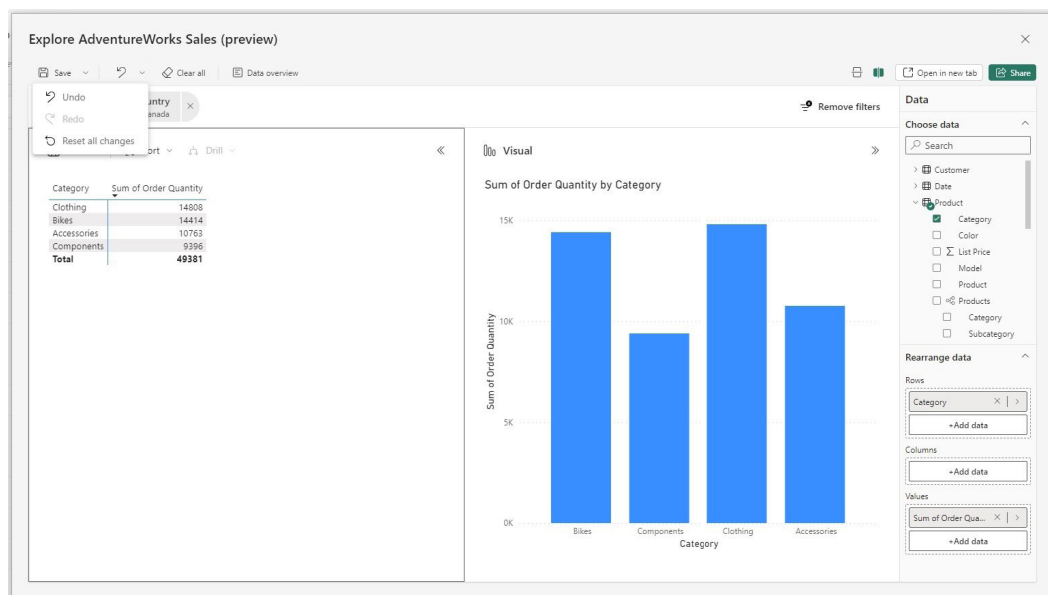


Undo / Redo, Clear all, and New filter cards in Explore

This update adds a few new features to the new Explore experience.

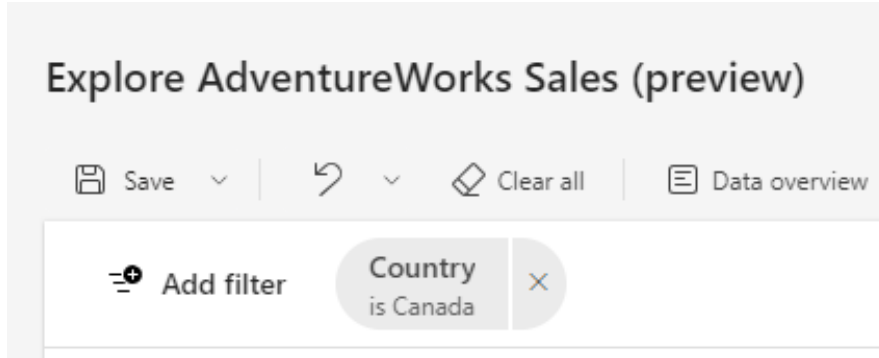
UNDO / REDO

Now it's simple to undo your previous action or use the 'Reset all changes' to go back to the last save state of your exploration. Do note though that if you haven't saved your exploration yet, then reset will clear your canvas back to blank. Be careful!



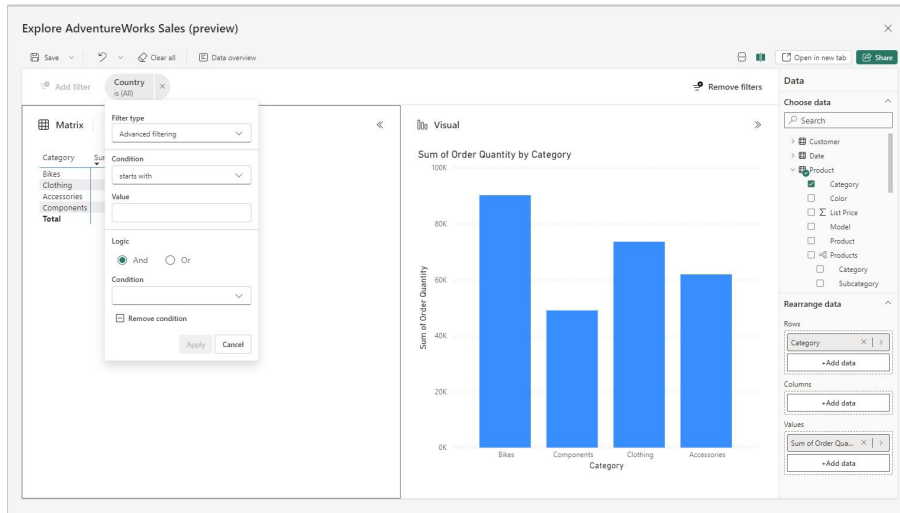
CLEAR ALL

The new 'clear all' feature allows you to wipe your canvas back to blank. This works great when using Explore as a whiteboarding space. This is made simple with the new 'clear all' option.



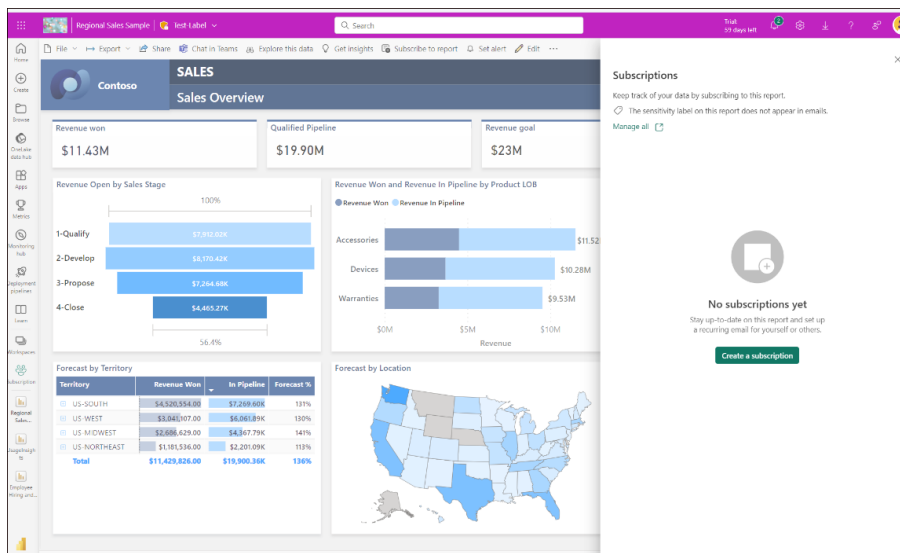
NEW FILTER CARD STYLING

When using the filtering experience in Explore you'll now notice an update to the Filter cards style and readability.

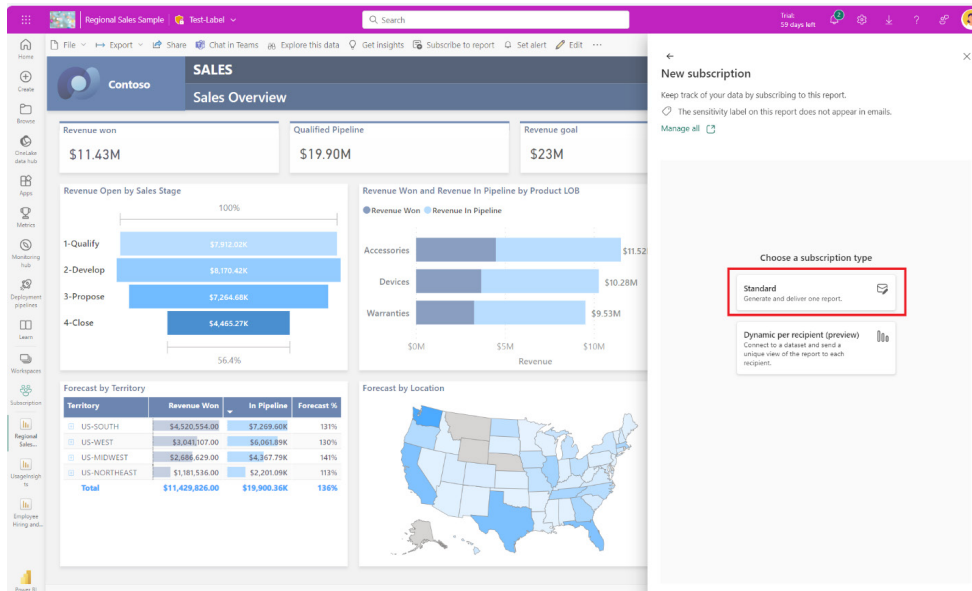


Deliver report subscriptions to OneDrive SharePoint in Preview

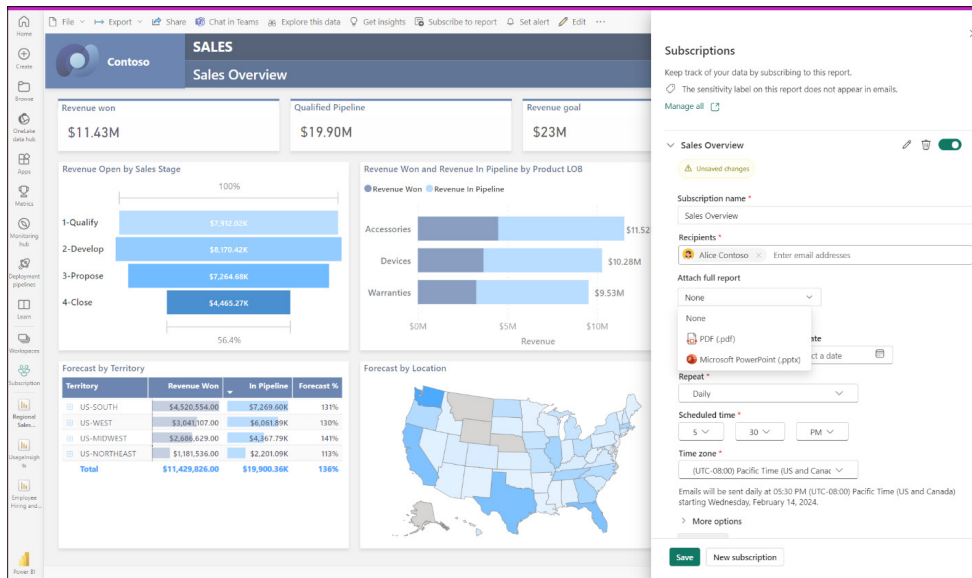
You can now send subscriptions to OneDrive SharePoint (ODSP). With this update, all your large reports, both **PBIX** and paginated reports can be sent to ODSP. At this time, the workspace must be backed by a premium capacity or equivalent Fabric capacity.



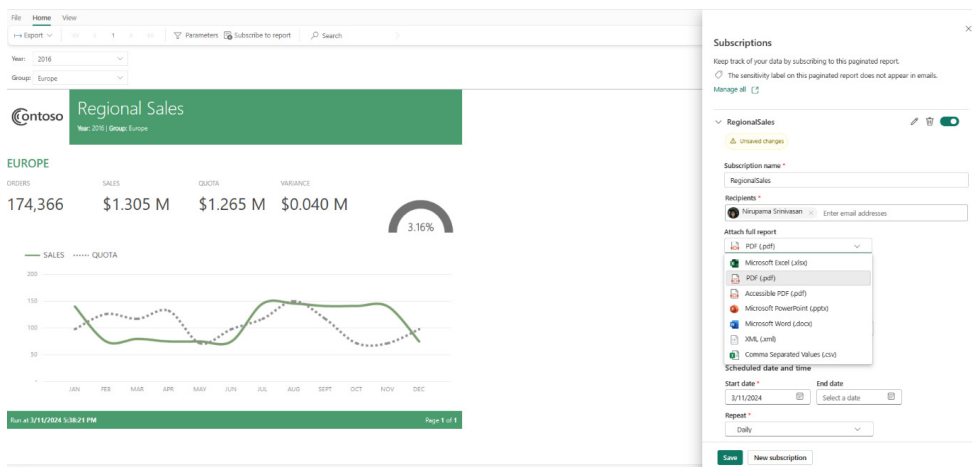
Power BI currently supports “Standard” subscriptions.



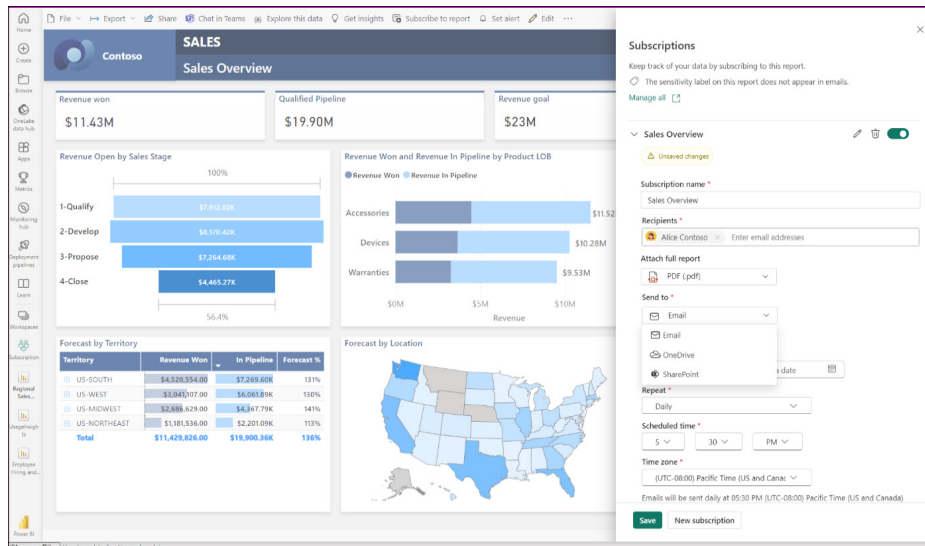
You need to select the 'Attach full report' option.



This update supports more output formats for paginated reports.



Once you select the output format, you can select the OneDrive or SharePoint option, the location and enter the subscription schedule to have your report delivered.



This feature will not be supported in Sov clouds whilst in Preview.

Storytelling in PowerPoint: improved image mode in the Power BI add-in for PowerPoint

Microsoft has made saving Power BI content as an image simpler and more powerful.

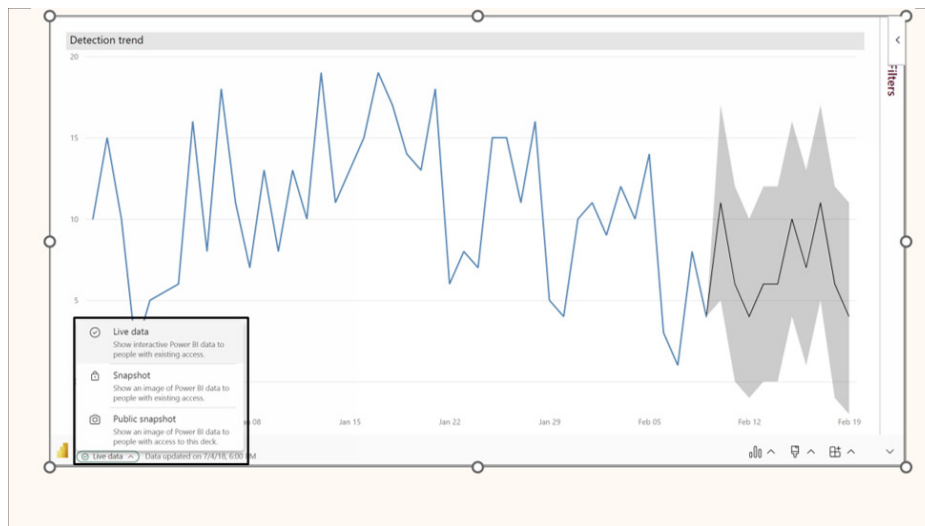
First, Power BI has added a new dropdown menu to the add-in's footer. In that menu, you may choose whether you want to see live data or a snapshot. Thus, it is now much easier to find where to switch between live data and a static image.

Second, for snapshots, you now have two options:

1. **Public snapshot:** anyone who can view the presentation can view the image
2. **Snapshot:** only those who have permission to view the report in Power BI will be able to see the snapshot.

Third, Power BI has disabled the default snapshot, so that the slide thumbnail doesn't show the image by default (this also applies when you copy and paste the slide into an email for example), but only after the add-in is loaded and the required permissions have been checked.

Lastly, this setting is also honoured when you open the presentation in PowerPoint for the web. You still cannot change a live view into a snapshot in PowerPoint for the web, but if you or someone else has changed the view to snapshot in the PowerPoint desktop application, this will be respected, and you will see the snapshot also in PowerPoint for the web.



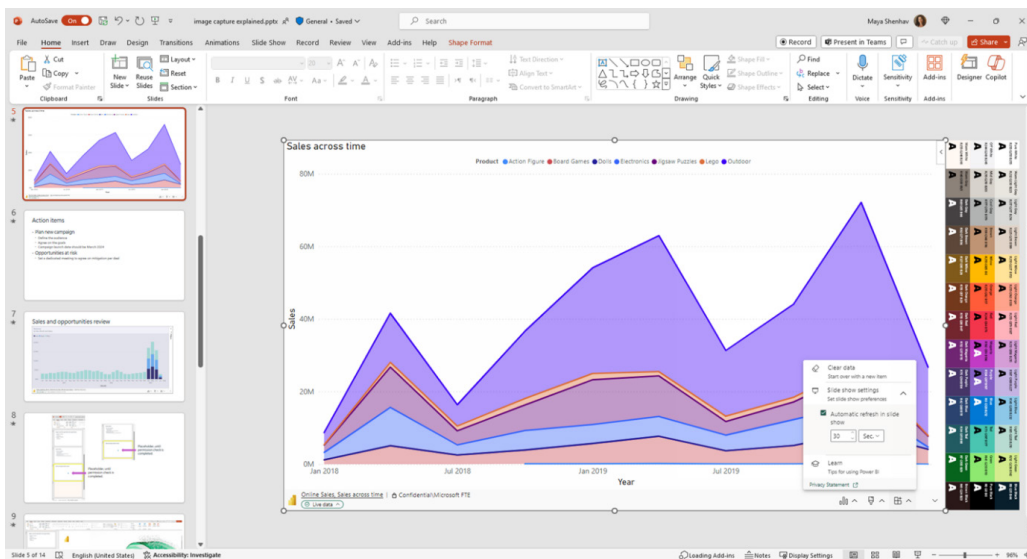
Storytelling in PowerPoint: continuous slide show auto refresh

PowerPoint allows you to continuously playback a presentation. This is especially useful when you want to present information in public displays without any human interaction.

If a presentation that is running continuously has slides that include the Power BI add-in, the data in the add-in might become outdated, since the add-in gets the data from Power BI when the slide is loaded or when

the user manually refreshes the data being presented.

With the new automatic refresh in slide show feature, you can set the add-in to automatically pull fresh data from Power BI while the presentation is in slide show mode, ensuring that the presentation will always show the most recent data.



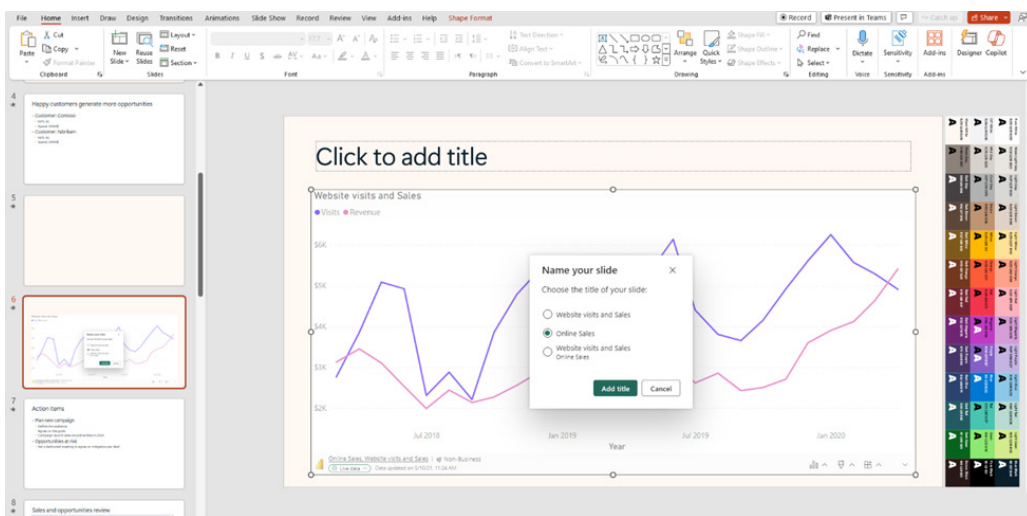
To enable automatic refresh, go to the add-in footer, select Add-in options, choose 'Slide show settings', check 'Automatic refresh in slide show' and set the desired frequency.

It should be noted that auto refresh only happens in slide show mode and not while you're editing the presentation.

Storytelling in PowerPoint: auto populating the slide title

When you add the Power BI add-in to an empty slide that doesn't have a title yet, the Power BI add-in is there to assist. It offers you suggestions for the slide title based upon the content of you add-in. The title can be

the report name, the page / visual name, or both. Just select the desired option and hit 'Add title'.



Introducing the Fabric metadata scanning sample application

The new Fabric metadata scanning application is now available. This sample application builds upon the metadata scanning capabilities of Fabric's set of Admin REST APIs collectively known as the scanner APIs. This new app can be used as a reference for administrators interested in utilising the Scanner API to catalogue and report on all the metadata of their organisation's Fabric items.

The Fabric metadata scanning sample app handles all the steps for calling the scanner API including authentication, parallelism, throttling

and incremental scanning. In addition, it provides a central configuration file which can be easily modified to suit the specific needs of the caller. Currently, authentication is supported both by using a service principal and a delegated token.

The app is available as a Microsoft open-source project, and therefore the company is open for suggestions and improvements to this new feature.

Dynamic Subscriptions for Power BI and paginated reports

It has also been announced that you may now send dynamic per recipient subscriptions to up to 1,000 recipients instead of the earlier limit of 50 recipients from the data in the Power BI semantic model. For existing subscriptions, Power BI will automatically send subscriptions up

to 1,000 recipients if your Power BI semantic model contains that many rows of data. You need to edit the subscription if you don't want to automatically send subscriptions.

Workspace and folders are Fabric entities, which means that you can add items that are not necessarily Power BI items to a workspace. However, the Power BI Mobile apps only support a subset of Power BI

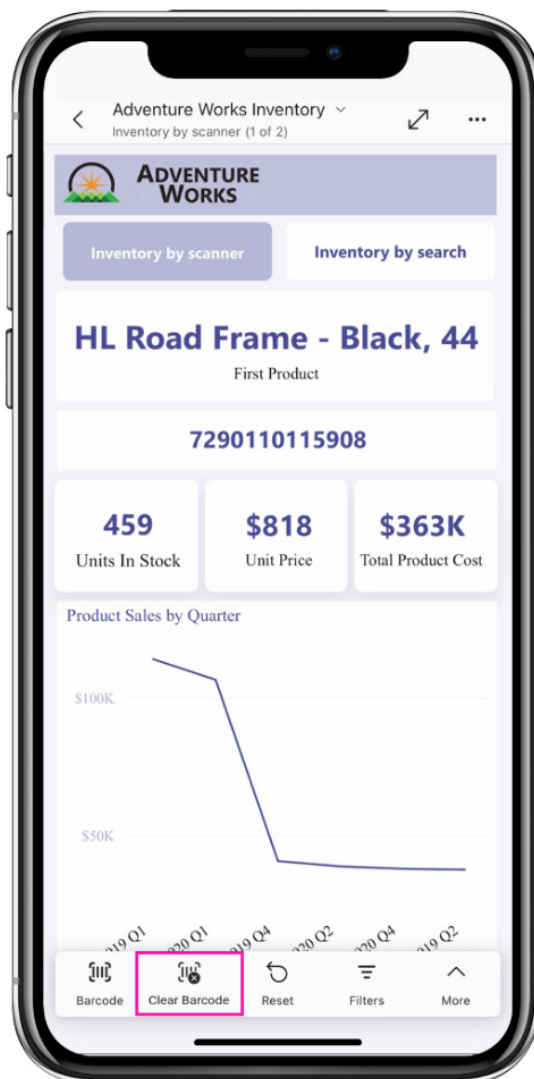
items. Therefore, only the Power BI item will be accessible when you are browsing the folder content from the app. If a folder contains only non-Power BI items, it will appear empty in the mobile application.

New 'Clear barcode' action in the report footer

When a field in your model is marked as a barcode, you can use your mobile device camera to scan the barcodes of real objects to filter reports that are built on this model. This feature is extremely useful for retail, where you can scan the barcode on a piece of merchandise to get a report showing data about the item directly in your mobile app

(for example, inventory information, product selling data).

To make it easier and more intuitive to use barcodes, Power BI has added a new button to the report footer that makes it a one-click action to clear any previously scanned barcode from the report's filter.



Open Power BI items in full screen mode

The aim of the Power BI Mobile apps is to always always keep in mind the frontline workers who need quick access to their content. In this update, it has been made possible to open Power BI items on full screen, so that users may view their data more easily.

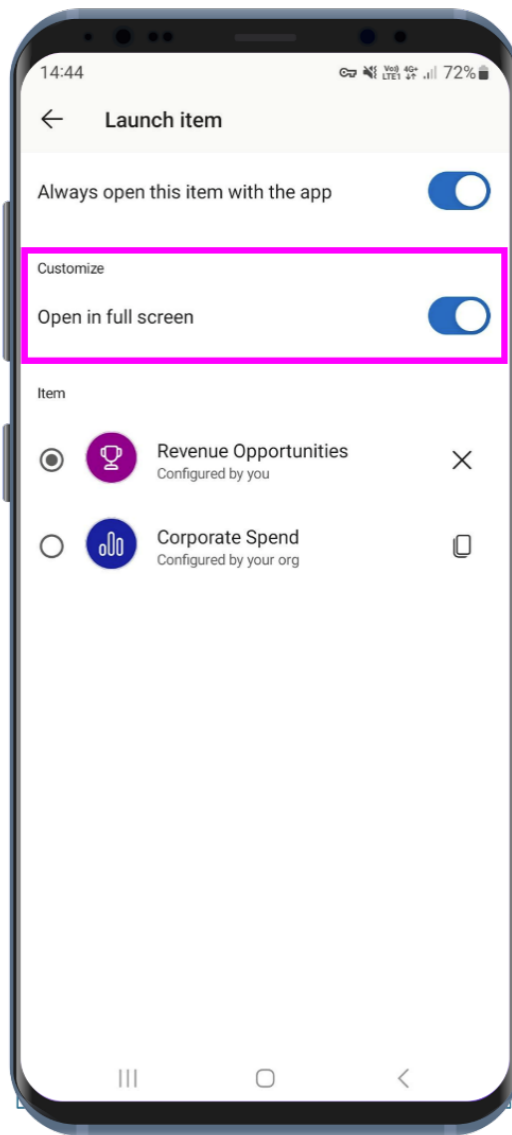
Opening an item on full screen is supported both for launch items and when using a universal link.

A launch item is a Power BI item (report, page, app, etc.) that the user has selected to automatically open when they open the app. Now, you may also tell the Power BI Mobile app to open this item in full screen mode.

To set a launch item to open in full screen mode, go to **Settings -> Launch item** and enable the 'Open in full screen' toggle.

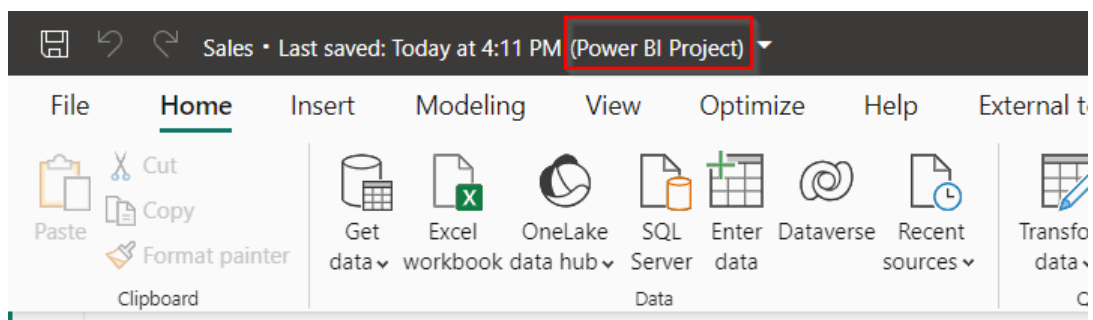
Using an MDM tool that supports an AppConfig file, mobile device administrators can also configure a launch item to be opened in full screen mode for their users.

You can also add the query parameter? fullscreen=1 to a Power BI item's link. When you use a link with this parameter on your mobile device, the mobile app will open the item in full screen mode.

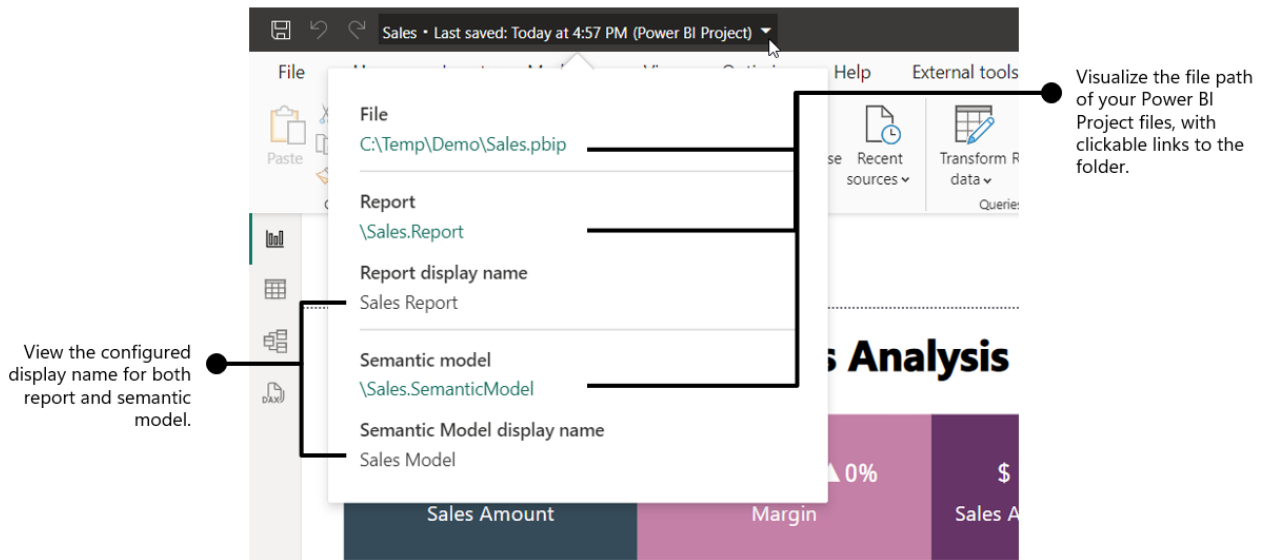


New title flyout for Power BI Desktop developer mode

You can quickly recognise when you are working on a Power BI Project (**PBIP**) by looking at the Title bar:



If you click on the Title bar, you will see a new flyout that is specific for Power BI Project. This lets you easily locate the Power BI Project files as well as the display name settings for the report and the semantic model. You can also open the folder in File Explorer by clicking on the paths.



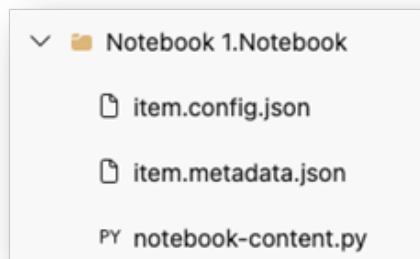
Rename to 'Semantic Model' in Power BI Project files

Following the rename to 'Semantic Model' announced last November, Power BI Project files (**PBIP**) also adhere to that naming change. Now, when saving as a **PBIP**, the following changes will be verified:

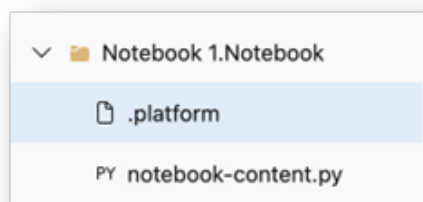
- Semantic Model folder, "`*. Dataset\`", will be saved as "`*.SemanticModel\`". This is only applied to new **PBIP** files; existing will keep the current folder name
- "`definition.pbidataset`" file is renamed to "`definition.pbism`".

System file updates for Git integration

Currently, when synchronising Fabric items with Git, every item directory is equipped with two [2] automatically generated system files, **item.metadata.json** and **item.config.json**. These files are vital for establishing and maintaining the connection between the two platforms.



As part of efforts to simplify the integration with Git, Power BI has consolidated these files into a single system file: **.platform**. This new system file will encompass all the attributes that were previously distributed between the two files.



When you make new changes to Git, your system files will be updated automatically to the new version in conjunction with your modifications. Both your own changes and the new file updates will show as part of the

commit operation. Additionally, any new projects exported from Power BI desktop via developer mode will adopt the new system file format. Beyond these adjustments, there will be no impact on your Git workflow.

Hierarchical Identity filter API

API 5.9.0 introduces a new filter API. This API allows you to create a visual that can filter matrix data hierarchically based on data points. This is useful for custom visuals that leverage group-on keys and allow hierarchical filtering using identities.

New visuals in AppSource

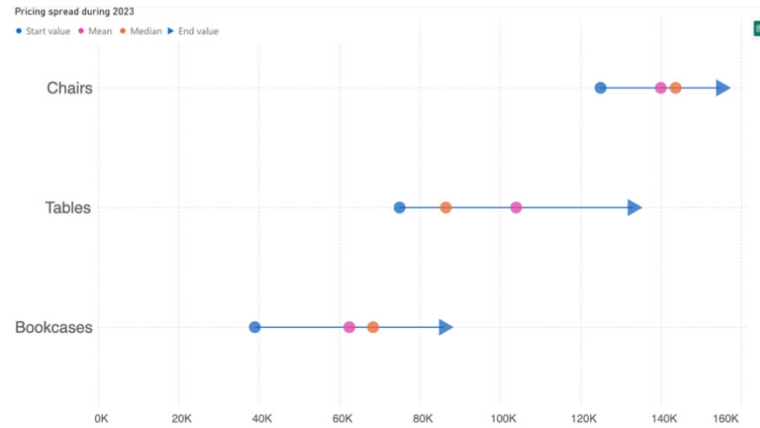
Latest visuals include:

- CloudScope Image
- Donut Chart image
- neas-spc
- orcaviz-enterprise
- Stacked Insights
- Untap Text Box
- Waterfall – What's driving my variation?
- Waterfall-Visual-Extended.

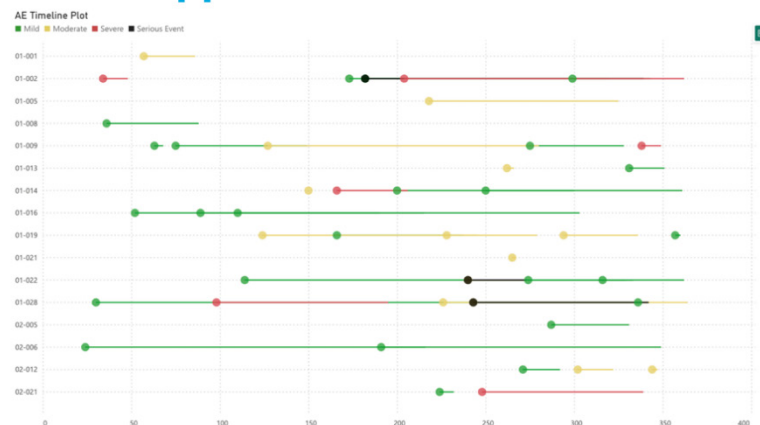
Dumbbell Bar chart by Nova Silva

In the latest release, the capability to display multiple dumbbell bars in a single row has been introduced, allowing for the presentation of more than two values. This update opens new possibilities, including the creation of the Adverse Event Timeline plot, or AE Timeline.

Dumbbell Bar Chart: unlimited number of markers...



...and support for the AE Timeline Plot.



The AE Timeline serves as a graphical representation of the timing of adverse events in clinical trials or studies. Its primary objective is to visually convey when adverse events occur concerning the timing of treatment or exposure. Widely used in medical research, especially

during safety data analysis in drug development, the AE Timeline is now available within Power BI.

You may download it from AppSource.

Date Picker by Powerviz

The Date Picker visual offers a modern calendar view, Presets, Pop-up mode, Default Selection, Themes, and more. The 'First Day of Week' option was added in the recent version update.

Key features include:

- **Display Mode:** choose between Pop-up and Canvas modes
- **Presets:** many commonly used presets like Today, Last Week, YTD, MTD or create your preset using field
- **Default Selection:** control the date period selected when the user refreshes or reopens the report
- **Filter Type:** choose between Range and Start / End types
- **Month Style:** select single- or double-month date slicer
- **Multiple Date Ranges:** flexibility to select multiple date ranges
- **Themes:** 15+ pre-built themes with full customisation
- **Holidays and Weekends:** customise holidays / weekends representation
- **Import / Export JSON:** build templates and share your designs.

You can try Date Picker for free from AppSource.

Date Picker

MOST ADVANCED DATE SLICER FOR POWER BI
WITH CALENDAR VIEW, DEFAULT SELECTION, PRESETS, THEMES AND FULL CUSTOMIZATION

Canvas/Pop-up

Start/End Style

Presets

Holidays/Weekends

Monet 15+ Themes

Multiple Date Ranges

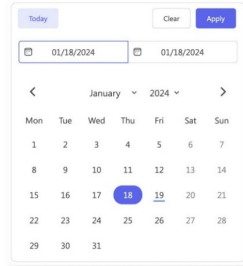


MOST ADVANCED DATE SLICER FOR POWER BI

WITH CALENDAR VIEW, DEFAULT SELECTION, PRESETS, THEMES AND FULL CUSTOMIZATION



First Day of the Week



First Day Of Week

- Monday
- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

Drill Down Combo PRO

Drill Down Combo PRO lets report creators build impressive charts of categorical data. You may choose from multiple chart types and create Column, Line, Area and their combination charts. You can use various customisation options to modify your chart whilst enhancing the readability of your data with features like conditional formatting and dynamic thresholds.

Main features include:

- **conditional formatting:** compare results against forecasts by automatically adjusting formatting based on a numerical value
- **full customisation:** customise x and y axes, the legend, outline and fill settings
- **choose normal, 100% proportional, or zero-based stacking**
- **set up to four [4] static and / or dynamic thresholds** to demonstrate targets
- **customise multiple series simultaneously** with series and value label defaults.

Popular use cases include:

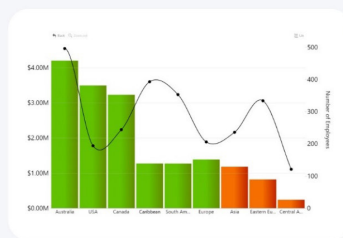
- **Sales and marketing:** sales strategies, results, marketing metrics
- **Human resources:** hiring, overtime and efficiency ratios by department
- **Accounting and finance:** financial performance by region, office or business line
- **Manufacturing:** production and quality metrics.



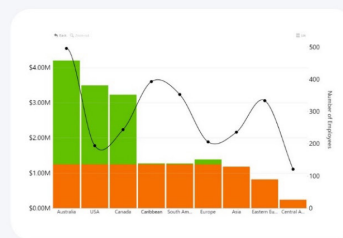
Drill Down Combo PRO



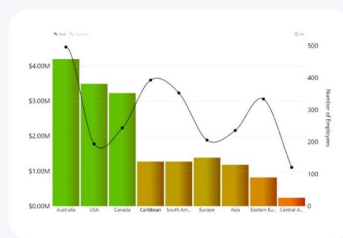
Color Mode - Solid H Color



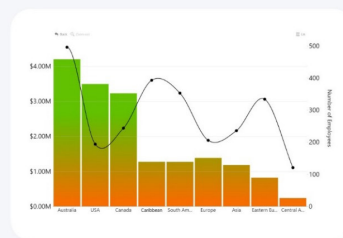
Color Mode - Solid V Color



Color Mode - Stepped Color



Color Mode - Gradient



zoomcharts.com/powerbi

Financial Reporting Matrix by Profitbase

In this visual, users are now able to specify which rows should be classified as cost-rows, which will make it easier to get the conditional formatting of variances correctly:

	Actuals	Budget	Var	Var %	Cost?
Sales	24,880,850	25,673,618	-792,768	3.09 %	
Other Operational Income	-146,000	-144,269	-1,731	-1.20 %	
Total Operating Income	24,734,850	25,529,349	-794,499	1.89 %	
Cost of Goods	3,309,090	3,185,978	123,112	3.86 %	1
Change in stock WIP FG	-	-	-	-	1
Payroll and social Cost	28,177,868	33,069,772	-3,891,904	-11.77 %	1
Other Operating Expenses	5,178,695	5,516,641	-338,146	-6.13 %	1
Total Operating Expenses	37,665,653	41,772,591	-4,106,938	-14.03 %	1
Operating Profit	-12,930,803	-16,243,242	3,312,439	15.92 %	
Operating Margin	-52.3%	-63.6%	-416.9%	843.37 %	

Selecting a row, and ticking 'is cost' will tag the row as cost. This can be used in conditional formatting to make sure that positive variances on expenses are a bad for the result, while a positive variance on an income row is good for the result.

The new version also includes more flexibility in measuring placement and column subtotals.

Measures can be placed:

- default (below column headers)
- above column headers
- in rows.

Default measure placement									
	Company 1			Company 2			Company 3		
	Actuals	Budget	Variance	Actuals	Budget	Variance	Actuals	Budget	Variance
Sales	13,355,932	14,040,248	-684,316	-	58,094	-58,094	18,390,342	18,701,672	-311,330
Other Operational Income	600,914	741,859	-140,945	-	-	-	201,520	209,085	-7,565
Cost of Goods	3,408,758	3,667,743	-258,985	780	722	58	1,582,139	1,566,869	15,270
Payroll and social Cost	-1,979,217	-2,219,364	240,147	5,364,677	4,847,746	516,931	13,479,555	16,746,544	-3,266,989
Other Operating Expenses	1,999,558	2,045,475	-45,917	33	41	-8	6,164,159	6,374,563	-210,404

Measure placement above column headers									
	Actuals			Budget			Variance		
	Company 1	Company 2	Company 3	Company 1	Company 2	Company 3	Company 1	Company 2	Company 3
Sales	13,355,932	-	18,390,342	14,040,248	58,094	18,701,672	-684,316	-58,094	-311,330
Other Operational Income	600,914	-	201,520	741,859	-	209,085	-140,945	-	-7,565
Cost of Goods	3,408,758	780	1,582,139	3,667,743	722	1,566,869	-258,985	58	15,270
Payroll and social Cost	-1,979,217	5,364,677	13,479,555	-2,219,364	4,847,746	16,746,544	240,147	516,931	-3,266,989
Other Operating Expenses	1,999,558	33	6,164,159	2,045,475	41	6,374,563	-45,917	-8	-210,404

Measure placement in rows			
	Company 1	Company 2	Company 3
Sales			
Actuals	13,355,932	-	18,390,342
Budget	14,040,248	58,094	18,701,672
Variance	-684,316	-58,094	-311,330
Other Operational Income			
Actuals	600,914	-	201,520
Budget	741,859	-	209,085
Variance	-140,945	-	-7,565

If you have multiple fields showing on your column headers, you can now decide which of these fields you want a column subtotal for. This is in addition to the already existing features of the Financial Reporting Matrix:

- adding custom rows
- applying company / customer specific themes
- expand / collapse columns
- conditionally hide columns *and more*.

Highlighted new features include:

- new Format pane design
- measure placement – in rows
- select column subtotals
- row options.

You can get the visual from AppSource.

Horizon chart by Powerviz

An Horizon chart is an advanced visual, for time-series data, revealing trends and anomalies. It displays stacked data layers, allowing users to compare multiple categories while maintaining data clarity. Horizon charts are particularly useful to monitor and analyse complex data over time, making this a useful visual for data analysis and decision-making.

Key features include:

- **Horizon styles:** choose Natural, Linear or Step with adjustable scaling
- **Layer:** layer data by range or custom criteria; display positive and negative values together or separately on top
- **Reference line:** highlight patterns with x-axis lines and labels
- **Colours:** apply 30+ color palettes and use FX rules for dynamic colouring
- **Ranking:** filter Top / Bottom N values, with 'Others'
- **Gridline:** add gridlines to the x and y axes
- **Custom ToolTip:** add highest, lowest, mean and median points without additional DAX
- **Themes:** save designs and share seamlessly with JSON files.

Other features included are ranking, annotation, grid view, show condition and accessibility support.

Business use cases include time series data comparison, environmental monitoring and anomaly detection. You can try Horizon chart for free from AppSource.



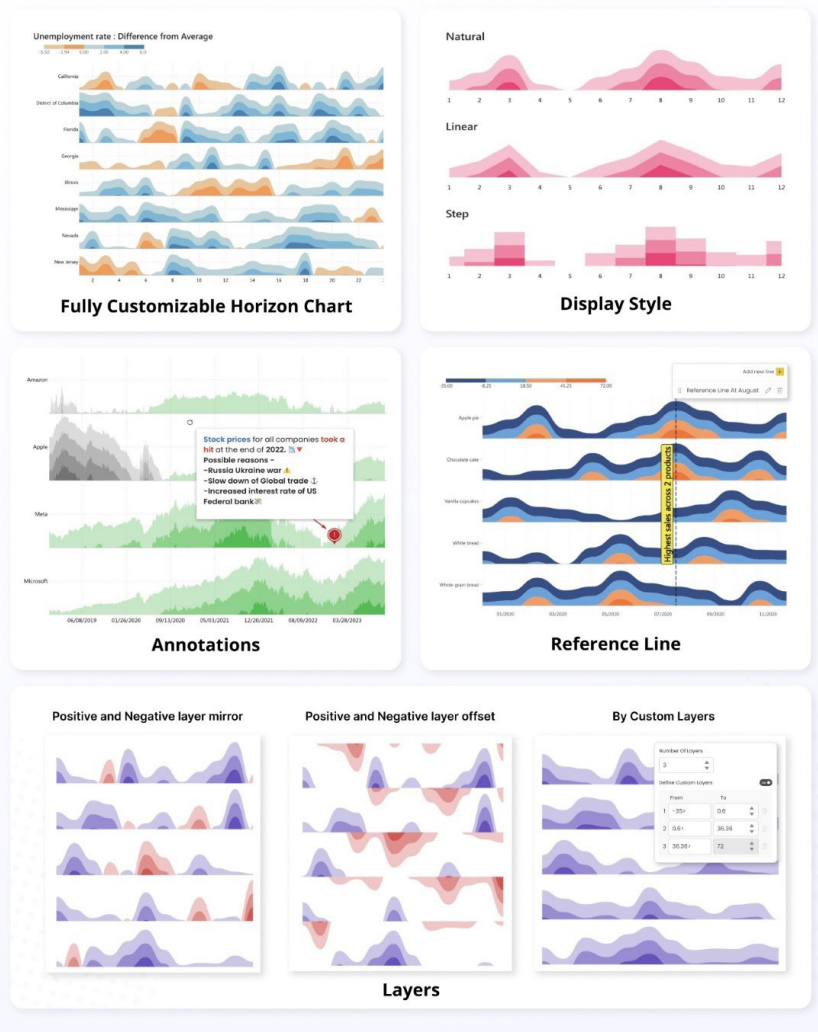
Horizon Chart



Powerviz
www.powerviz.ai

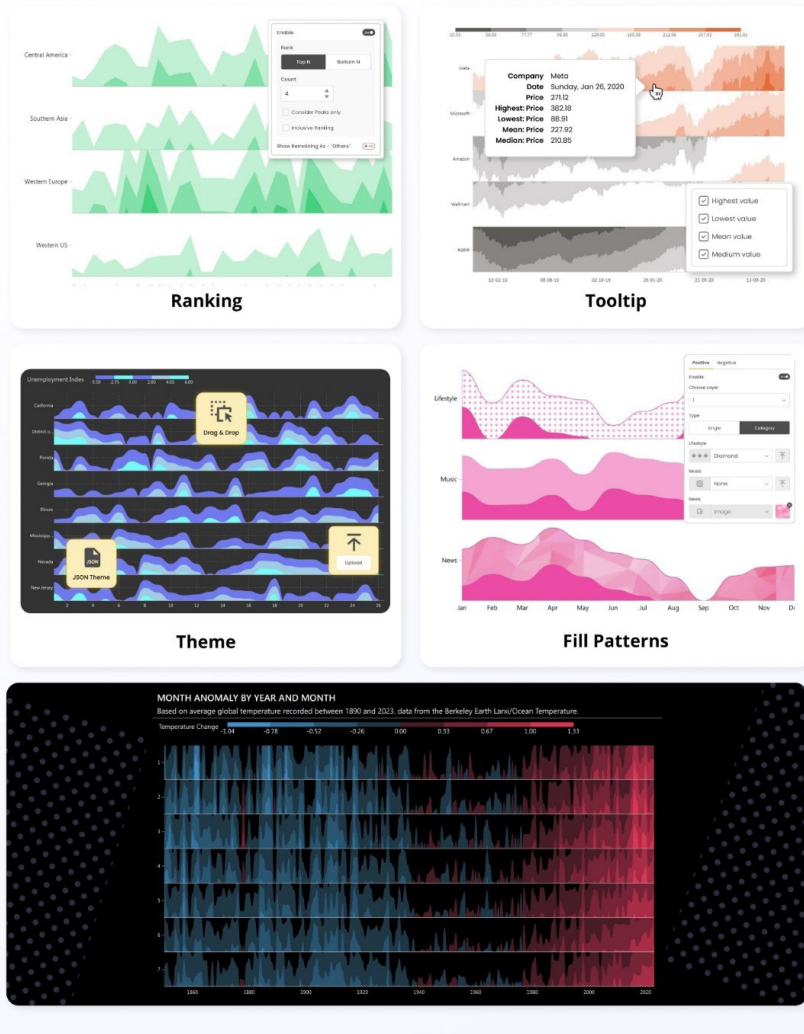
INTRODUCING HORIZON CHART BY POWERVIZ

Visualize time series data with layered area chart stacked vertically to compare multiple categories.



INTRODUCING HORIZON CHART BY POWERVIZ

Display style, Custom layer, Reference line, 30+ Palettes, Custom Tooltip, Conditional formatting & More.



Drill Down Scatter PRO by ZoomCharts

ZoomCharts has just launched the latest addition to their suite of custom visuals – Drill Down Scatter PRO. It provides all the features you would expect from a Scatter chart visual, with the ability to drill down. Simply click on a data point and see all the values underneath it.

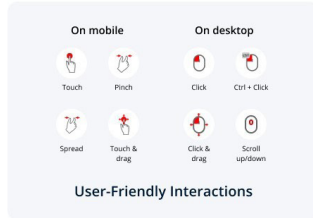
This way, you can quickly find your answers while also gaining a full understanding of where they come from. Furthermore, the visual’s user interface (UI) is designed to be smooth and user-friendly for PCs and touch devices with cross-chart filtering.

Main features:

- **Drill down:** create a multi-level hierarchy and drill down with just a click
- **Dynamic formatting:** apply custom marker colours, shapes or images to each data point directly from data
- **Trendlines:** show a linear or polynomial regression line on the chart
- **Thresholds:** display up to four [4] line or area thresholds on each axis
- **Area shading:** highlight up to eight [8] custom areas with rectangles or ellipses.

POWERFUL, YET USER-FRIENDLY

Create incredible and feature-packed scatter charts, now with the ZoomCharts signature drill down experience.



CUSTOMIZE EVERY DETAIL

Create your perfect chart with 200+ formatting settings for markers, labels, value axes, trendlines, thresholds, and more.

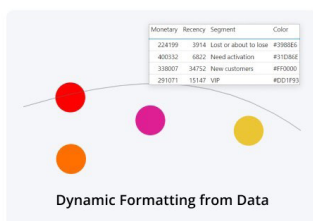
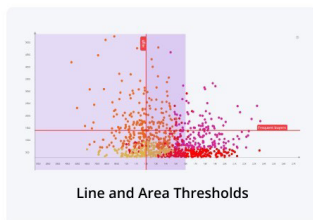
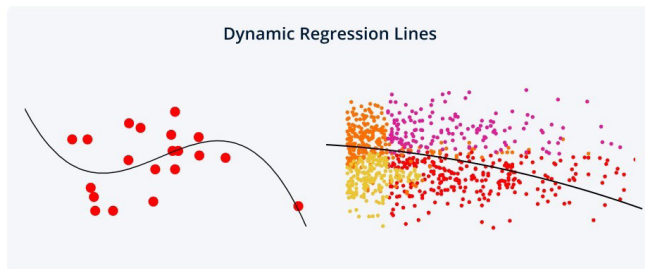


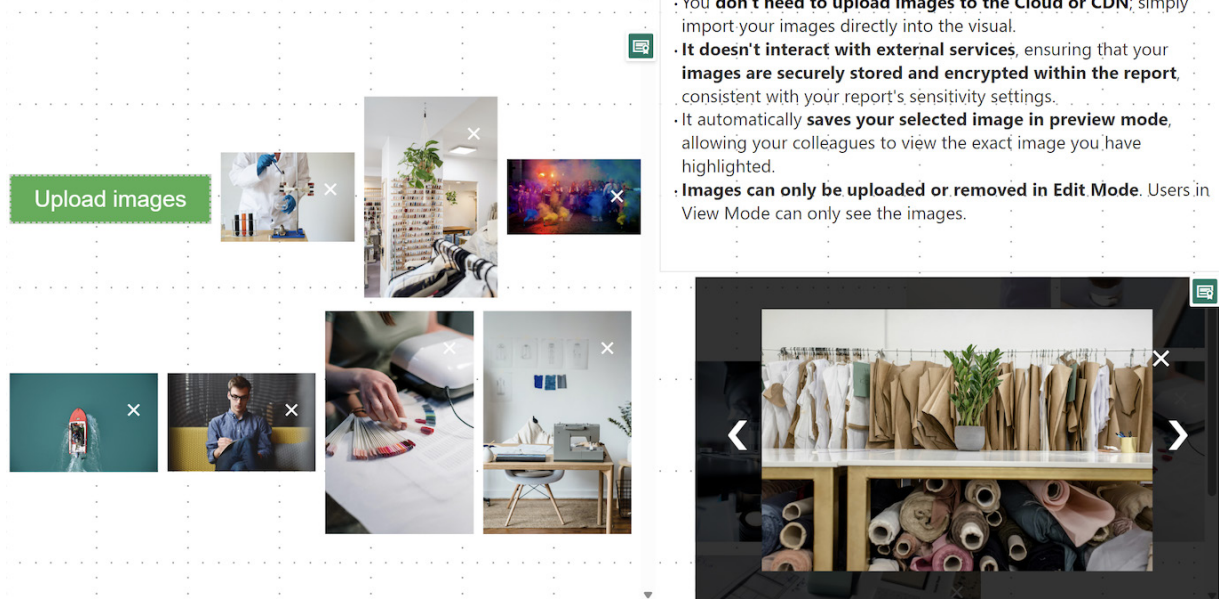
Image Gallery

The Image Gallery is the first visual to be certified by Microsoft that allows for the display of high-quality images and their exportation along with other report content. There is no need to upload images to the Cloud, a CDN or use any datasets. Simply import your images directly into the visual and share them instantly with your colleagues.

It should be noted that:

- Microsoft certification ensures that the visual doesn't interact with external services, ensuring that your images are securely stored and encrypted within the report, consistent with your report's sensitivity settings
- it automatically saves your selected image in preview mode, allowing your colleagues to view the exact image you have highlighted
- images may be uploaded or removed exclusively in Edit mode. Users in View mode can only view the images
- the visual is compatible with Power BI's export functionality to PDF and PowerPoint.

The **Image Gallery visual** allows for an easy and straightforward way to upload and display your images directly in the report



You can simply upload any image file and instantly share it with your colleagues:

- You **don't need to upload images to the Cloud or CDN**; simply import your images directly into the visual.
- **It doesn't interact with external services**, ensuring that your **images are securely stored and encrypted within the report**, consistent with your report's sensitivity settings.
- It automatically **saves your selected image in preview mode**, allowing your colleagues to view the exact image you have highlighted.
- **Images can only be uploaded or removed in Edit Mode**. Users in View Mode can only see the images.

Horizontal Bar chart

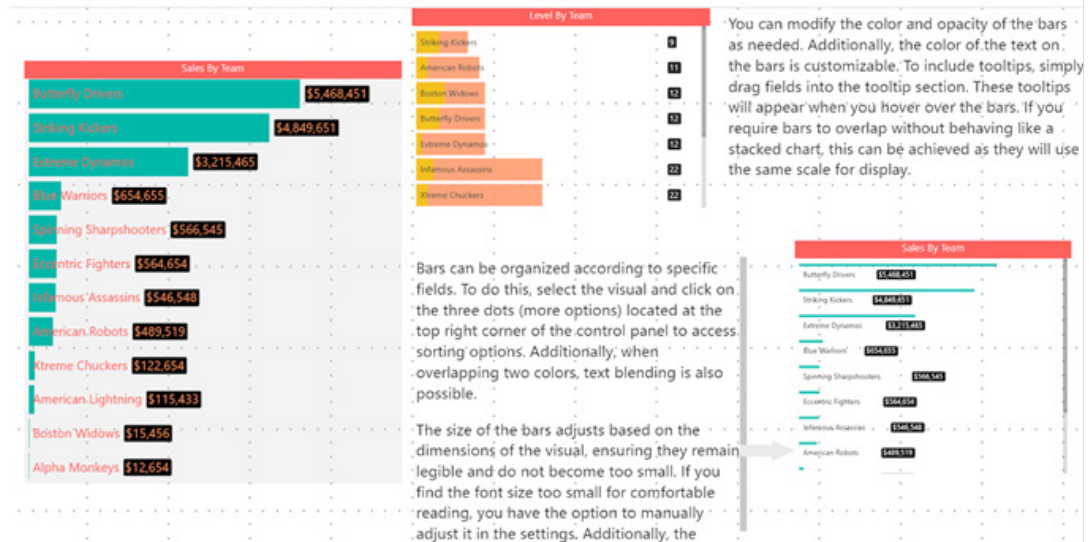
This is a space-saving Horizontal bar chart designed with category labels placed inside the bars for clarity. This chart serves as an efficient filter to navigate through your data more effectively, optimising space by placing the category labels within the bars themselves.

It should be noted that:

Microsoft certification ensures that the visual doesn't interact with external services, ensuring that your images are securely stored and encrypted within the report, consistent with your report's sensitivity settings

- **adjustable bar thickness and spacing:** offers the flexibility to adjust the thickness of the bars and the spacing between them. This allows for optimal use of space and improves readability, especially when dealing with large datasets
- **ToolTip details on hover:** displays detailed information about each category when the user hovers over a bar. This feature provides additional context and insights without cluttering the visual
- **data-driven category labels:** automatically updates category labels based upon the data source. This ensures that the chart remains accurate and up to date, reflecting any changes in the underlying data
- **support for hierarchical data:** allows users to drill down into hierarchical categories within the chart. This functionality enables a more detailed data analysis without leaving the context of the initial visual
- **export options:** offers the ability to export the chart as an image or PDF, facilitating easy sharing and reporting outside of Power BI.

HorizontalBarChart serves as an interactive filter visual, ingeniously saving space by incorporating the text within the bars, unlike the traditional bar chart control where text occupies additional space outside the bars.



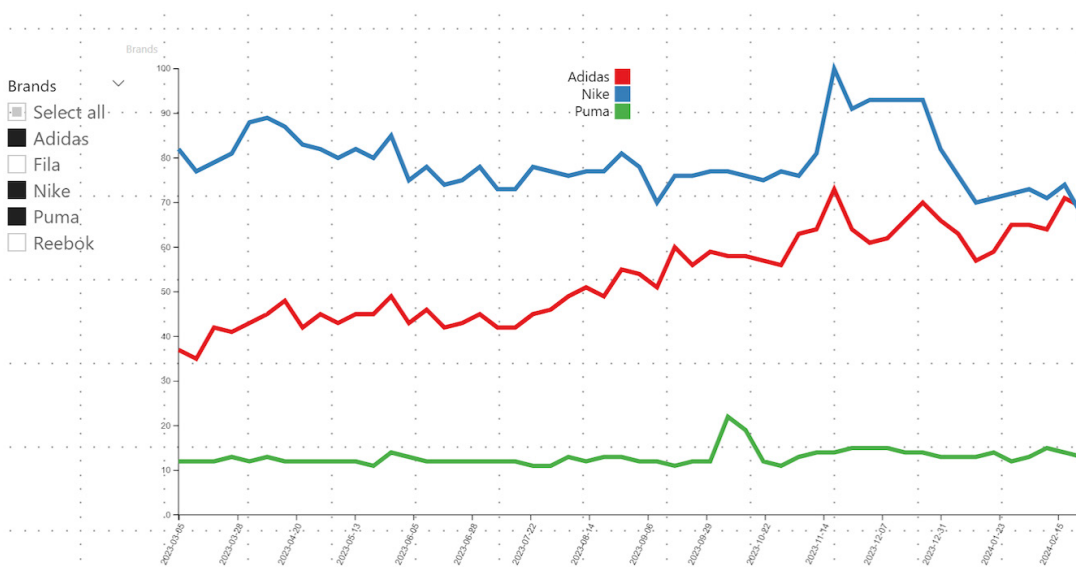
Trends

There is now a Trends visual for Power BI, leveraging Google Trends data for strategic business analysis. This visual tool allows you to compare brand popularity, monitor market trends and gain insights into consumer search behaviours directly within your Power BI environment.

With Trends visual, you can:

- analyse the ebb and flow of brand interest over time to identify market opportunities and competitive threats
- compare the popularity of products to inform marketing strategies and product development decisions
- understand seasonal trends to optimise your marketing campaigns and inventory planning.

Securely integrated and easy to use, Trends displays your Power BI reports as a dynamic analysis tool, offering a projected view of the market landscape.



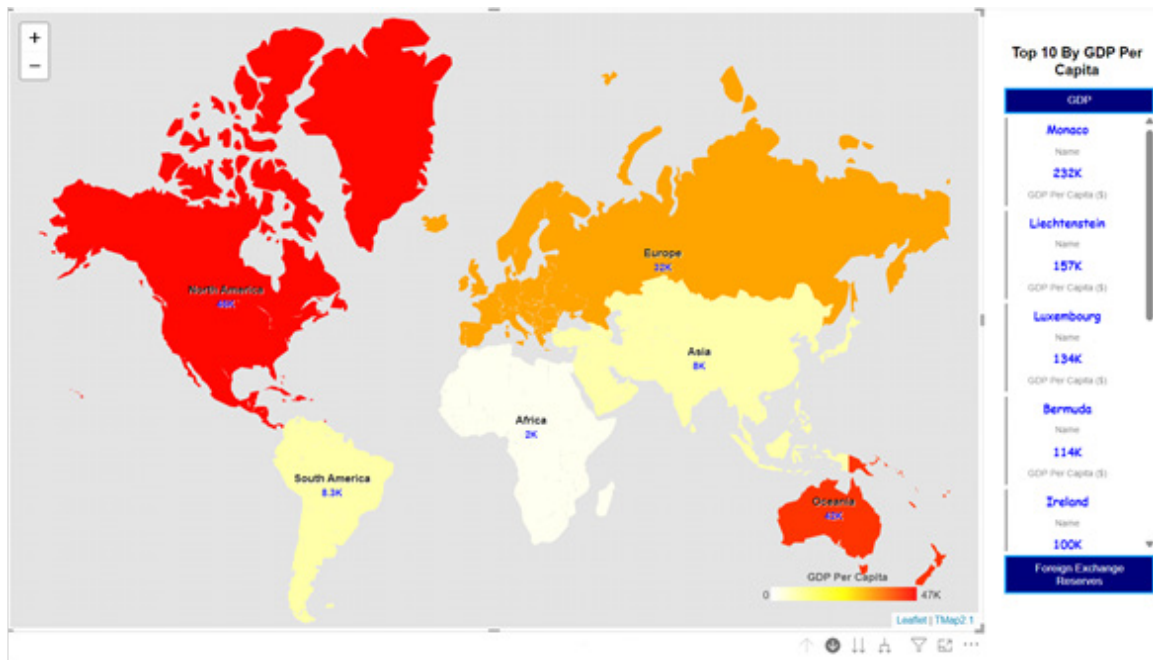
Multi-pane Card 1.1

The new Multi-pane Card visual may be used to group and show data in multiple collapsible panes in Power BI reports. It is an alternative to multi-row card visual, but it can combine columns into a few groups and put each group's data in each pane. It is suitable to show data in detail with a reduced number of report pages.

Area and Population	
GDP	
Name:	Argentina
GDP:	487227000000
GDP Per Capita:	10636
Name:	Bolivia
GDP:	40408000000
GDP Per Capita:	3345
Name:	Brazil
GDP:	1608981000000
GDP Per Capita:	7507
Name:	Chile
GDP:	317059000000
GDP Per Capita:	16265

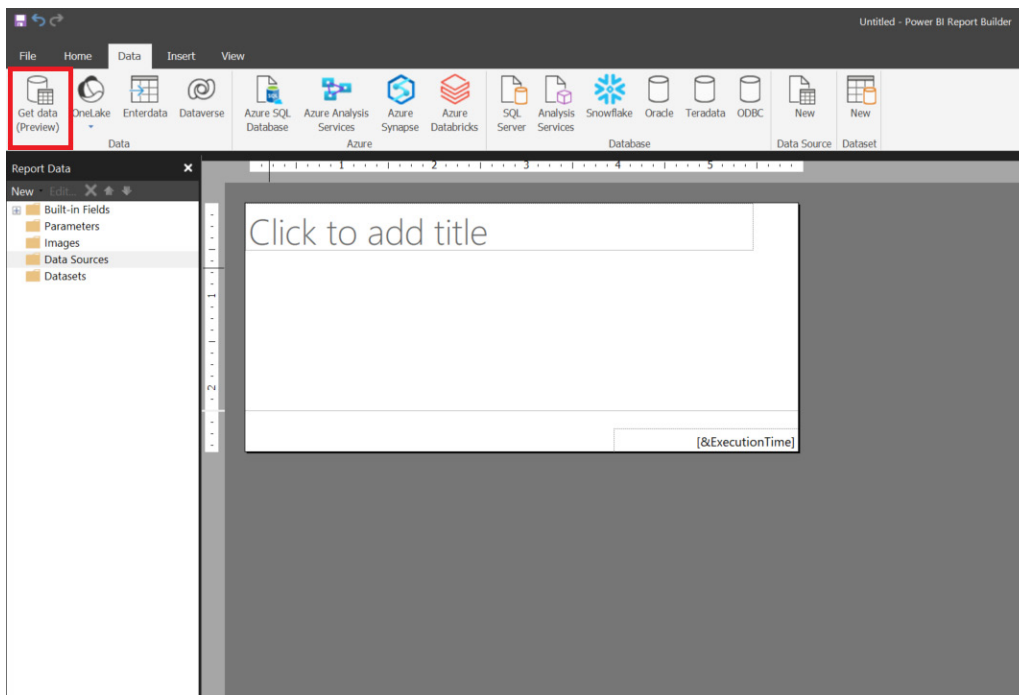
Foreign Exchange Reserves

Data can be sorted by a specified column and numbers can be converted to a human readable string. You can also set up how many rows that you want to show on the card. Using these features, it will be very easy to show “Top 10 best performing stores” or “Top 10 worst performing stores” for retail businesses.

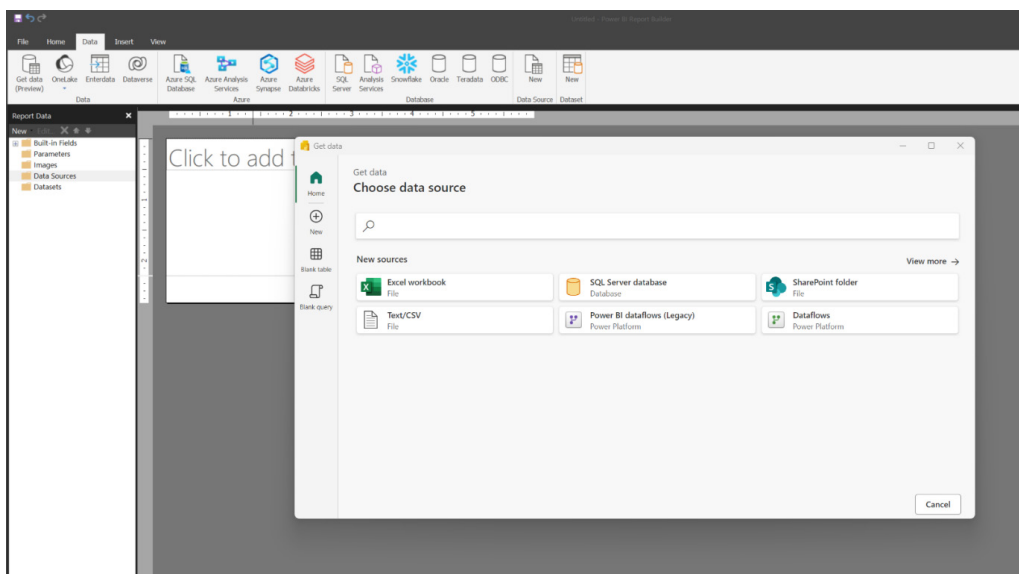


Connect to new data sources from Power BI Report Builder in Preview

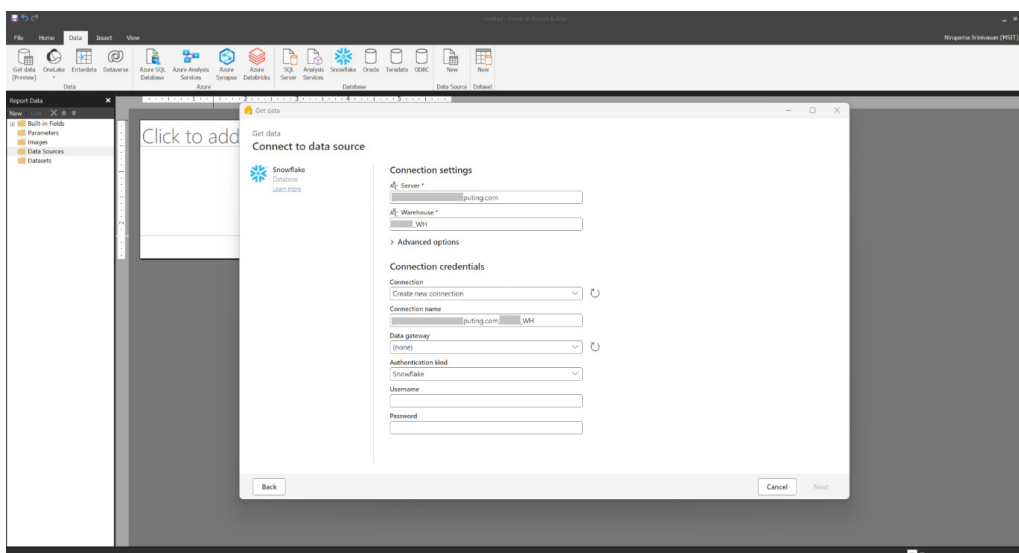
You can now connect to new data sources such as Snowflake and Databricks using the ‘Get Data’ button in the Power BI Report Builder.



Follow the simple, click-through experience of Power Query online. Select the data source that you want to connect to.

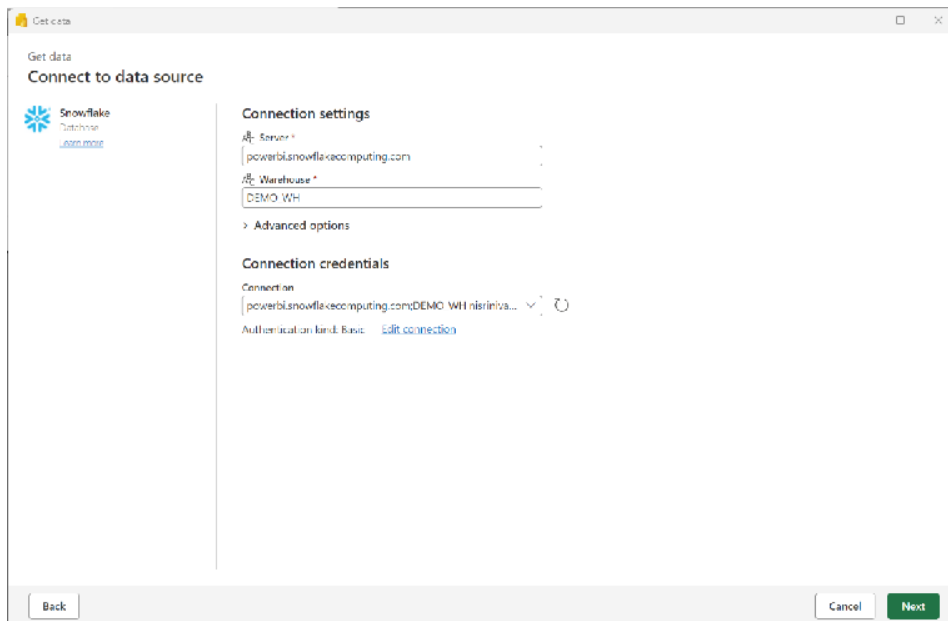


If you want to use AAD, you need to create a shareable cloud connection. You can create one or use one that has been shared with you.

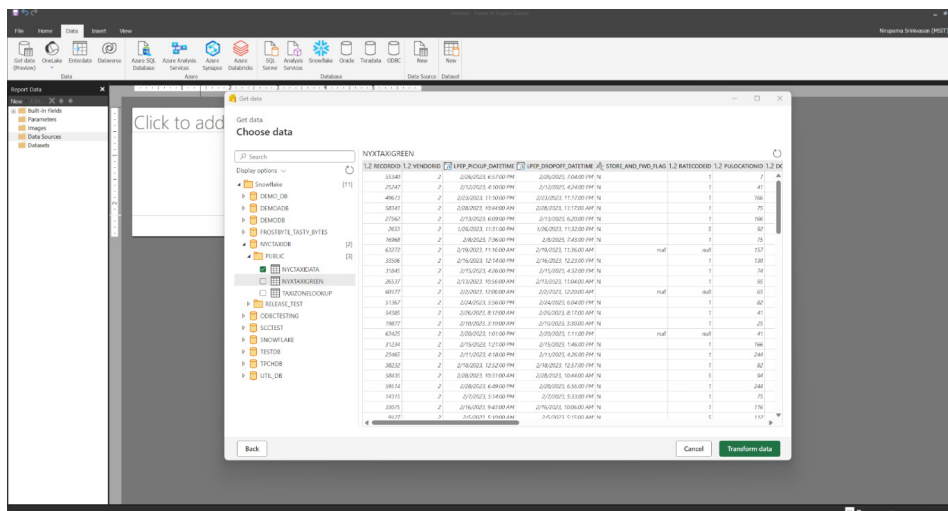


You might also select the shareable cloud connection from the 'Connection' dropdown. Make sure that the report consumer has permissions to the shareable cloud connection.

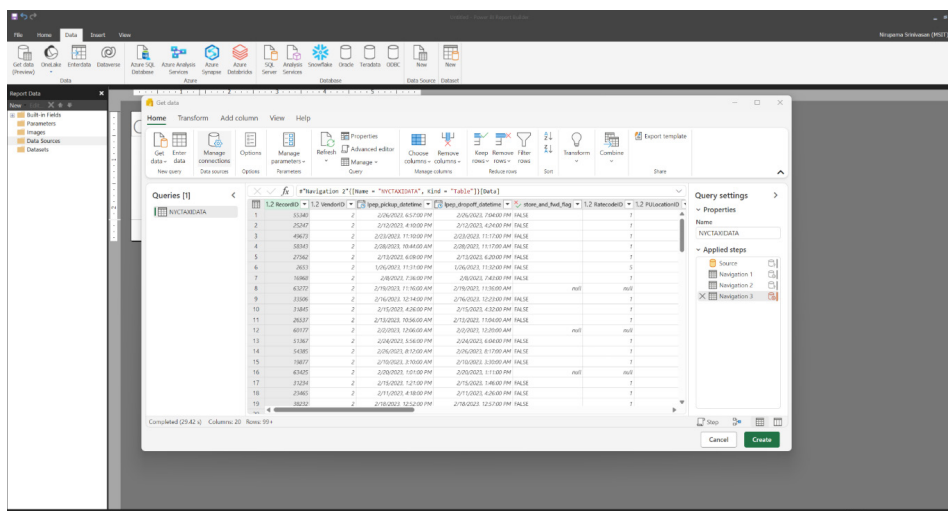
Once you have a connection, select Next.



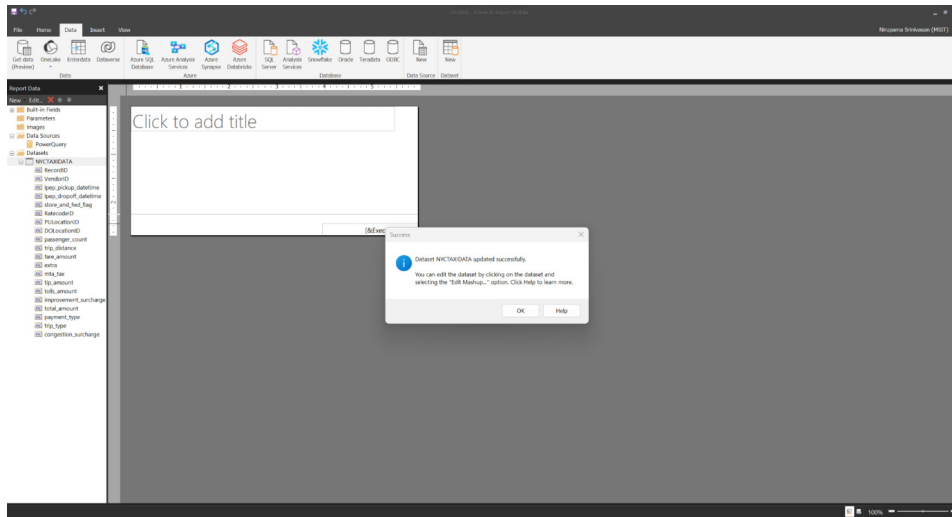
You can transform the data that was selected.



In the Power Query editor, you can perform all the operations supported.



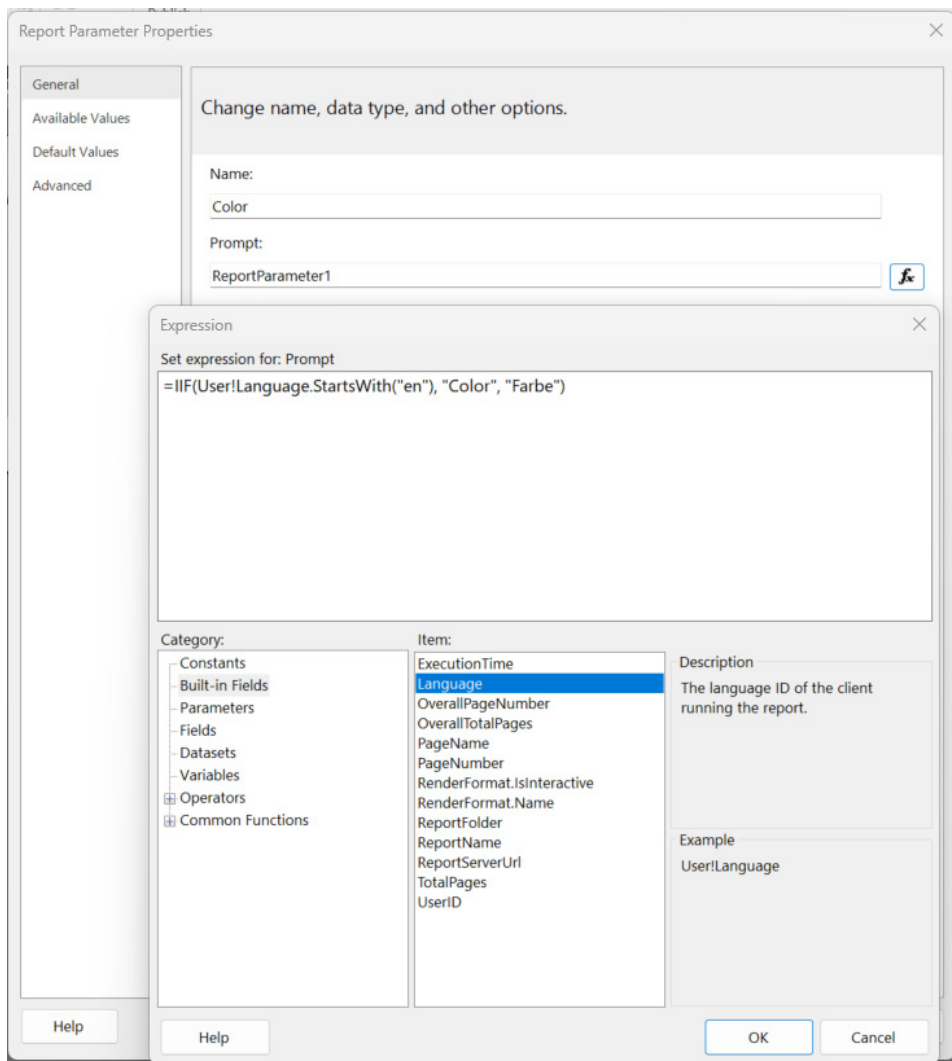
The M query will be used to build your RDL dataset.



You can use this dataset to build your paginated report. You can publish the report to the Service and share it.

Localised parameter prompts in Power BI Report Builder

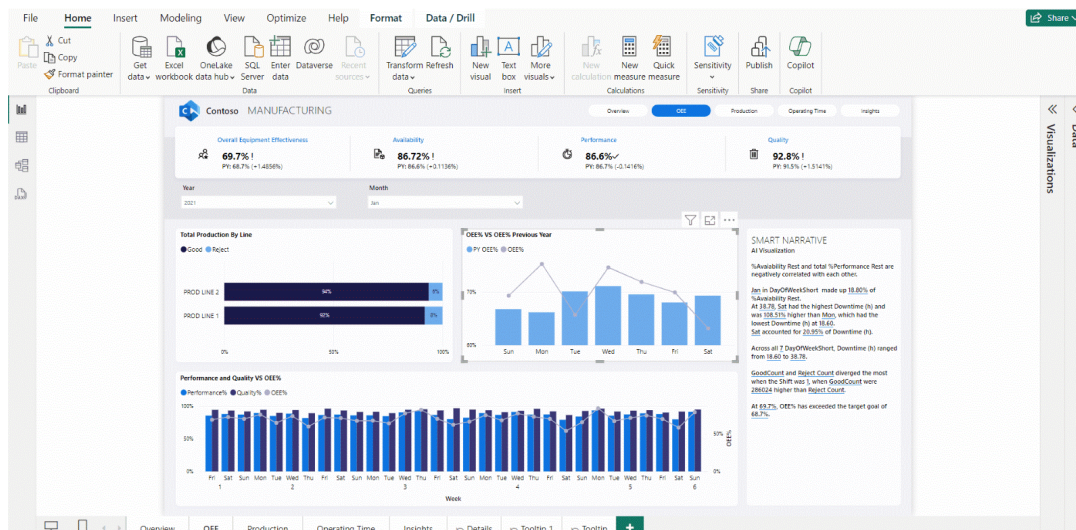
You no longer need to create several reports to support parameter prompts in more than one language. You may simply set an expression for the prompt in Power BI Report Builder and specify the translated labels for a given language that the prompt should be displayed in.



Introducing Copilot pane in Power BI Desktop in Preview

Earlier this year, Microsoft announced the Preview of Copilot for all customers with Premium / Fabric capacity in Power BI web. This update sees the same Copilot experience for report creation is now available for Preview in Power BI Desktop. With this current Preview, users may create reports faster and easier in the Power BI Desktop experience. You can now open the Copilot pane in report view and ask Copilot to:

- **Create a report page:** Copilot will create an entire report page for you by identifying the tables, fields, measures and charts that would help you get started
- **Summarise a semantic model:** Copilot will help you understand your Power BI semantic model by summarising the data in your model
- **Suggest a topic:** Copilot will suggest topics for your report pages.



More next month.

New Features for Excel

This month sees Export to CSV and Show Details in PivotTables are now available in Excel for the web. Also, creating Power BI-connected tables is available in Excel for Windows users, together Office Scripts for Office 365 E1 and F3 licenses.

In summary:

Excel for the web

- Export to CSV
- Create Power BI Connected Tables in Excel
- Show Details in PivotTables

Excel for Windows

- Office Scripts for Office 365 E1 and F3 Licences.

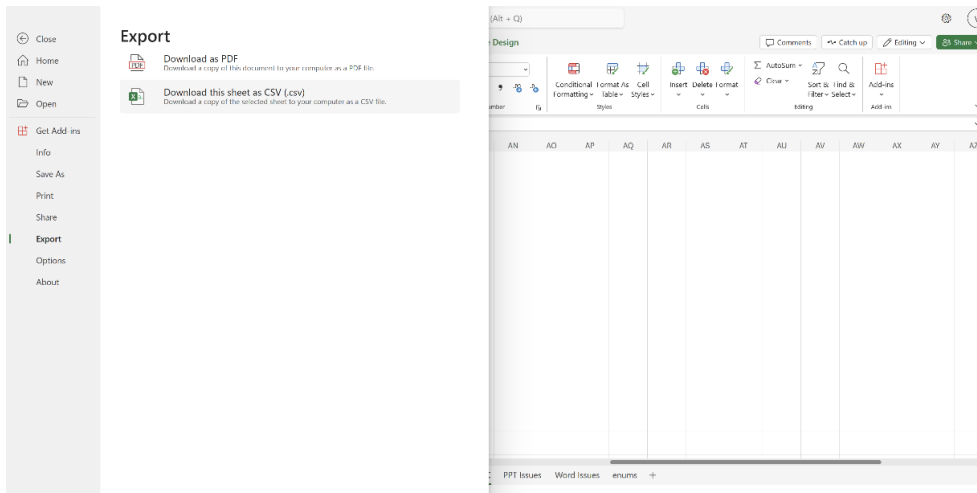
Let's get started.

Export to CSV

The ability to export to CSV is now available to all web users. This experience was already supported for Windows and Mac users. Now this feature is available to Excel for the web users too. You may take advantage of this lightweight file format in Excel for the web to exchange and use data between applications and across platforms.

It works as follows:

- Create or open an existing worksheet in Excel for the web
- Select **File -> Export -> Download this sheet as CSV (.csv)**.



The downloaded .csv file is then available in your local folder and ready to use.

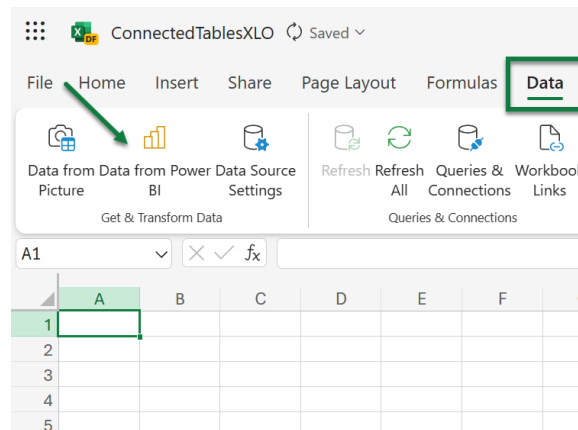
Create Power BI Connected Tables in Excel

Yes, we know we mentioned this last month, but for completeness, we reiterate it here. Back in August last year, Microsoft announced new ways to create connected tables in Excel with Power BI. Now, this feature is available to all in Excel online.

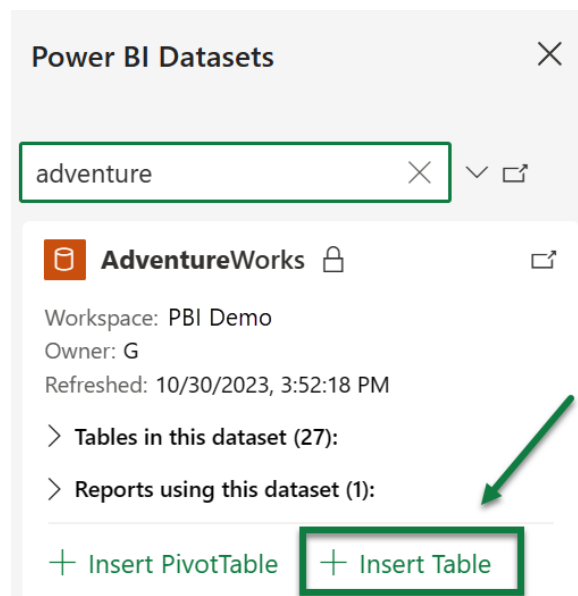
It goes further: Microsoft has also been working hard to ensure that all Microsoft 365 update channels are able to use this feature in the Excel desktop application.

To connect directly to data in your semantic model:

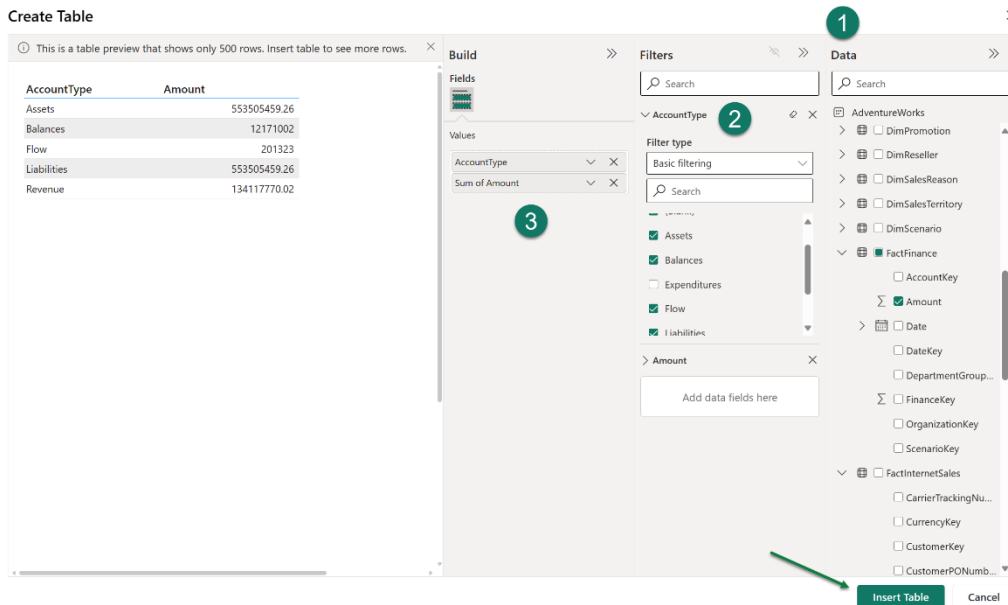
- Select 'Data from Power BI' on the Data tab of the Ribbon



- Use the search feature in the 'Power BI Datasets' pane to find the dataset / semantic model you'd like to connect to and select 'Insert Table'



- Use the 'Create Table' dialog to:
 - select data to appear in your Table in the Data pane
 - apply any filters you'd like in the Filters pane
 - rearrange the field order in the Build pane



- Select 'Insert Table'. You now have a Table connected directly to your Power BI semantic model. Just like with other Connected Table experiences, the workbook contains a connection that you can review and modify in the Queries and Connections properties.

	A	B
1	Data returned for AdventureWorks.	
2		
3	DimAccount[AccountType]	[SumAmount]
4	Assets	553505459.3
5	Balances	12171002
6	Flow	201323
7	Liabilities	553505459.3
8	Revenue	134117770
9		

There are some limitations and other points to consider:

- After you select From Power BI in the Excel Ribbon, the artifacts loaded in the pane are not all the semantic models you have access to. They are a selection of your most used semantic models. You should use the search bar in the pane to get additional semantic models
- The order of Power BI semantic models in the pane may be different from their order in the Data hub in the Power BI Service
- For newly created semantic models, recently refreshed semantic models, or semantic models that you just got access to, it may take up to 24 hours for these semantic models to show up in the Power BI Semantic models pane. If you don't see the semantic model you want, navigate to the Power BI OneLake data hub (<https://app.powerbi.com/datahub>) from the Power BI Semantic models pane in Excel and use 'Analyze in Excel' to create an Excel workbook for that semantic model
- Excel and Power BI visuals use different query languages and data load behaviours, so data load performance may be different between Excel and Power BI.

Show Details in PivotTables

Microsoft has added a new button on the Ribbon under the 'PivotTable Analyze' tab called 'Show Details'. This button allows you to drill into your PivotTables. Previously, you were able to double-click a value cell in

the PivotTable and create a new Table to further analyse the details for that value. This button makes this existing capability easier to find and use. The functionality was already available for web users.

Office Scripts for Office 365 E1 and F3 Licences

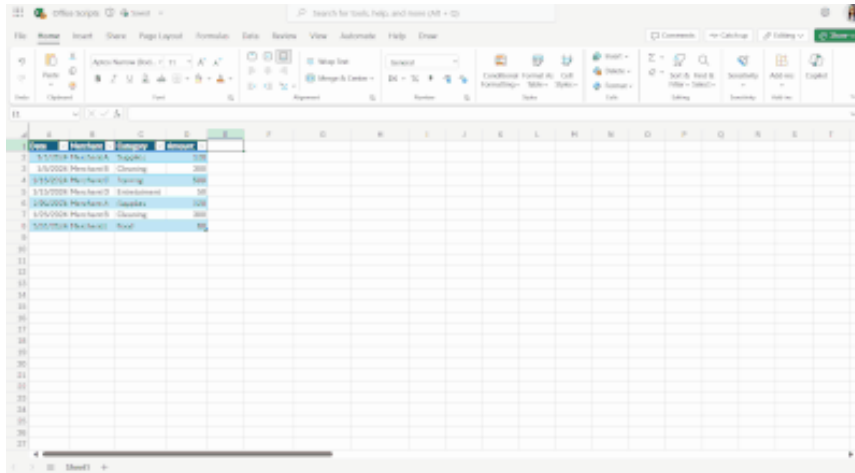
Office Scripts in Excel is now available for customers with Office 365 Enterprise E1 and Office 365 F3 licences. From this update, you can find the Office Scripts feature set in the Automate tab on the Excel Ribbon.

As a reminder, Office Scripts is an automation platform in Excel that allows users with all levels of programming experience to automate

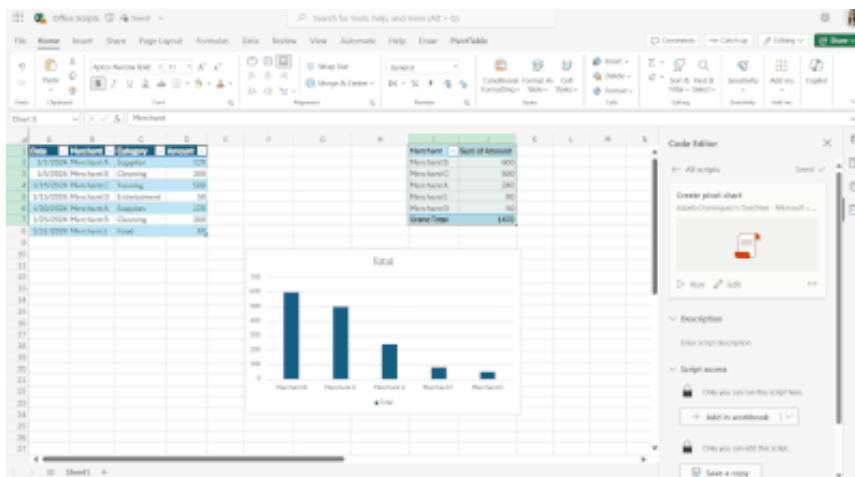
their repetitive workflows. To get started, use the 'Action Recorder' to record the actions you take in Excel. These actions are then translated into a script that you can run at any time. No programming experience is required. If you need to modify your script, you can use the Code Editor, a TypeScript-based editor directly within Excel. You can use it to edit your existing scripts or to create new ones using the Office Scripts API.

How it works:

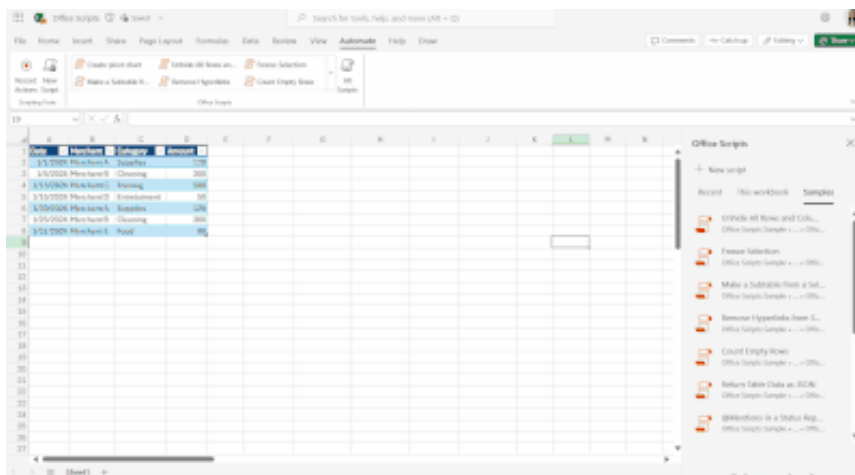
- To start a recording, select **Automate -> Record Actions**, and then select stop once you are finished



- You can edit your script using the Edit button



- Click the Run button to run your script or any of the samples.



Until next month.

The A to Z of Excel Functions: N



This function returns a value converted to a number.

The **N** function employs the following syntax to operate:

N(value)

The **N** function has the following argument:

- **value** is required and represents the value you wish to convert. **N** converts as follows:

If value is or refers to	N returns
a number	that number
a date, insofar it is recognised by Excel	serial number of that date
TRUE	1
FALSE	0
an error value, e.g. #DIV/0!	the error value
all other values	0

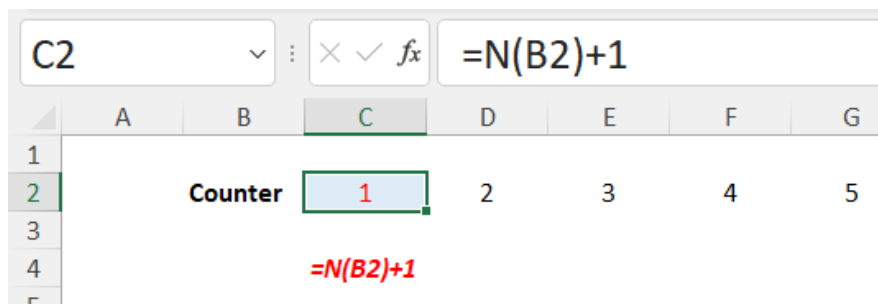
It should be further noted that:

- it is not generally necessary to use the **N** function in a formula, because Excel automatically converts values as necessary
- this function is provided for compatibility with other spreadsheet programs.

Please see our examples below:

	A	B	C
1	Data		
2	7		
3	Even		
4	TRUE		
5	Saturday, 1 January 2033		
6			
7			
8	Formula	Description	Result
9	=N(A2)	Since this is a number, its value is returned	7
10	=N(A3)	Since this is text, zero [0] is returned	0
11	=N(A4)	Since this is the logical value (TRUE), one [1] is returned	1
12	=N(A5)	Since this is a date, the serial number is returned (this value will vary depending upon which date system is used)	48580
13	=N("6")	Because "6" is text, zero [0] is returned	0
14			

At SumProduct, we use the **N** function extensively with counters:



Note that the formula would give **#VALUE!** if **N** were not used as “Counter” + 1 cannot be evaluated.

The A to Z of Excel Functions: NA



The **NA** function returns the error value **#N/A**. The **#N/A** is the error value that means “no value is available”. Often, we use **NA** to mark empty cells. By entering **#N/A** in cells where you are missing information,

you can avoid the problem of unintentionally including empty cells in your calculations. (When a formula refers to a cell containing **#N/A**, the formula returns the **#N/A** error value.)

The **NA** function employs the following syntax to operate:

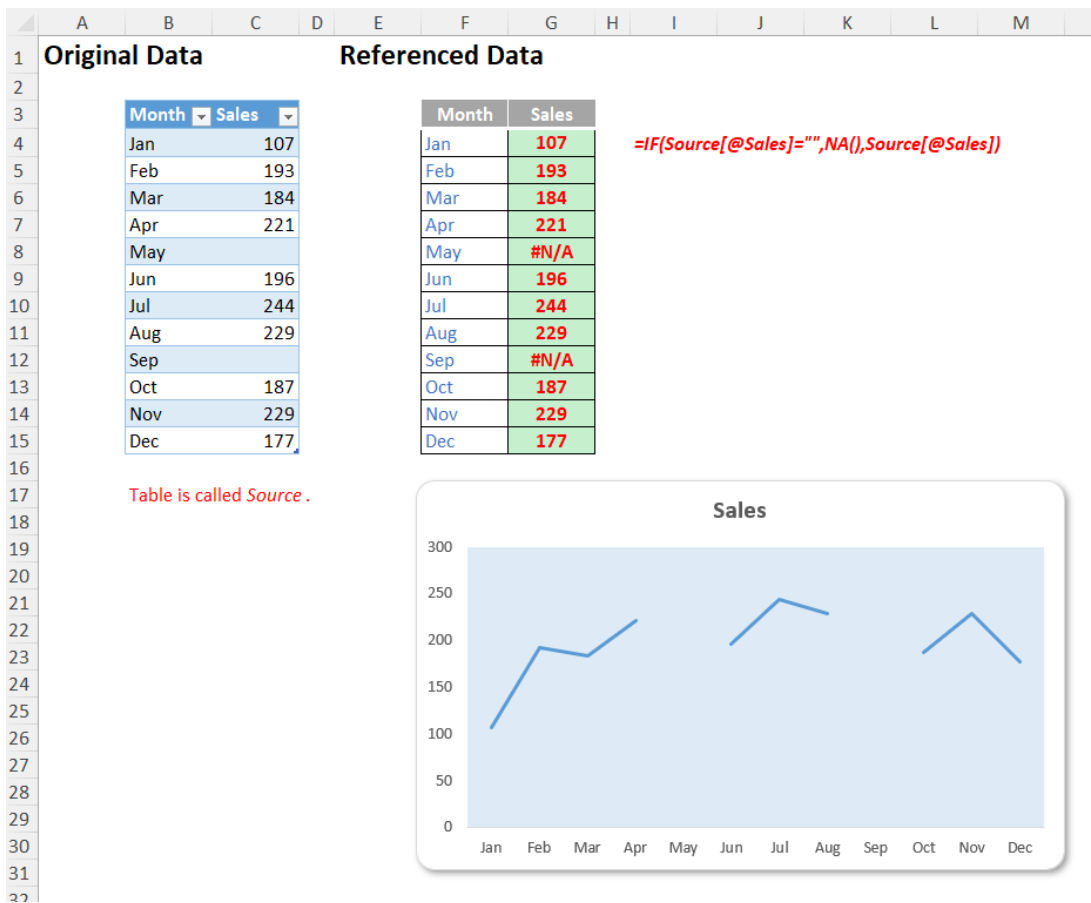
NA()

The **NA** function takes no **sxxt**, sorry, I mean, arguments (obviously, **sxxt** = salt).

It should be further noted that:

- you must include the empty parentheses with the function name; otherwise, Microsoft Excel will not recognise it as a function (it will consider it an undefined range name)
- you may also type the value **#N/A** directly into a cell. The **NA** function is provided for compatibility with other spreadsheet programs.

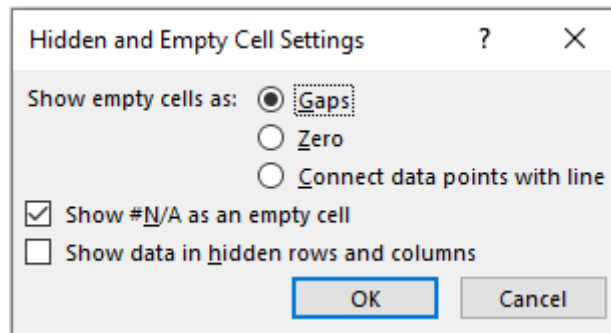
The **NA** function is often used in conjunction with charting:



Here, the original data is missing information for May and September. However, the chart is using the Referenced Data table, which uses the formula

$=IF(Source[@Sales]="",NA(),Source[@Sales])$

i.e. missing data is replaced with #N/A. For line charts, this has the effect that data will not be plotted rather than have a value of zero [0], depending upon the settings selected in the 'Hidden and Empty Cell Settings' dialog, *viz.*

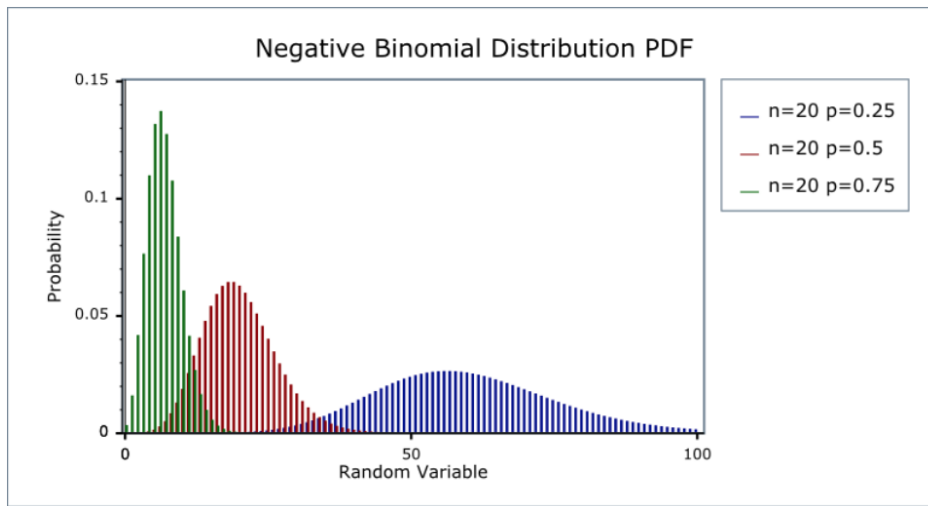


(This dialog is located by right-clicking on the chart, selecting 'Select Data...' from the ensuing shortcut menu and clicking on the 'Hidden and Empty Cells' button in the 'Select Data Source' dialog.)

The A to Z of Excel Functions: NEGBINOM.DIST

In probability theory and statistics, the negative binomial distribution is a discrete probability distribution that models the number of successes in a sequence of n independent success / failure experiments, each of

which yields success with probability p , before a specified number of failures (denoted r) occur. For the record, a success / failure experiment is also called a Bernoulli experiment or Bernoulli trial.



This function returns the negative binomial distribution, the probability that there will be a **number_f** failures before the **number_s**-th success, with **probability_s** probability of a success. The **NEGBINOM.DIST** function should be used in problems with a fixed number of successes, when

the outcomes of any trial are only success or failure, when trials are independent and when the probability of success is constant throughout the experiment. For example, **NEGBINOM.DIST** can calculate the probability that two babies born are male before one female baby is born.

The **NEGBINOM.DIST** function employs the following syntax to operate:

NEGBINOM.DIST(number_f, number_s, probability_s, cumulative)

The **NEGBINOM.DIST** function has the following arguments:

- **number_f**: this is required and represents the number of failures in trials
- **number_s**: this is also required. This is the threshold number of successes
- **probability_s**: again, this is required. This is the probability of success in each trial
- **cumulative**: the final argument is also required. This is a logical value that determines the form of the function. If **cumulative** is **TRUE**, then **NEGBINOM.DIST** returns the cumulative distribution function, which is the probability that there are at most **number_f** failures; if **cumulative** is **FALSE**, it returns the probability density function, which is the probability that there are **number_f** failures.

It should be further noted that:

- **number_f** and **number_s** are truncated to integers
- if **number_f**, **number_s**, or **probability_s** is / are non-numeric, **NEGBINOM.DIST** returns the #VALUE! error value
- if **number_f** < 0 or **number_s** < 1, **NEGBINOM.DIST** returns the #NUM! error value
- if **probability_s** < 0 or **probability_s** > 1, **NEGBINOM.DIST** returns the #NUM! error value
- the equation for the negative binomial distribution is:

$$nb(x; r, p) = \binom{x+r-1}{r-1} p^r (1-p)^x$$

where:

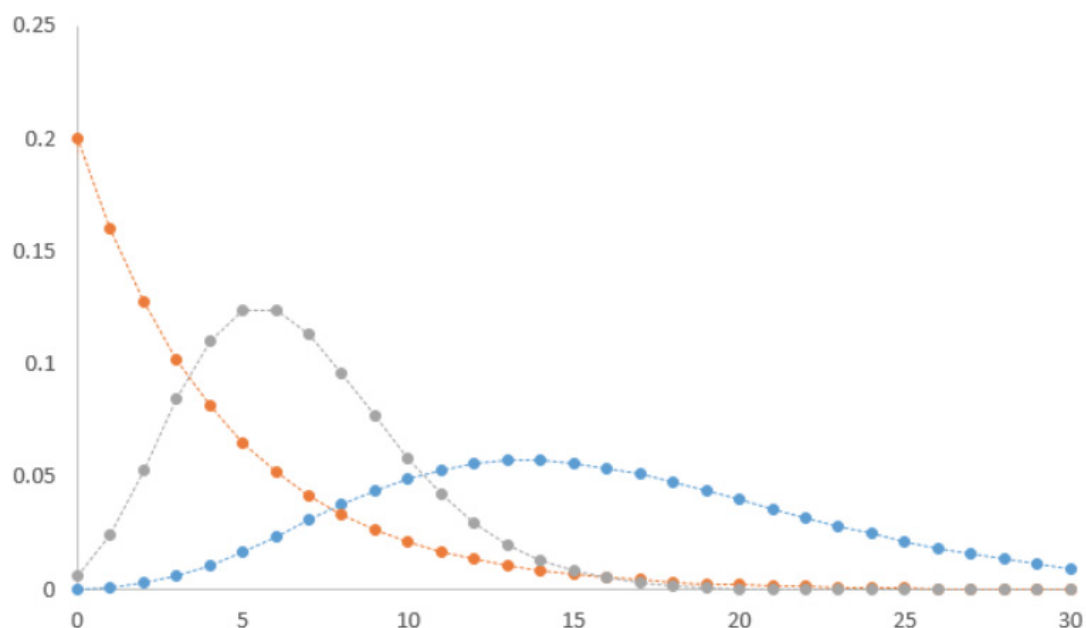
x is **number_f**, **r** is **number_s** and **p** is **probability_s**.

Have we lost you yet? Please see our example below:

	A	B	C	D	E	F
1	Description	Value				
2	Number of failures in trials	6				
3	Number of successes in trials	10				
4	Probability of success on each trial	60%				
5						
6						
7	Description	Result			Formula	
8	Probability of exactly six failures occurring before 10 successes have occurred	0.1239586			=NEGBINOM.DIST(D2,D3,D4,FALSE)	
9	Probability of at most six failures occurring before 10 trials have been successful	0.52717411			=NEGBINOM.DIST(D2,D3,D4,TRUE)	
10						

Essentially, **NEGBINOM.DIST** replaces **NEGBINOMDIST** (see below). First introduced in Excel 2010, this provides more compatibility with other statistical software. The former function is still recognised in Excel though for legacy reasons.

The A to Z of Excel Functions: NEGBINOMDIST



You're probably seeing the similarities between this function and the last one.

The **NEGBINOMDIST** function employs the following syntax to operate:

NEGBINOMDIST(number_f, number_s, probability_s)

The **NEGBINOMDIST** function has the following arguments:

- **number_f**: this is required and represents the number of failures in trials
- **number_s**: this is also required. This is the threshold number of successes
- **probability_s**: again, this is required. This is the probability of success on each trial.

Unlike **NEGBINOM.DIST**, this function does not have the **cumulative** argument.

It should be further noted that:

- **number_f** and **number_s** are truncated to integers
- if **number_f**, **number_s**, or **probability_s** is / are non-numeric, **NEGBINOMDIST** returns the **#VALUE!** error value
- if **number_f** < 0 or **number_s** < 1, **NEGBINOMDIST** returns the **#NUM!** error value
- if **probability_s** < 0 or **probability_s** > 1, **NEGBINOMDIST** returns the **#NUM!** error value
- the equation for the negative binomial distribution is:

$$nb(x; r, p) = \binom{x+r-1}{r-1} p^r (1-p)^x$$

where:

x is **number_f**, **r** is **number_s** and **p** is **probability_s**.

Please see our final example for this month below:

	A	B	C	D	E	F
1	Description			Value		
2	Number of failures in trials			6		
3	Number of successes in trials			10		
4	Probability of success on each trial			60%		
5						
6						
7	Description			Result	Formula	
8	Probability of exactly six failures occurring before 10 successes have occurred			0.1239586	=NEGBINOMDIST(D2,D3,D4)	
9						

Essentially, **NEGBINOMDIST** is a slightly less flexible version of **NEGBINOM.DIST** and represents the version of the function used before its successor was introduced in Excel 2010. It is still recognised in Excel for legacy reasons. Although this function is still available for backward

compatibility, you should consider using the new functions from now on, because this function may not be available in future versions of Excel.

More Excel Functions next month.

Beat the Boredom Suggested Solution

To recap, the problem we presented earlier in this newsletter was to challenge you to create an option list for a whole workbook. Specifically, we create a dashboard to track the accommodation and catering services for one of our imaginary clients:

- a Dashboard sheet showing which customer group is staying in which room and on what date
- a Catering sheet which displays the number of guests in each room and by date who will be using catering services (this was simply generated by an **INDEX-MATCH** from the Data sheet).

The client wants to be able to view by whole month, 14-day or 7-day in both reports at any time.

For example, we just need to input the 'Start Date', and click on option to view as '7 days', the list will be generated for the whole week to see which group of customers will be coming:

	A	B	C	D	E	F	G	H
1								
2	Start Date	Viewing Option						
3	1/11/2019	<input type="radio"/> Whole Month <input checked="" type="radio"/> 7 days <input type="radio"/> 14 days						
4								
5								
6								
7								
8								
9								
10	Room	Fri	Sat	Sun	Mon	Tue	Wed	Thu
11		01-Nov-19	02-Nov-19	03-Nov-19	04-Nov-19	05-Nov-19	06-Nov-19	07-Nov-19
12	Room 01	Group D	Group D		Group D	Group D	Group D	Group D
13	Room 02	Group D	Group D		Group D	Group D	Group D	Group D
14	Room 03	Group D	Group D		Group D	Group D	Group D	Group D
15	Room 04	Group D	Group D		Group D	Group D	Group D	Group D
16	Room 05	Group D	Group D		Group D	Group D	Group D	Group D
17	Room 06	Group D	Group D		Group D	Group D	Group D	Group D
18	Room 07	Group D	Group D		Group D	Group D	Group D	Group D
19	Room 08	Group D	Group D		Group D	Group D	Group D	Group D
20	Room 09	Group D	Group D		Group D	Group D	Group D	Group D
21	Room 10	Group D	Group D		Group D	Group D	Group D	Group D
22	Unit 1	Group E	Group E	Group E	Group E	Group E	Group E	
23	Unit 2	Group D	Group D		Group D	Group D		Group D
24	Unit 3				Group D	Group D		
25	Unit 4				Group D	Group D		
26	Suite Room 01				Group D	Group D		
27	Suite Room 02				Group D	Group D		
28								
29								
30								
31								
32								

whilst in the Catering sheet, the list is also updated accordingly, where we can see how many we need to prepare for catering:

	A	B	C	D	E	F	G	H	I
1									
2	Start Date	Viewing Option							
3	1/11/2019	<input type="radio"/> Whole Month <input checked="" type="radio"/> 7 days <input type="radio"/> 14 days							
4									
5									
6									
7									
8									
9									
10	Room	Fri	Sat	Sun	Mon	Tue	Wed	Thu	
11		01-Nov-19	02-Nov-19	03-Nov-19	04-Nov-19	05-Nov-19	06-Nov-19	07-Nov-19	
12	Room 01	1	1		1	1	1	1	
13	Room 02	1	1		1	1	1	1	
14	Room 03	1	1		1	1	1	1	
15	Room 04	1	1		1	1	1	1	
16	Room 05	1	1		1	1	1	1	
17	Room 06	1	1		1	1	1	1	
18	Room 07	1	1		1	1	1	1	
19	Room 08	1	1		1	1	1	1	
20	Room 09	1	1		1	1	1	1	
21	Room 10	1	1		1	1	1	1	
22	Unit 1	1	1	1	1	1	1		
23	Unit 2	4	4		4	4		4	
24	Unit 3				4	4			
25	Unit 4				4	4			
26	Suite Room 01				1	1			
27	Suite Room 02				1	1			
28									
29									
30									
31									
32									

If we choose '14 days', the list is now longer:

with a similar effect in the Catering sheet:

Further, the list will be updated for the whole month if we choose to view 'Whole Month':

Suggested Solution

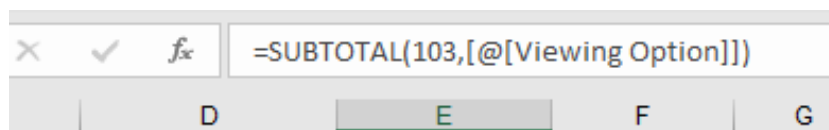
We need to create a lookup table for the 'Viewing Option' list in a separate worksheet (here called 'LookupTable'). The table contains a 'Viewing Options' column, listing all of the options, and a 'Date Difference' column, indicating the number of days which will be added to the start date, viz.

	A	B	C	D	E
1					
2	Viewing Options	Date Difference			
3	7 days	6			
4	14 days	13			
5	Whole Month	30			
6					
7					

Next, we create a Selection table like the one below. This table contains the fields 'Viewing Option', a Visible indicator (where number one [1] means the option has been chosen), and Order, which is used to sort. Cells in the Visible column are based upon the formula:

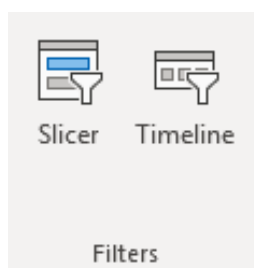
=SUBTOTAL(103,[@[Viewing Option]])

where 103 represents the number function of **COUNTA**, with any hidden values excluded (you can read more about **SUBTOTAL** [here](#)).

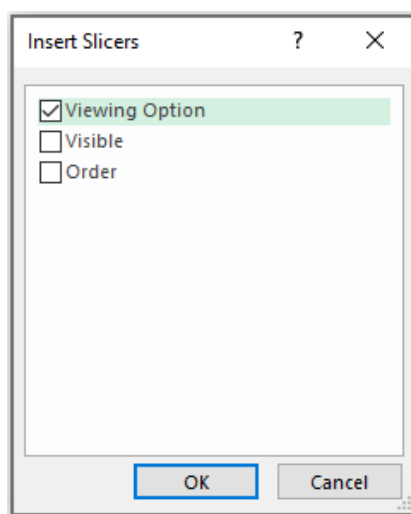


Viewing Option	Visible	Order
Whole Month	1	1
14 days	1	2
7 days	1	3

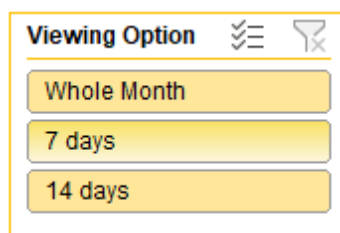
With the cursor in this table, go to the Insert tab and choose Slicer:



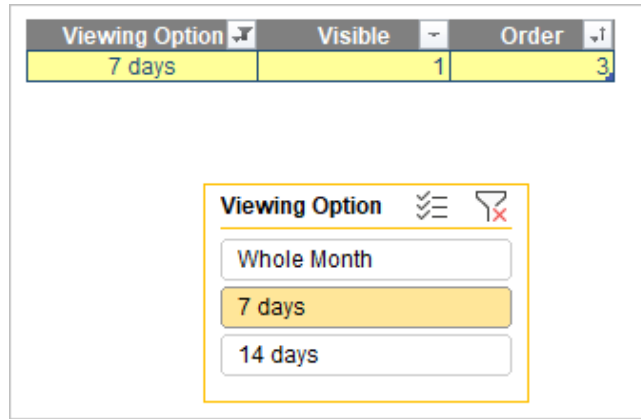
From the resulting 'Insert Slicers' dialog, since we want to have 'Viewing Option' as a list, select this field and click OK.



We will have a slicer box similar to the one below, where we can copy and paste to any sheet that we wish to use.

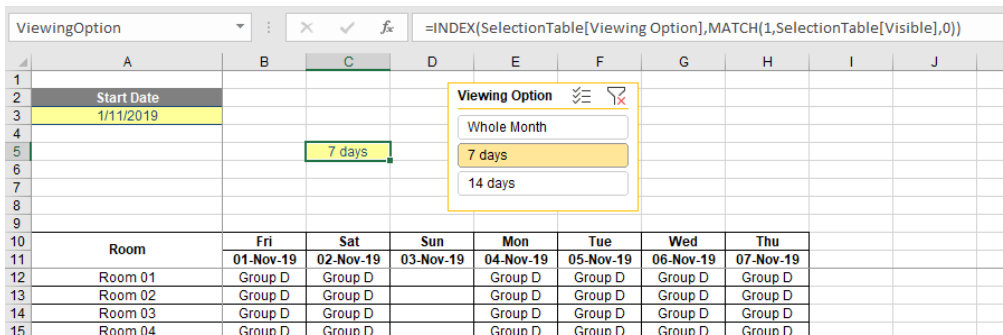


Now if we click on one of the options, the Selection table will only show the option being selected:



With the logistics prepared, go back to the main sheet and choose one cell – here, cell **C5** – which indicates the option ticked from the slicer box (note here that later this cell will be hidden behind the slicer box). This cell **C5**, named 'ViewingOption', contains the following formula to look up the visible option from the Selection table:

=INDEX(SelectionTable[ViewingOption],MATCH(1,SelectionTable[Visible],0))



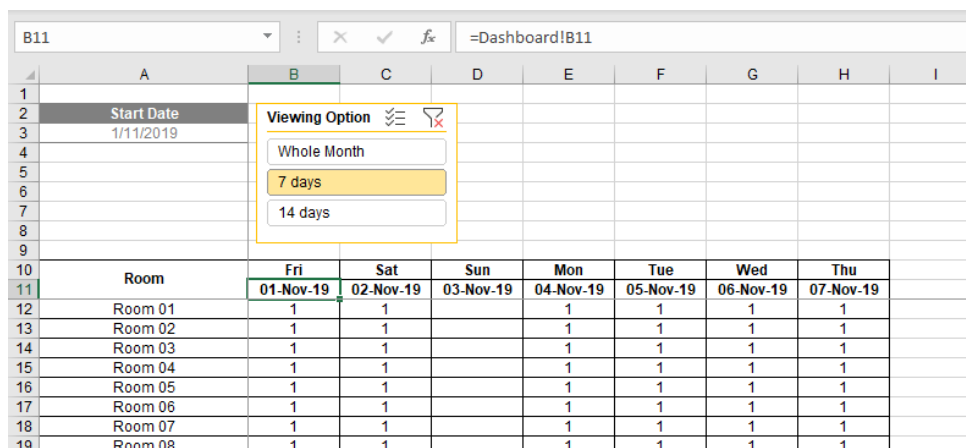
We will then need to generate the date list. Cell **B11** is the first date of the list, which is the Start Date as an assumption. The formula in cell **C11** is:

=IF(B11="", "", IF(B11-DateChosen<INDEX(LookupTable[Date Difference], MATCH(ViewingOption,LookupTable[Viewing Options],0)),B11+1,""))

which compares the viewing option selected and looks up the date difference to add from the lookup table. We will copy the formula to 30 more cells, because we require 31 days maximum for a whole month. The relevant cells in row 10 contains the formula to show the day of week:

=IF(B11="", "",TEXT(B11,"ddd"))

In the Catering worksheet, simply put all the cells equal to the relevant cells in the Dashboard sheet, noting that the slicer box is also copied here for easy reference. If we are in the Catering sheet and we want to view more or fewer days, just click the option on the slicer box in this sheet. It will trigger the Viewing Option cell (cell **C5**) in the Dashboard and then update the date list accordingly.



For the final touch, we need to set up some conditional formatting so that if the date is not shown, that date cell and all cells below it will not be bordered (to make them invisible). You can also hide the sheet containing the lookup table and Selection table to keep the magic all yours.

Let us know if you think there is a better approach. Otherwise, more next month.

Upcoming SumProduct Training Courses

Location	Course	Course Date	Local Time	UTC	Duration
Sydney Australia	Power Pivot, Power Query and Power BI	2 May 2024 - 3 May 2024	09:00 - 17:00 AEDT	1 May 2024 22:00 UTC- 3 May 2024 06:00 UTC	2 Days
Melbourne Australia	Excel Tips and Tricks	20 May 2024	09:00 - 17:00 AEDT	19 May 2024 22:00 UTC- 20 May 2024 06:00 UTC	1 Day
Melbourne Australia	Financial Modelling	21 May 2024 - 22 May 2024	09:00 - 17:00 AEDT	20 May 2024 22:00 UTC- 22 May 2024 06:00 UTC	2 Days
Melbourne Australia	Power Pivot, Power Query and Power BI	23 May 2024 - 24 May 2024	09:00 - 17:00 AEDT	22 May 2024 22:00 UTC- 24 May 2024 06:00 UTC	2 Days
Melbourne Australia	Power Pivot, Power Query and Power BI	17 June 2024 - 18 June 2024	09:00 - 17:00 AEDT	16 June 2024 22:00 UTC- 18 June 2024 06:00 UTC	2 Days
Melbourne Australia	Excel Tips and Tricks	19 June 2024	09:00 - 17:00 AEDT	18 June 2024 22:00 UTC- 19 June 2024 06:00 UTC	1 Day
Melbourne Australia	Financial Modelling	20 June 2024 - 21 June 2024	09:00 - 17:00 AEDT	19 June 2024 22:00 UTC- 21 June 2024 06:00 UTC	2 Days
Virtual (Australia)	ChatGPT Part 1	24 June 2024	13:30 - 17:00 AEDT	24 June 2024 02:30 UTC- 24 June 2024 06:00 UTC	1 Day
Virtual (Australia)	ChatGPT Part 2	1 July 2024	13:30 - 17:00 AEDT	1 July 2024 02:30 UTC- 1 July 2024 06:00 UTC	1 Day
Sydney Australia	Power Pivot, Power Query and Power BI	15 July 2024 - 16 July 2024	09:00 - 17:00 AEDT	14 July 2024 22:00 UTC- 16 July 2024 06:00 UTC	2 Days
Sydney Australia	Excel Tips and Tricks	17 July 2024	09:00 - 17:00 AEDT	16 July 2024 22:00 UTC- 17 July 2024 06:00 UTC	1 Day
Sydney Australia	Financial Modelling	18 July 2024 - 19 July 2024	09:00 - 17:00 AEDT	17 July 2024 22:00 UTC- 19 July 2024 06:00 UTC	2 Days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. We've started going through the alphabet actions. We complete the alphabet this month!

Keystroke	What it does
ALT + <u>W</u>	(Excel 2003:) Activate Window menu
CTRL + <u>W</u>	Close Window
CTRL + <u>X</u>	Cut
CTRL + <u>Y</u>	Redo
CTRL + <u>Z</u>	Undo

There are c.550 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file at <http://www.sumproduct.com/thought/keyboard-shortcuts>. Also, check out our new daily **Excel Tip of the Day** feature on the www.sumproduct.com homepage.

Our Services

We have undertaken a vast array of assignments over the years, including:

- **Business planning**
- **Building three-way integrated financial statement projections**
- **Independent expert reviews**
- **Key driver analysis**
- **Model reviews / audits for internal and external purposes**
- **M&A work**
- **Model scoping**
- **Power BI, Power Query & Power Pivot**
- **Project finance**
- **Real options analysis**
- **Refinancing / restructuring**
- **Strategic modelling**
- **Valuations**
- **Working capital management**

If you require modelling assistance of any kind, please do not hesitate to contact us at contact@sumproduct.com.

Link to Others

These newsletters are not intended to be closely guarded secrets. Please feel free to forward this newsletter to anyone you think might be interested in converting to "the SumProduct way".

If you have received a forwarded newsletter and would like to receive future editions automatically, please subscribe by completing our newsletter registration process found at the foot of any www.sumproduct.com web page.

Any Questions?

If you have any tips, comments or queries for future newsletters, we'd be delighted to hear from you. Please drop us a line at newsletter@sumproduct.com.

Training

SumProduct offers a wide range of training courses, aimed at finance professionals and budding Excel experts. Courses include Excel Tricks & Tips, Financial Modelling 101, Introduction to Forecasting and M&A Modelling.

Check out our more popular courses in our training brochure:



Drop us a line at training@sumproduct.com for a copy of the brochure or download it directly from www.sumproduct.com/training.

Sydney Address: SumProduct Pty Ltd, Suite 803, Level 8, 276 Pitt Street, Sydney NSW 2000
New York Address: SumProduct Pty Ltd, 48 Wall Street, New York, NY, USA 10005
London Address: SumProduct Pty Ltd, Office 7, 3537 Ludgate Hill, London, EC4M 7JN, UK
Melbourne Address: SumProduct Pty Ltd, Ground Floor, 470 St Kilda Road, Melbourne, VIC 3004
Registered Address: SumProduct Pty Ltd, Level 14, 440 Collins Street, Melbourne, VIC 3000

contact@sumproduct.com
www.sumproduct.com
+61 3 9020 2071