Big news, big newsletter this month!

It's so big it's put our Desktop Publishing team into meltdown, never mind pandemic lockdown.

Our big news – we get to finally announce this year's Excel Summit – and it's available to EVERYONE!! At the time of writing, we have no less than **46** Excel experts confirmed for our *Excel Virtually Global* conference. By our reckoning, that's the largest public collection of Excel experts ever. And it costs next to nothing to attend. And with it online, with live and recorded options, you have no excuse not to join!

And it's a big newsletter too – thanks in part to us having to go through no less than two Power BI Desktop updates. Tolstoy would be proud of us.

There's other news as well, including a free three-way integrated financial model (and information on a Power BI variant), information on Power BI datasets, an update to Microsoft Information Protection, new names for the update channels, a new sheet tab icon for Excel, updates for Excel for Mac and belated news of a significant "tweak" to the calculation engine in Excel.

But there's even more in this month's bursting-at-the-seams newsletter: Beat the Boredom, Visual Basics, Power Pivot Principles, Power Query Pointers, A to Z of Excel Functions *(Euro Convert if you like this month's offerings!)*, Keyboard Shortcuts *et al*.

By the time you've read this month's newsletter it will be July. We hope it takes your mind off the current state of the world.

Stay safe, stay happy, stay healthy.

Until next month.

Liam Bastick, Managing Director, SumProduct

Excel Virtually Global

EXCEL VIRTUALLY GLOBAL 2020

Microsoft's Most Valuable Professionals, or MVPs, are technology experts who passionately share their knowledge with the community. They are always on the "bleeding edge" and have an unstoppable urge to get their hands on new, exciting technologies.

How much would you be prepared to pay for the likes of Excel (and other) MVPs, Microsoft staff and other industry experts, such as David Abiola, Jon Acampora, Matt Allington, Indira Bandari, Medha Bandari, Liam Bastick, David Benaim, Yolanda Cuesta, Govert van Drimmelen, Purna Chandra Rao Duggirala, Imke Feldmann, Leila Gharani, Jordan Goldmeier, Richard Goring, Roger Govier, Frederic le Guen, Ingeborg Hawighorst, Tim Heng, Wyn Hopkins, Boris Hristov, Bill Jelen, Tony de Jonker, Gasper Kamensek, Jeff Lenning, John MacDougall, Nabil Mourad, Patrick O'Beirne, Dave Paradi, Keyur Patel, Jon Peltier, Boriana Petrova, Jan Karel Pieterse, Ken Puls, Reza Rad, Sudhi Ramamurthy, Tony Roberts, Raphael Santos, Rishi Sapra, Glenna Shaw, Oz du Soleil, Grzegorz Stolecki, Echo Swinford, Alessandro Trovato, Henk Vlootman, Charles Williams and Qinglin Zhou to present on a variety of Excel topics in **your house**?
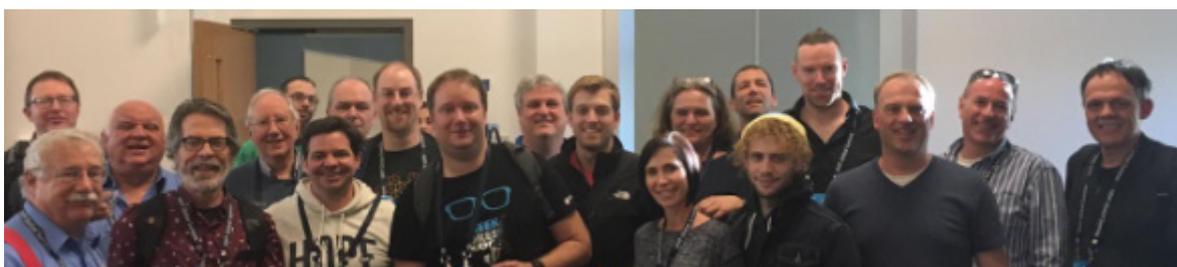
Not everyone in this picture will be presenting – but a lot of them will be!

Well, it's an option. Our usual *Excel Summit South* will not be held this year due to the COVID-19 pandemic. But we won't we be beaten. We'll just go bigger. And better. And global. And cheaper. And it's for charity.

This two-and-a-bit-day virtual conference, now in its fifth year, presents Excel, Data Platform and PowerPoint MVPs, together with other acknowledged experts from Microsoft and / or around the globe to present, answer questions and demonstrate the future of Excel and how it will make your life easier, personally and professionally.

Topics for the 53 sessions will include: Auditing Spreadsheets, Charts, Dashboards, Data Analysis, Data Types, Dynamic Arrays, Excel Tricks & Tips, Financial Modelling, Forecasting, Maps, Microsoft 365, New Functions and Features, PivotTables, Power BI, Power Pivot, Power Query, Presenting Your Data, Spilled Formulae, Testing, Timelines and VBA. And note well – it's not all in English, with sessions in Mandarin, Portuguese, Spanish and Telugu, as well.

Each session (including Q&A) will last no more than an hour and topics cover all expertise levels, from novice to expert. Most presenters are well known in their spheres, and have written blogs, books and articles and / or present video sessions.

Most sessions will be recorded so you may watch them later with downloads aplenty – there are no medals for staying up to watch the entire event live! That's just as well, as it will run from 19:00 GMT / UTC on Tuesday 21 July to 23:59 GMT / UTC on Thursday 23 July. What do these marathon runners know about marathons? We're planning a *Tour de Excel*. (Yes, I know it should be d'Excel, but you get the gist!)

From your own favourite chair, bring a laptop, an inquisitive mind and your sense of humour. Be prepared to learn heaps. And remember, it's not just value for money, it's for charity – all profits will be donated to a global COVID-19 research charity.

For more details (e.g. times, speakers, sessions), please go to www.excelvirtuallyglobal.com and register at https://www.eventbrite.com/e/excel-virtually-global-a-virtual-excel-summit-tickets-106319837496.

Hopefully, we'll see you there!

Three-Way Integrated Financial Models Offer

We know that everyone all over the world has been going through a fairly tough time with isolation and social distancing. We know how important it is to maintain these measures in order to keep everyone safe from the coronavirus.

With isolation laws in place, many businesses have had to go through some form of restructuring, be it selling products at a different stage of production or changing the entire operation of the company. Cash flows have suffered too, as everyone has tightened their proverbial belts.

These changes require analysis of the company's financial statements, both actual and forecast, before making any decisions. To help our readers, we have decided to give out a free copy of a three-way integrated financial model in Excel.

You can find a copy of the file at:
https://sumproduct-4634.kxcdn.com/fileadmin/filemount/news_graphics/Free_Excel_File___PBI_bait/SP_Simple_Example_Financial_Statement_Model.xlsx.

Profit & Loss Statement

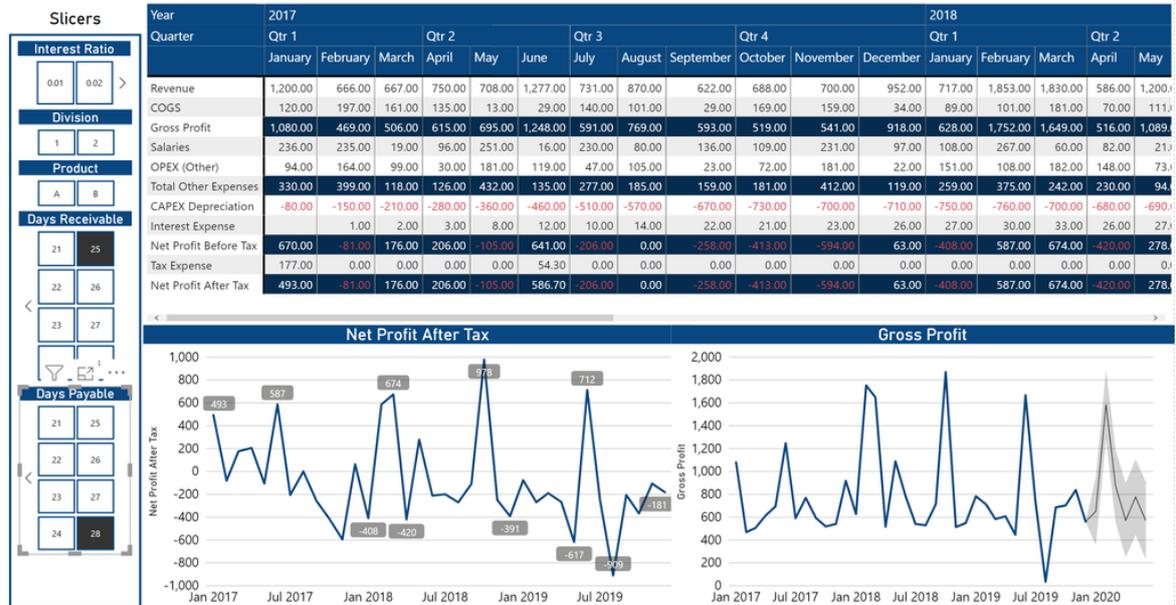|		2020	2021								
Revenue	$000	33,000	32,250	2,750	2,750	2,750	2,750	2,750	2,750	2,750	2,750
COGS	$000	(12,540)	(12,900)	(1,045)	(1,045)	(1,045)	(1,045)	(1,045)	(1,045)	(1,045)	(1,045)
COGS - Inventory	$000	-	-	-	-	-	-	-	-	-	-
Gross Profit	$000	20,460	19,350	1,705	1,705	1,705	1,705	1,705	1,705	1,705	1,705
Gross Margin	(% of Revenue)	62%	60%	62%	62%	62%	62%	62%	62%	62%	62%
Overheads											
Salaries and Benefits	$000	(5,600)	(5,700)	(467)	(467)	(467)	(467)	(467)	(467)	(467)	(467)
Rent	$000	(212)	(216)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)
Other Overheads	$000	(6,500)	(6,500)	(542)	(542)	(542)	(542)	(542)	(542)	(542)	(542)
Total Overheads	$000	(12,312)	(12,416)	(1,026)	(1,026)	(1,026)	(1,026)	(1,026)	(1,026)	(1,026)	(1,026)
EBITDA	$000	8,148	6,934	679	679	679	679	679	679	679	679
Plus Interest Income	$000	148	231	10	10	10	11	11	12	13	13
Less Depreciation	$000	-	-	-	-	-	-	-	-	-	-
Less Interest Expense	$000	(27)	(24)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
PBT	$000	8,269	7,141	686	686	687	687	688	689	689	690
Less Tax	$000	(2,274)	(1,964)	(189)	(189)	(189)	(189)	(189)	(189)	(190)	(190)
NPAT	$000	5,995	5,177	497	497	498	498	499	499	500	500

Hopefully, you will find this file useful. Please note that it is a simple three-way integrated financial model, it contains generic input assumptions that applies to many businesses, but it's not perfect and it is simplistic. Our normal models are more sophisticated, but you get the general idea.

We hope this will be beneficial: a user will have to add inputs and possibly adapt the model further before it should be used in a business, but it's better than a blank Excel worksheet. And please remember, we do not warrant that the model is free from mathematical error and / or accounting accuracy, so *caveat emptor!*

But there's more.

Apart from three-way integrated financial models in Excel, we are also proud to announce that we will be offering a new service where we will build the same three-way integrated financial models in Power BI. We know some of our competitors are offering similar products, but we believe we are the only company to offer to construct the financials completely in Power BI, rather than import the statements from elsewhere (obviously, we still need to bring the source data in!).

Profit & Loss Statement

Year	2017												2018				
Quarter	Qtr 1			Qtr 2			Qtr 3			Qtr 4			Qtr 1			Qtr 2	
	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May
Revenue	1,200.00	666.00	667.00	750.00	708.00	1,277.00	731.00	870.00	622.00	688.00	700.00	952.00	717.00	1,853.00	1,830.00	586.00	1,200.0
COGS	120.00	197.00	161.00	135.00	13.00	29.00	140.00	101.00	29.00	169.00	159.00	34.00	89.00	101.00	181.00	70.00	111.0
Gross Profit	1,080.00	469.00	506.00	615.00	695.00	1,248.00	591.00	769.00	593.00	519.00	541.00	918.00	628.00	1,752.00	1,649.00	516.00	1,089.0
Salaries	236.00	235.00	19.00	96.00	251.00	16.00	230.00	80.00	136.00	109.00	231.00	97.00	108.00	267.00	60.00	82.00	21.0
OPEX (Other)	94.00	164.00	99.00	30.00	181.00	119.00	47.00	105.00	23.00	72.00	181.00	22.00	151.00	108.00	182.00	148.00	73.0
Total Other Expenses	330.00	399.00	118.00	126.00	432.00	135.00	277.00	185.00	159.00	181.00	412.00	119.00	259.00	375.00	242.00	230.00	94.0
CAPEX Depreciation	-80.00	-150.00	-210.00	-280.00	-360.00	-460.00	-510.00	-570.00	-670.00	-730.00	-700.00	-710.00	-750.00	-760.00	-700.00	-680.00	-690.0
Interest Expense		1.00	2.00	3.00	8.00	12.00	10.00	14.00	22.00	21.00	23.00	26.00	27.00	30.00	33.00	26.00	27.0
Net Profit Before Tax	670.00	-81.00	176.00	206.00	-105.00	641.00	-206.00	0.00	-258.00	-413.00	-594.00	63.00	-408.00	587.00	674.00	-420.00	278.0
Tax Expense	177.00	0.00	0.00	0.00	0.00	54.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Net Profit After Tax	493.00	-81.00	176.00	206.00	-105.00	586.70	-206.00	0.00	-258.00	-413.00	-594.00	63.00	-408.00	587.00	674.00	-420.00	278.0

Building such models in Power BI offers greater flexibility for end users. With a reporting dashboard created in Power BI, depending on the complexity of the data, end users will be able to slice and dice the data at any level in any way they want. They will also be able to flex certain inputs and see live dynamic changes to their bottom line when variables are altered.

If you are interested in learning more, please reach out to us at contact@sumproduct.com.

Beat the Boredom Challenge

*With many of us currently "working from home" / quarantined, there are only so Zoom / Teams calls you can make before you reach your data limit. Perhaps they should measure data allowance in mugs of coffee. 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…*

If there's one thing that can be tedious in Excel, it's creating a variance report. Imagine you had originally created a budget and as more information came to light, you decided to revise the numbers as follows:

Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Original Budget	50	72	75	59	63	77	71	86	98	88	95	77
Reforecast	81	79	79	96	55	62	89	68	72	77	67	83
Variance	31	7	4	37	(8)	(15)	18	(18)	(26)	(11)	(28)	6

That's easy enough, right? Put the original budget in the first line and the reforecast data in the second line et voila! you can produce your variance analysis in the bottom row.

But that's not how management want it. They want it to look like this:

Required Reporting Format

	Jan			Feb			Mar		
	Budget	Reforecast	Variance	Budget	Reforecast	Variance	Budget	Reforecast	Variance
	50	81	31	72	79	7	75	79	4

It's all well and good, but that means a different formula in each cell:

Required Reporting Format

	Jan			Feb			Mar		
	Budget	Reforecast	Variance	Budget	Reforecast	Variance	Budget	Reforecast	Variance
	50	81	31	72	79	7	75	79	4
	=E5	=E6	=F14-E14	=F5	=F6	=I14-H14	=G5	=G6	=L14-K14

Yuck. That means plenty of opportunities to reference the wrong cell as well as making it impossible to copy the calculation across the row. Thousands of accountants face this thankless task every day – this report can be ridiculously time-consuming and is so easy to calculate incorrectly or misreference. Is there a better way?

All you have to do is reproduce the above example and write a formula in cell **E14** (the first calculation) that may be copied across the entire row of the Report Table.

Sound easy? Try it. One solution may be found later in this newsletter – but no reading ahead!
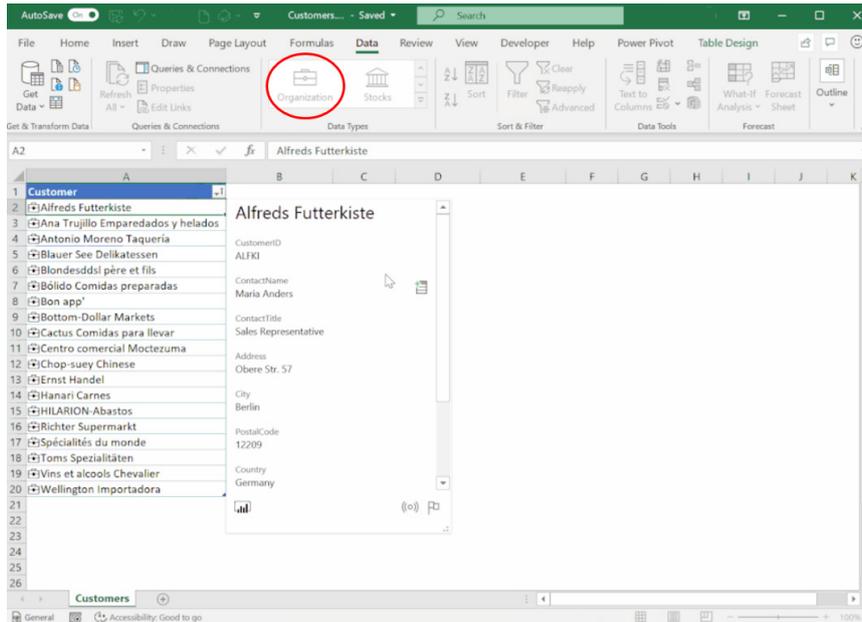
Coming Soon: Power BI Datasets in Excel

Last month it was announced that Microsoft is introducing two new ways to access Power BI data from within Excel:
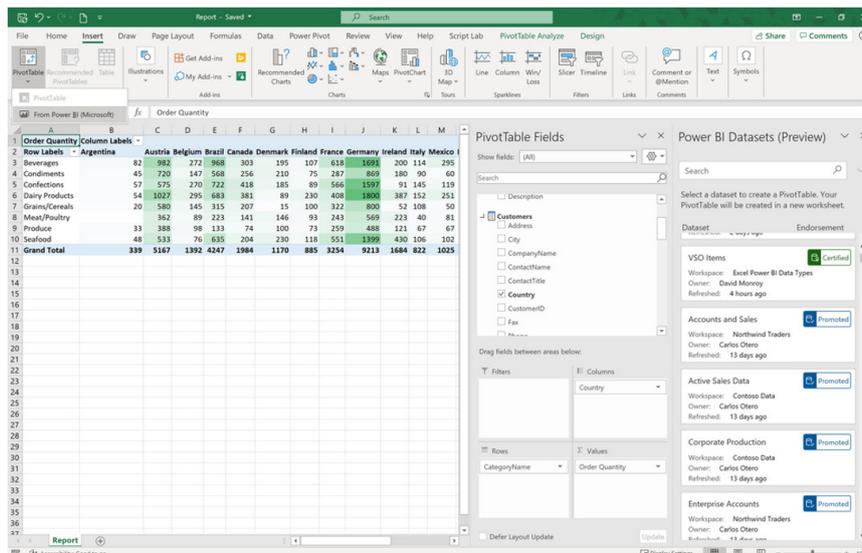
1. Excel Data Types
2. through PivotTables connected directly to Power BI.

It's been a common gripe amongst users for quite some time as to how to get Power BI datasets (back) into Excel. Analyze in Excel may be one way, but now with the click of a button, users may now discover Power BI datasets without having to go via Power BI. By using Power BI certified and promoted dataset capabilities, users now have easier access to relevant and refreshable data.

Using Data Types, you can quickly find details from featured tables in Power BI datasets within Excel's data types gallery. Data Types gives you the flexibility to organise information in any way you want within the Excel grid. This allows you to use formulae, build reports and analyse your data in the good ol' fashioned spreadsheet way.

You may also analyse Power BI datasets in Excel using PivotTables:

As well as Data Types, Microsoft has also added the ability for PivotTables connected to datasets stored in Power BI to be created in Excel, allowing you to continue to work in Excel. This new capability creates a live connection to the underlying dataset in Power BI, meaning updates within the source are published to the reports connected to it.

It should also be noted that Excel PivotTables also respect the Microsoft Information Protection (MIP) Sensitivity labels *(see below)* applied to the file when the PivotTable was created. Therefore, since Excel may now promote the adoption of certified datasets within your organisation, this can help with version control surrounding your data, when making critical decisions in your business.

These new capabilities will start rolling out to Office Insiders later this year. Watch this space.

Coming Soon: Microsoft Information Protection (MIP)

Not only available in Excel, but also in both Power BI and other Office products, **Sensitivity labels** from the Microsoft Information Protection framework are already available *(indeed, we wrote about them back in September 2019)*, allowing you to classify and protect your organisation's data whilst making sure productivity and collaboration are unhindered.

These labels will persist when applied from Power BI content and exported to Excel, PowerPoint and / or PDF files. However, this feature will shortly take a step further. When you connect to a Power BI dataset from Excel, that dataset's Sensitivity label will be inherited and applied to the Excel file and all associated outcomes, such as headers, footers and encryption.
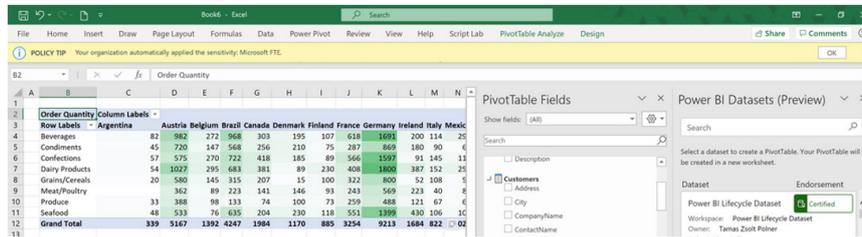
This new, more rigorous integration between Excel and Power BI will provide users with more information protection in Excel's familiar and easy to use interface, all with fewer clicks.

This update will also start rolling out to Office Insiders later this year.

Tell Me, Now in Excel for Mac

The 'Tell Me' feature allows Mac users to enter words and phrases about what you want to do next. It then suggests the tools, features and / or functions you want, in order to use or perform the action(s) you require. It may also be used to get additional help with a task.

You can find the Tell Me feature to the right of the light bulb in Excel (it's also in Word and PowerPoint). Simply click it and type what you're looking to do.
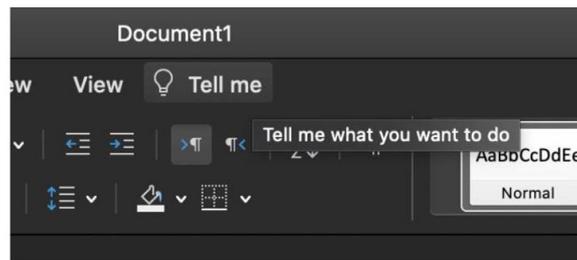
This feature is available to Office 365 subscribers on Insider (shouldn't that be Beta now?) build 16.36 (20041300) or later.

Data From Picture in Excel for Mac

And there's more. 'Data From Picture' in Excel for Mac allows you to turn images with table data into real data you can edit in Excel. This may use a screen clipping, an image already stored or from an iPhone camera, for example.

To use 'Data From Picture', first you need to capture the content you want to digitise, *e.g.*

- select **Insert -> Data From Picture -> Picture From File:**
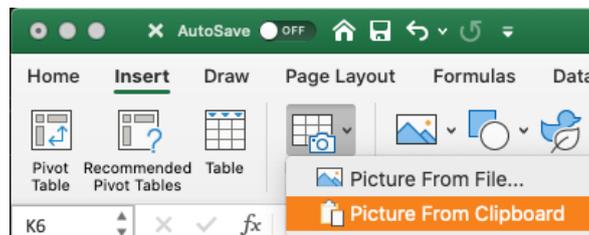
- copy an image of a table to your clipboard, say, by taking a screenshot of a table by pressing **SHIFT + CMD + CTRL + 4**, and then select **Insert -> Data From Picture -> Picture From Clipboard**
- right-click a cell, and select 'Scan Documents' (this requires an iPhone configured to use *Continuity Camera*). Make sure you have good lighting and focus on the data, and then tap the button to take the picture. If you're satisfied, tap the Save button to send it to Excel.
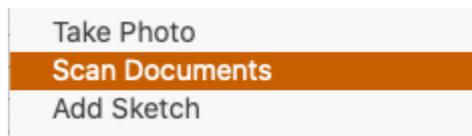
After you have captured the picture of the content you want to bring into Excel, the 'Data From Picture' dialog box opens and shows the progress as the image is being analysed. The results generated should be reviewed and amended as necessary. Then, select 'Insert Data'.
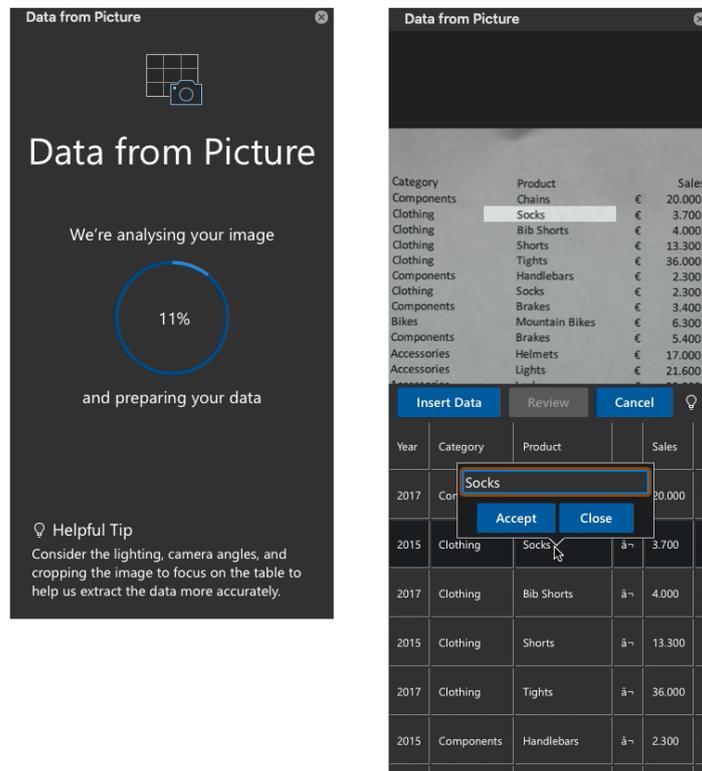
There are several scenarios that come to mind readily:

- Scan some data from a book or magazine (subject to copyright, obviously!)
- Screen capture a table from a website
- Take a picture of some printed data.

This feature is also available to Office 365 subscribers that are Insider (Beta) users on version 16.36 or greater.

New Update Channels

We covered the recent announcements about Office 365 being renamed in last time's newsletter. That caused a little commotion, so I thought I would try and upset you all a little more this month…

Recently, Microsoft has announced a new update channel, the **Monthly Enterprise Channel**, in response to those who wanted to use the Current channel but with just a little more "predictability". This came into effect from 12 May.

Furthermore, from 9 June, new Office / Microsoft tenants will be provided with a new default channel – instead of the Semi-Annual Enterprise channel, the default update channel for Enterprise will be the Current channel. This will **NOT** cause any changes for existing tenants.

But it gets better.

Additionally, on June 9, Microsoft is also updating the names of the existing update channels "…to offer admins *(sic)* more clarity into our servicing strategy…":

Old Name	New Name
-	**Monthly Enterprise Channel**
Insider	Beta Channel
Monthly Channel (Targeted)	Current Channel (Preview)
Monthly Channel	Current Channel
Semi-Annual Channel (Targeted)	Semi-Annual Enterprise Channel (Preview)
Semi-Annual Channel	Semi-Annual Enterprise Channel

If you use an automatic deployment rule (ADR) to deploy updates, by using Configuration Manager, you may need to make changes due to the update channel name changes. Microsoft advises that any ADR changes should be made **after** June 9.

You may want to update your organisation content and documentation to reflect this change.

Let the street parties start now, COVID-19 restrictions notwithstanding.

New Protected Sheet Icon

For those in the Office 365 Insider channel (now called the Microsoft 365 Beta channel, if you are keeping up to date with the last two newsletters!), there's a new icon for your sheet tabs:

See the small padlock icon? If you protect your worksheet (**Home -> Format -> Protect Sheet…** or **ALT + T + P + P**), you will see this image. Now, if you password protect your workbook and then forget your password, well, that's a *different* story…

You Might Need to Read the Manual for Automatic Calculations

It actually occurred with little to no fanfare a while ago, but Microsoft has "…made a little tweak…" to how Excel saves the calculation setting, so that manual calculation settings don't cause so much disruption when you have several workbooks open together and decide to save one or more.

The software giant has changed the settings so that Excel should only change a workbook's saved calculation mode *if you set it yourself during that session*. Therefore, if you don't touch the calculation mode setting, it will retain the original calculation state for each workbook. That's great news and stops the proliferation of manually calculating workbooks propagating through an organisation.

For example, consider two workbooks, *Manual*, set to manual calculation setting and *Auto*, set to automatic calculation setting:

- open *Manual*
- this causes Excel to be in manual calculation mode
- Open *Auto*
- Excel stays in manual calculation mode
- save *Auto*
- Excel no longer sets the calculation mode in *Auto* to manual (it would have done in the past!).

That's going to save a lot of unknowing heartache…

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 creating loops.
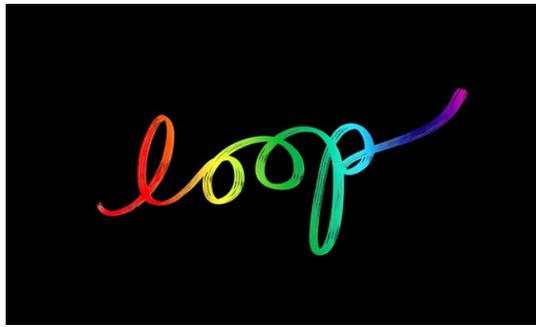
Last month, we showed you how to declare variables. This time, we're going to use a variable to create a loop. Let's introduce the **For loop**.

The basics of the For loop involve taking a variable, incrementing it until it gets to a certain target number, and performing a bit of code for each incremental step. It looks a bit like this:

```
For X = 1 to 10
<Do this code for each of the 10 times>
Next X
```

We can use this to put together a simple example that counts the number of coin flips land Heads when we flip them 10 times. Let's combine a few of the things that we've learned. If you like, you can copy the text below into VBA, or type it out yourself.

```
Sub FlipCoins()
Dim X as Integer
'Declare an integer that will be incremented
Dim Heads as Integer
'Declare a variable that will store the number of times a coin lands as Heads
Heads = 0
'Set the initial value for the counter to be zero
For X = 1 to 10
If Rnd() >= 0.5 Then Heads = Heads + 1
'Take a random number between 0 and 1.  If the value is greater than or equal to 0.5, then add one to
the Heads counter.
Next X
MsgBox "You flipped" & Heads & "Heads over 10 coin flips.  Well done!"
End Sub
```

Have fun flipping coins. More next time!

Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we look at negating formulae in Power Pivot.

You may recall that previously we were creating a measure that calculated refunds. Let's now consider that we want to have that measure be negated. To do this, go to the 'Power Pivot' tab on the Ribbon and then click on the Measures drop-down menu:
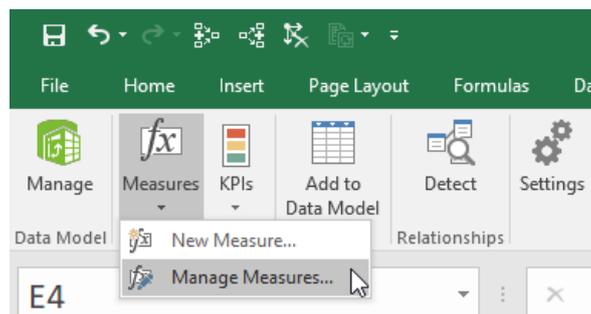
The 'Manage Measures' dialog box will appear, allowing us to select the 'Refunds' measure. Next, select the 'Edit' button:
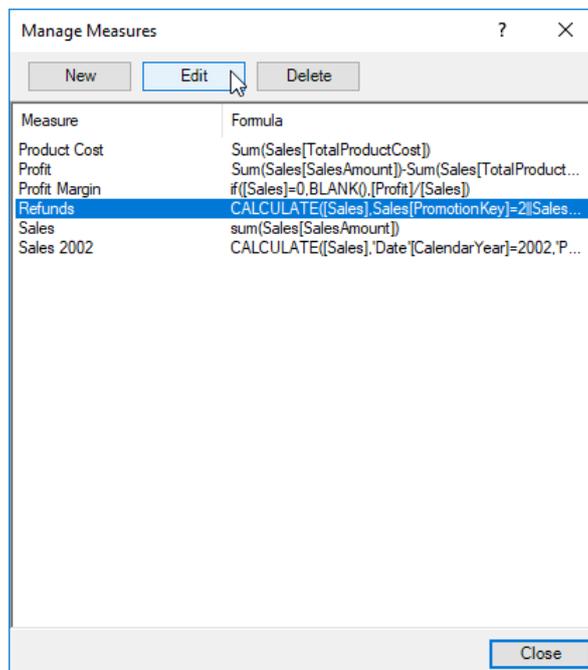
The 'Refund' measure will appear, where we can add a negative operator in-front of the formula *viz*.
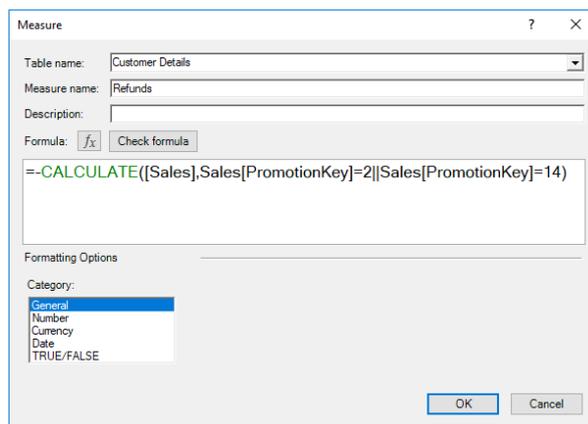
On some occasions, negating the formula via this method does not seem to work DAX. Further the minus sign – straight after the equals sign – can easily be missed by the unwary. There is a simple, safer option: multiply the entire formula by negative 1 instead:
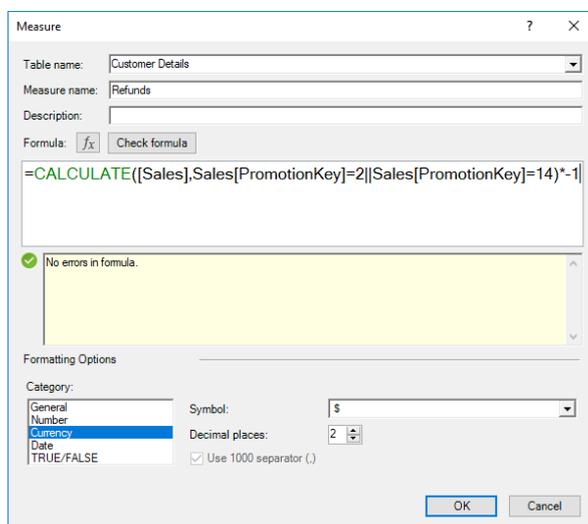
More *Power Pivot Principles* next month.

Get Data From PDF

For all the perennial whingeing we do about changes to Excel, Office and Windows, sometimes it's just *great* to see new stuff emanate.

Here is one such example. Without doubt, one of the most common questions we ever get at SumProduct is, "how do I extract data from a PDF file? Do you have any good software recommendations?".

Well – look at this:
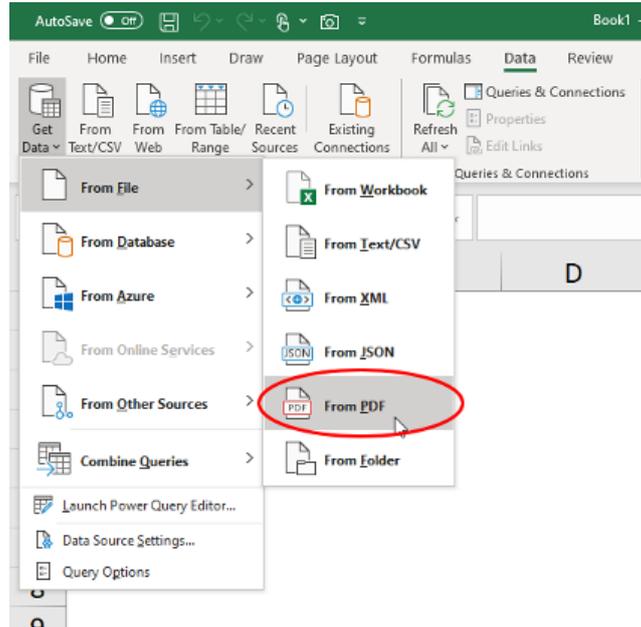
The latest release of The Artist Formerly Known as Office 365 Excel Insider (Fast) – and now Microsoft 365 Excel Beta Channel – has now gone out and beta'd itself. Power Query / Get & Transform has a new buddy, **Get Data From PDF**. There will be cheering from the rooftops for this one.

Only in the 365 Beta version presently, you may access this feature by going to **Data -> Get Data -> From File -> From PDF** (**ALT + A + PN + F + P**). We don't know how well it works yet – hey, this is hot off the press – but it's a start!

Office Insider / Beta Channel File Opening Issue Workaround

Now I know not everyone uses Office 365 / Microsoft 365 / whatever it's going to be called next week. And I know even fewer use the Insider / Beta channel. But just in case you do, there seems to be a problem for some of us (not everyone) with installing the latest Windows and Microsoft 365 updates.

You may find yourself trying to open a file directly from email or from a website and be confronted with one of these two messages – either:
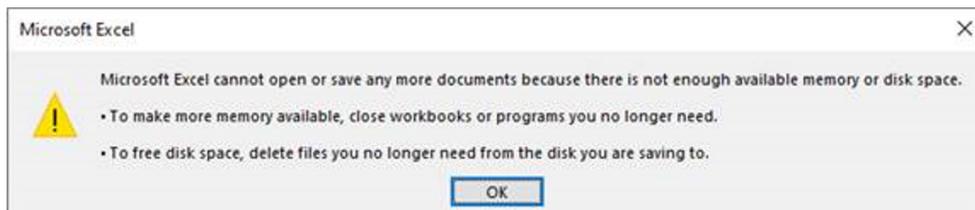
or:
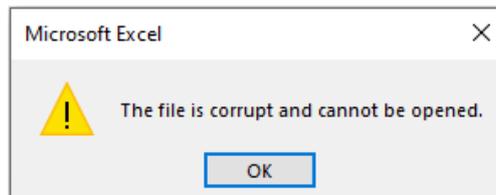
It's frustrating, but fellow Excel MVP David Benaim has come up with a way around this problem.

Rather than try to open the file directly, save the file instead. Then, go into File Explorer (**Windows Key + E**) and right-click on the saved file and access the Properties dialog:
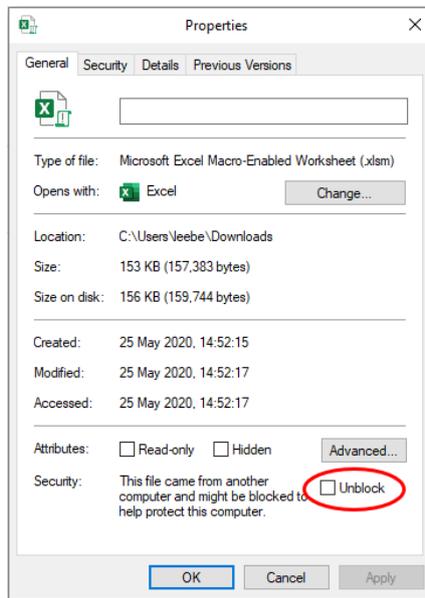
On the first tab, General, at the bottom you may note a new 'Security:' section, explaining that the offending file came from another computer and may have caught the coronavirus. To access it, you will need to tick the Unblock checkbox.

Whilst it's great that Microsoft is out there trying to save us from ourselves, it may get a little tedious if you have 200 files to download. There is a 'global' workaround, **BUT WE DO NOT RECOMMEND IT AN URGE YOU NOT TO "FIX" THE SITUATION THIS WAY**.

But, just in case you need to – and you know what the ramifications of the following are – this situation may be avoided as follows.

The issue appears to originate from 'Protected View'. As a reminder, an

Office document that opens in 'Protected View' mode cannot be edited until you acknowledge some sort of trust of the source of this document. To do this, you need to click the 'Enable editing' button upon opening so that you can edit the document. However, this is usually temporary. Next time you open the document, it may still open in 'Protected View' mode.

With this borne in mind, to counter our above issue for Excel files (for other Office products, the idea is similar), you could take the following ill-advised steps:

- Select **File -> Options** in Excel and select the final option in the left-hand column, 'Trust Center'
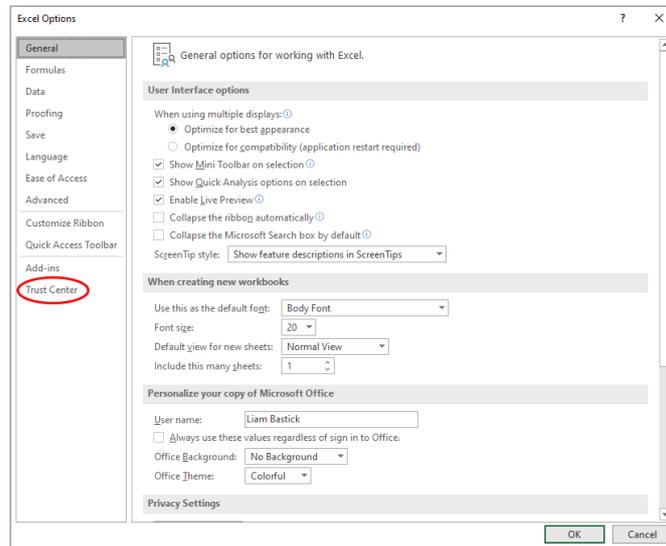
- Click the 'Trust Center Settings…' button
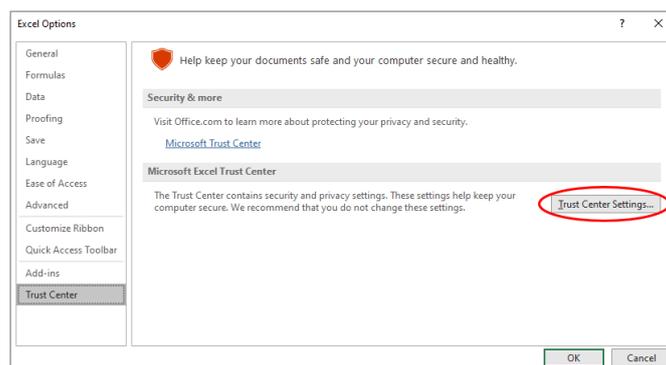
- In the resulting dialog, select 'Protected View' from the left-hand column and then de-select the first three checkboxes in the main pane to disable 'Protected View'
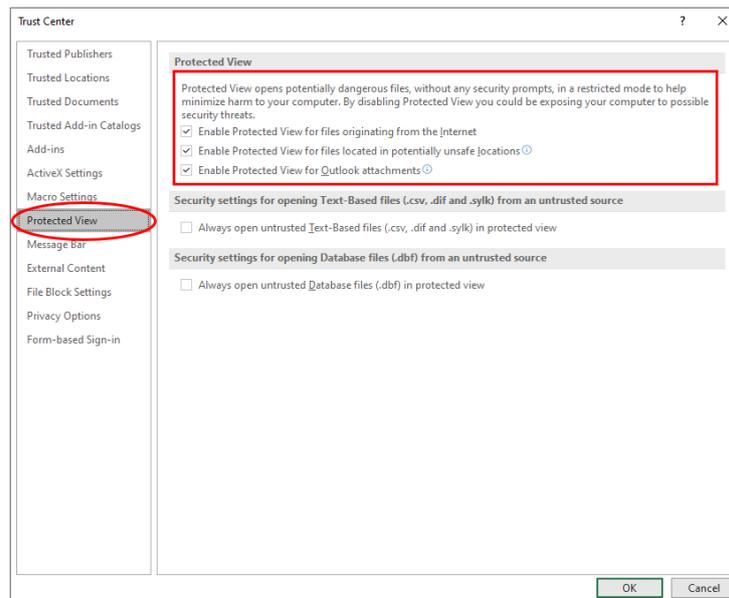
- Once these have been de-selected, click OK
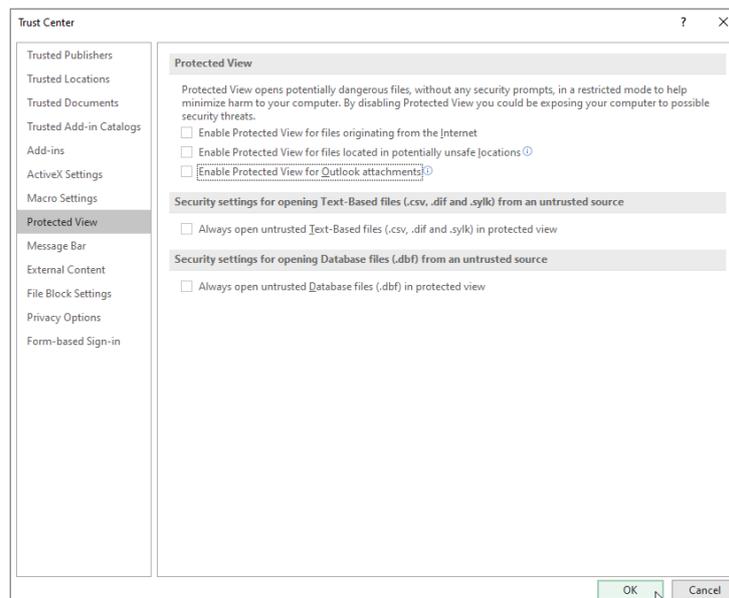
Your problems for opening files directly from the internet or email should now go away, but you may have created more problems than you have solved!

I can't stress enough how much I **DON'T** recommend this option. If you do have to do it to open numerous files, do remember to re-enable 'Protected View' afterwards.

It is noticeable that Microsoft is on the ball with this particular issue. I suspect this one might be remedied very quickly. This is what tends to happen when you try Beta versions of software. Personally, I like seeing these new ideas. Of course, there will be glitches, but as long as they don't fry my hard drive, personally, I am happy to take the rough with the smooth. This is just a bit of rough!

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 look at how to merge queries to compare two similar lists.

Sometimes, the tasks we have to do are less than thrilling. For example, you could be given two long lists of employees, and told to find who is missing from each list:

With Power Query, there is an easy way to do this.

We have two lists of employees which look virtually identical, but of course they are not. The first step to take is to use Power Query to load the lists. Let's begin by creating our first query.

On the 'POWER QUERY' tab (in Excel 2013, else the 'Get & Transform' section of the Data tab on the Ribbon), let's use the 'From Table / Range' option in the 'Excel Data' section. You may either convert the data into a Table before you use this option or else let Power Query do this as part of the query creation.

Our data appears in a new query, which we will call 'Employee Table 1'. Choose the 'Close and Load to' option on the 'Close and Load' section on the Home tab.
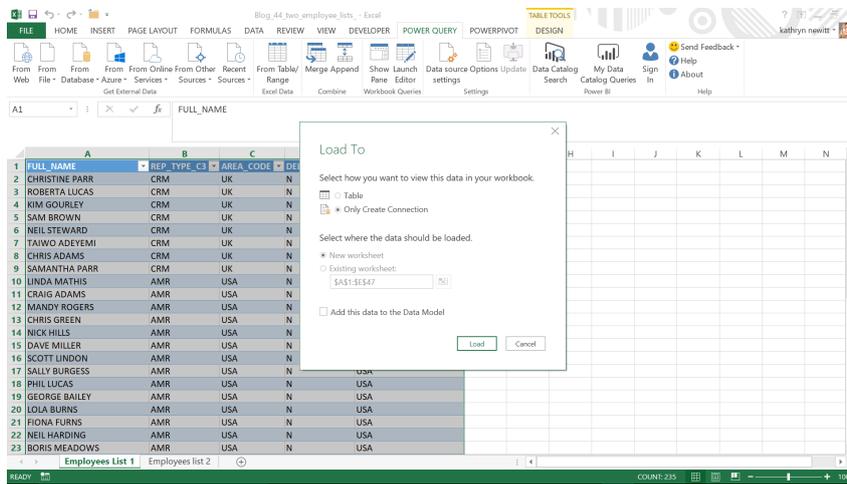
We only want to create the connection as we are going to use these queries for comparison. Having created the first query, we will repeat the process for the second employee list.
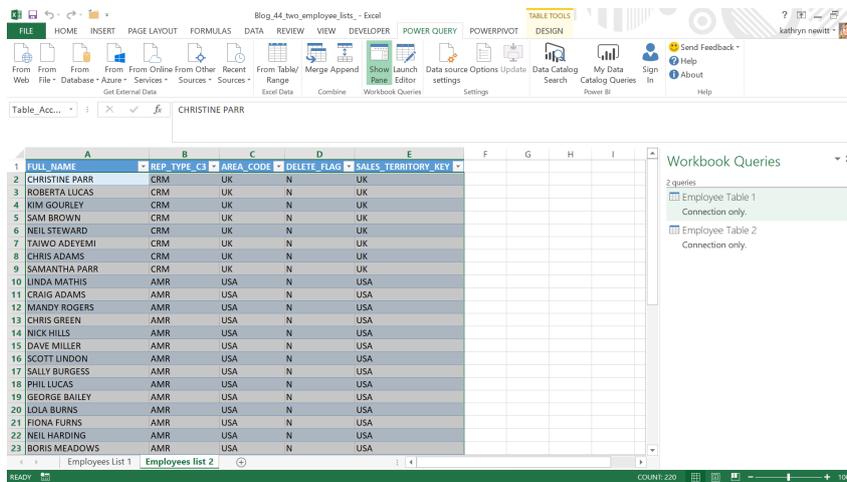
Our next step is to merge these queries. To do this, we can right-click on one of the employee queries (else use the option from the Combine section of the 'POWER QUERY' tab).
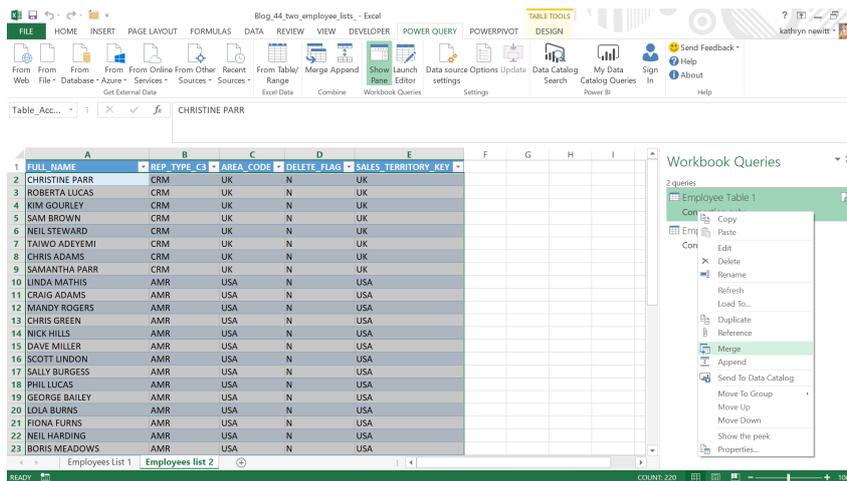
Select the Merge option.
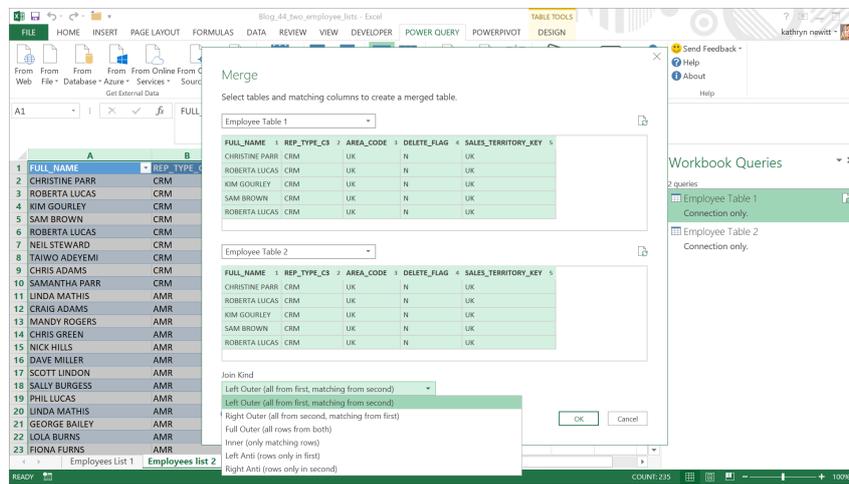
In the 'Merge' screen, we will specify the second employee table, and then we will see a preview of the data in both queries. We want to merge these tables completely, so select all columns in both tables.

At the bottom of the screen we have the option to specify the 'Join Kind', and this will determine what data I see when the queries are merged.

Here, we are interested in the joins that will either find our matching or missing data, which are the last three on the drop down.

Let's go through several of these options now.

'Inner'

This will give us those employees that are on both lists. Pick this option first.
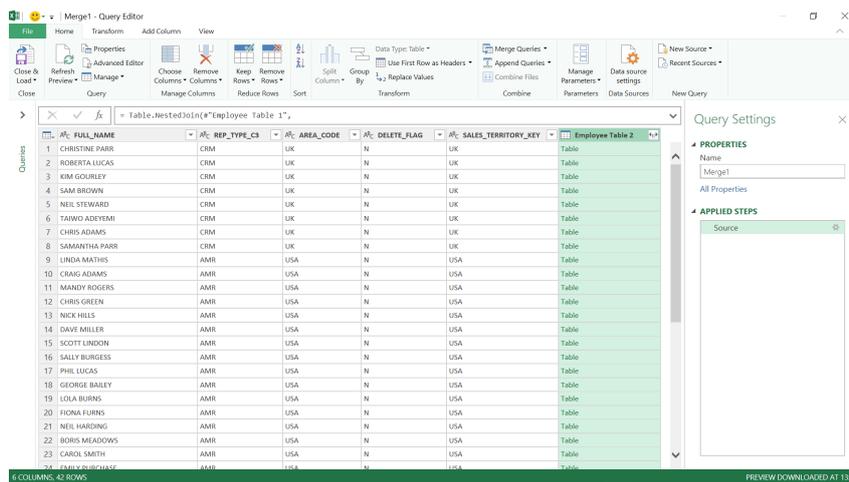
The rows we can see initially are those rows which match the criteria in the first table, and I have an extra column which is labelled 'Employee Table 2', which contains a table. Choose to expand the second table to see which rows match the criteria in the second table:
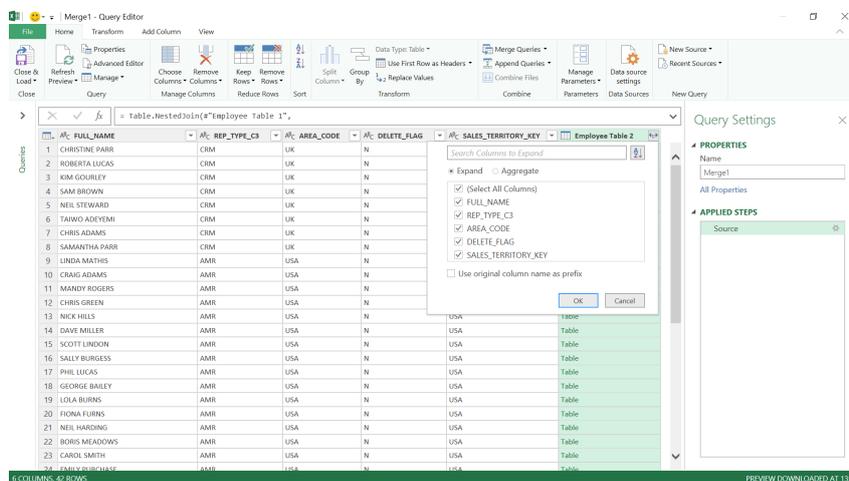
We don't need to use any original column names as a prefix, so uncheck that box and choose 'OK'.

I have 42 employees in both tables.

'Left Anti'

Let's opt to merge my tables again, and this time we will pick join type 'Left Anti'.

This time, we are interested in the first table, since this will show us those employees in 'Employee Table 1' who are missing from 'Employee Table 2'. We find four employees and two seem a little familiar… Notice Zoe, as she'll come up again later…

Just to show that the second table will be empty (as we are looking for employees that don't appear here), we may expand the table *viz*.

'Right Anti'

The last final choice we will look at here is to create a merge with a 'Right Anti' join. In the Power Query Editor, this looks a little strange before we expand the table:
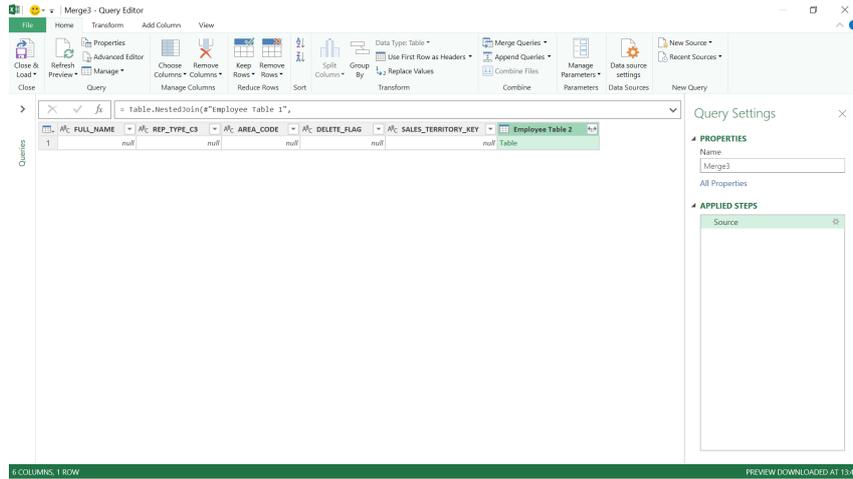
This is because we are seeing the results from the first table, and since we are looking for values that are in the second table and not in the first table, it is empty. Further, if we choose to expand the second table:
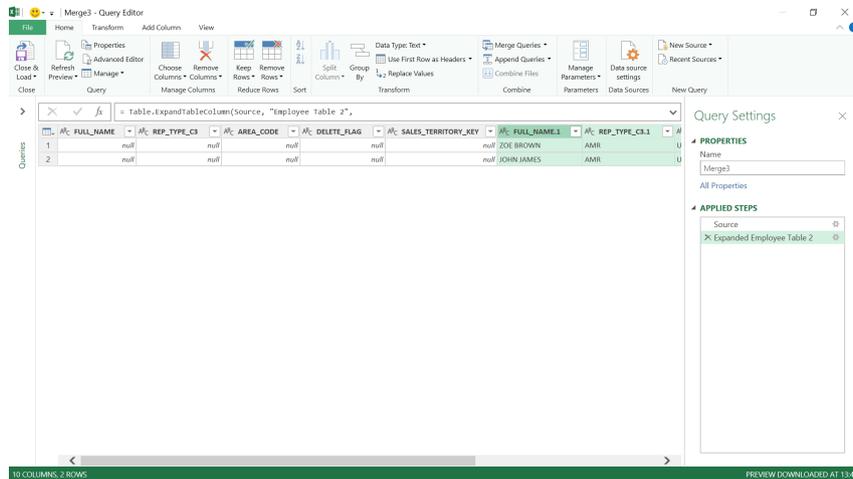
We see we have two employees that are missing from the first table – and it wouldn't take too much investigation to discover that Zoe has changed her name from Green to Brown!

More next month!

Power BI Desktop Latest Updates

You may have noticed the usual monthly Power BI Desktop updates were missing from last month's newsletter. This is because they were delayed, in order to be announced at the virtual Microsoft Business Applications Summit (MBAS) instead, which was held on Wednesday, 6 May. If you missed it, you can check out some of the highlights at https://www. microsoft.com/en-us/businessapplicationssummit.

So we've doubled up this month! Anyway, there were the usual multitude of updates (times two!), including a new visual personalisation feature to allow end-users to explore and customise visuals all within the consumption view of a report. But that wasn't all: if you're interested in fast refresh scenarios, these were accommodated too.

Further, it was announced that in light of the current COVID-19 pandemic, Microsoft has decided to give more flexibility by providing an additional month for users to move over to the modern filter experience before all reports in Power BI Desktop and Power BI Service are automatically migrated. Therefore, users had a little more time to update your reports so you can tweak / customise any of the Filter pane formatting before your reports were scheduled for an auto-upgrade in May. Given the printing deadlines for this newsletter, we cannot be sure this has actually occurred, as at the time of writing.
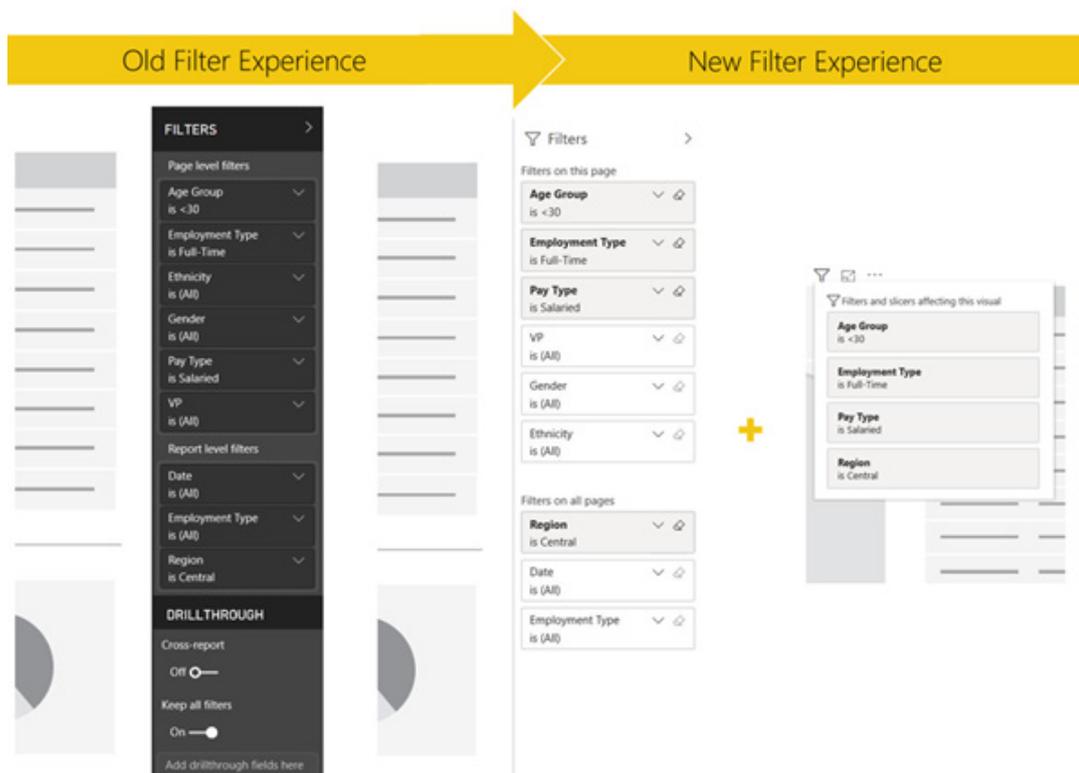
In any case, here's the full list of updates:

Reporting

- Personalize visuals (Preview)
- Change detection for page refresh (Preview)
- Relative time filter (Preview)
- Rectangular lasso select across visuals
- Conditional formatting for totals and subtotals in table and matrix
- Customize theme dialog is now Generally Available
- Improved discoverability for conditional formatting
- Curate featured tables for Excel (Preview)
- Apply all filters (Preview)
- Enhancements to change detection (Preview)
  - Change detection simulation in Power BI Desktop
  - Change detection queries in Performance Analyzer

- Drill through button action is now Generally Available
  - Conditionally set the drill through destination
  - Conditionally format disabled and enabled state ToolTips
  - Customise formatting for the disabled state
- Enhancements to page navigation action
  - Conditionally set the navigation destination
  - Support for shapes and images
- Buttons now support fill images
- Drop shadow support for visuals
- Filter pane migration

Analytics

- Direct Query support for AI visuals:
  - Decomposition tree
  - Key influencers
- Decomposition tree now supports ToolTips
- Decomposition tree is now Generally Available
- Q&A updates:
  - Suggest questions
  - Teach Q&A now supports measure conditions
  - Q&A is now supported on Power BI datasets

Visualisations

- Radar/Polar chart by xViz
- Comicgen by Gramener
- Pareto by sio2Graphs
- Growth Rate Combo Chart by Djeeni
- Smart Filter Pro by OKViz
- New Visualization icons
- Packed bubble chart by xViz
- Updates to hierarchy filter by xViz
- Power Apps visual is now compatible with all languages supported in Power BI

Template Applications

- Power Platform Center of Excellence StartKit
- Azure Cognitive Search: analyze logs and metrics
- COVID-19 Apps

Modelling

- List separator and decimal symbol will now default to the standard DAX separators

Data Preparation

- Enhancements to Query Diagnostics
- Direct Query on Dataflows
- Web by example now automatically suggests tables by default
- Enhancements to Query Diagnostics: Privacy Level partitions

Other

- New instructor-led training
- Dataset impact analysis.

Let's take a look at each in turn.

Data Connectivity

- CDM Folder view for Azure Data Lake Storage Gen2
- Witivio connector
- Linkar connector
- Webtrends connector
- Planview ProjectPlace connector
- Shortcuts Business Insights connector
- Vessel Insights connector
- Zoho Creator connector

Personalize visuals (Preview)

Previously, the way you could explore and modify the properties of a visual was by being in the full-editing experience (which can be quite foreign or not an option to many end-users without edit access), else have the report author duplicate the visual, make the requested modifications, and save it as a report bookmark.

That has now changed. With this update, you can empower your end users to explore and personalise visuals all within the consumption view of a report.
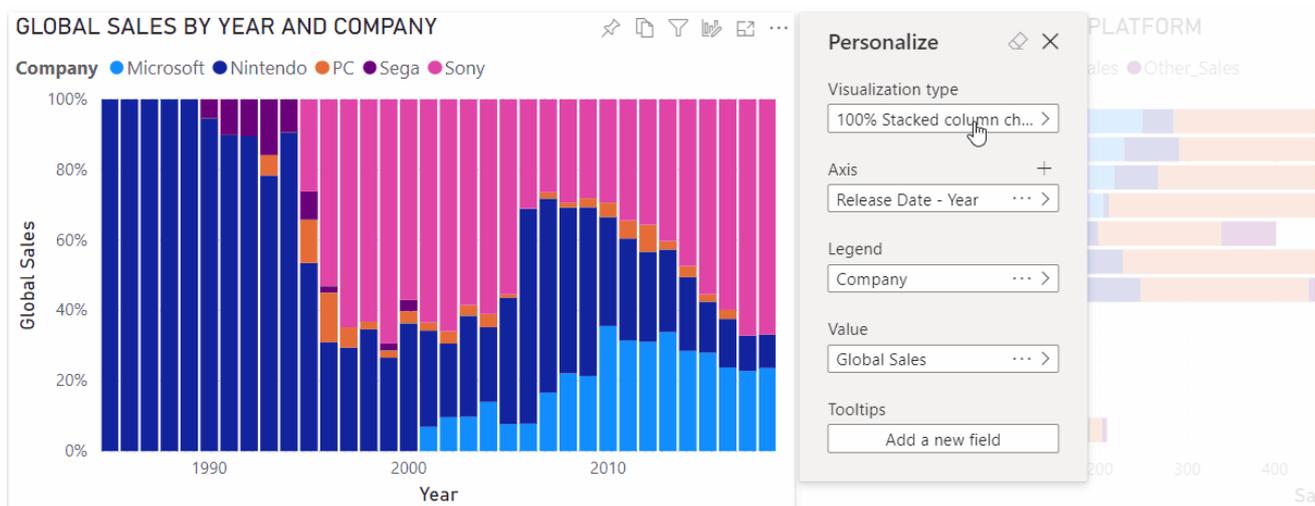
Using this feature, your end users may explore a visual in many ways:

- change the visualisation type
- swap out a measure or dimension
- add or remove a legend
- compare two or more different measures
- change aggregations, *etc.*

Not only does this feature allow for new exploration capabilities, but it also includes ways for end users to capture, share and revert / restore their changes:

- capture their changes
- share their changes
- reset all their changes to a report
- reset all their changes to a visual
- clear out their recent changes.

Since this feature is in Preview, you will need to first turn on the feature switch by going to **File -> Options and Settings -> Options -> Preview feature** and make sure 'Personalize visuals' is turned on:
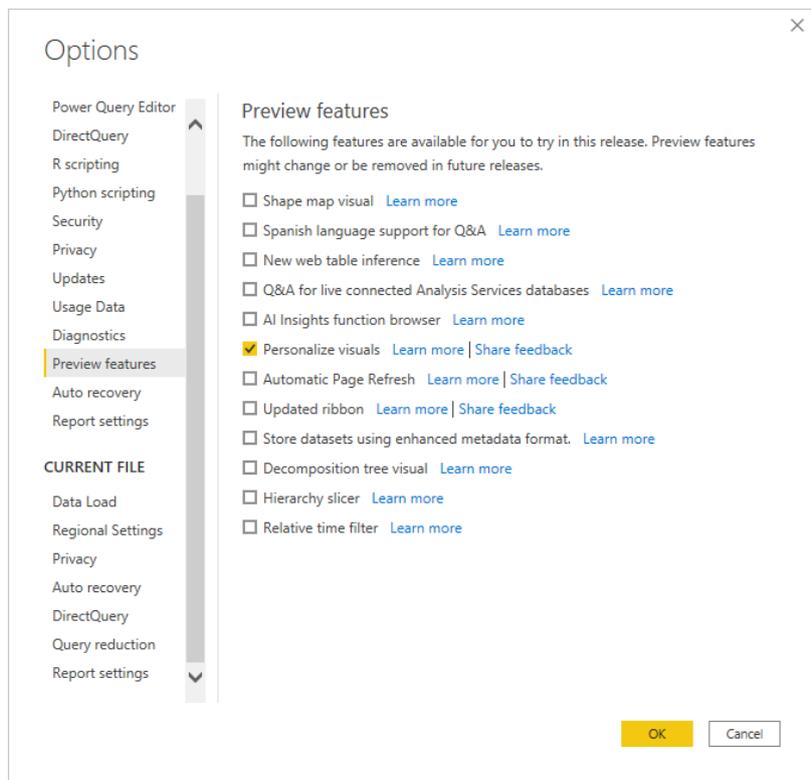
After you turn on the Preview switch, you will need to specifically enable it for the reports that you want end users to be able to personalise visuals for.

To enable the feature on in Power BI Desktop, you will need to go to **File -> Options and Settings -> Options -> Report settings** for the **CURRENT FILE** and make sure 'Personalize visuals (preview)' is turned on.
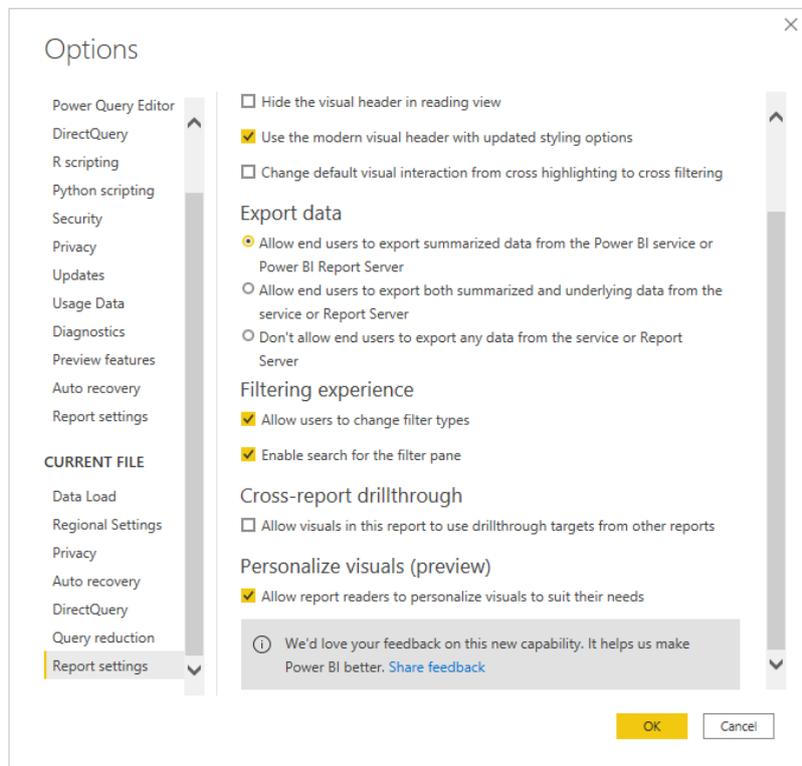
When you enable this setting for a given report, all visuals in that report will have this on by default. If you want to customise which visuals have this experience, you can toggle on / off this setting per visual in the visual header section of the Formatting pane:
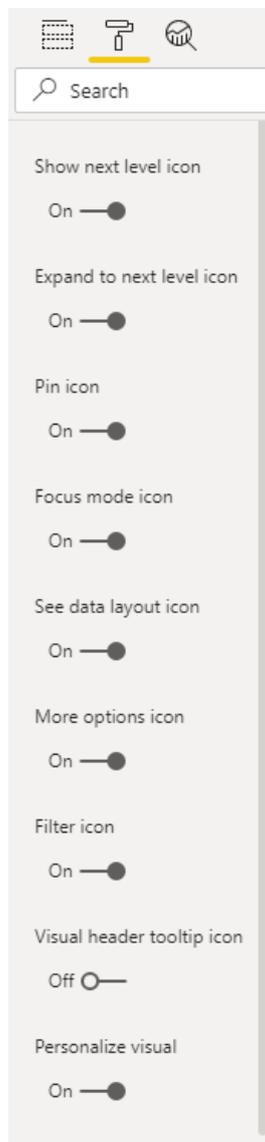
Change detection for page refresh (Preview)

There is now a new option for automatic page refresh, so that your page refresh is based on change detection rather than a specific refresh interval. We have been looking forward to this one. For frequent refresh scenarios, it can be very inefficient to continuously send all queries to the source, especially if the data has not even changed.

For example, if you are monitoring tweets, these might come into your model very often or between longer periods of time. If you query the data source in a constant, frequent interval, it may result in unnecessary queries and expensive resource usage. A better approach would be to have a query that runs in the background to check if data has changed and only refresh your entire report page if a change has been detected. Therefore, with this release, a new Change detection option has been added to specify how Power BI should query for changes to your Direct Query source, specifically, which measure should be evaluated and how frequently changes to that measure should be checked for.

To enable this feature, again, you will need to first turn on the 'Automatic Page Refresh preview' switch in the Options dialog:
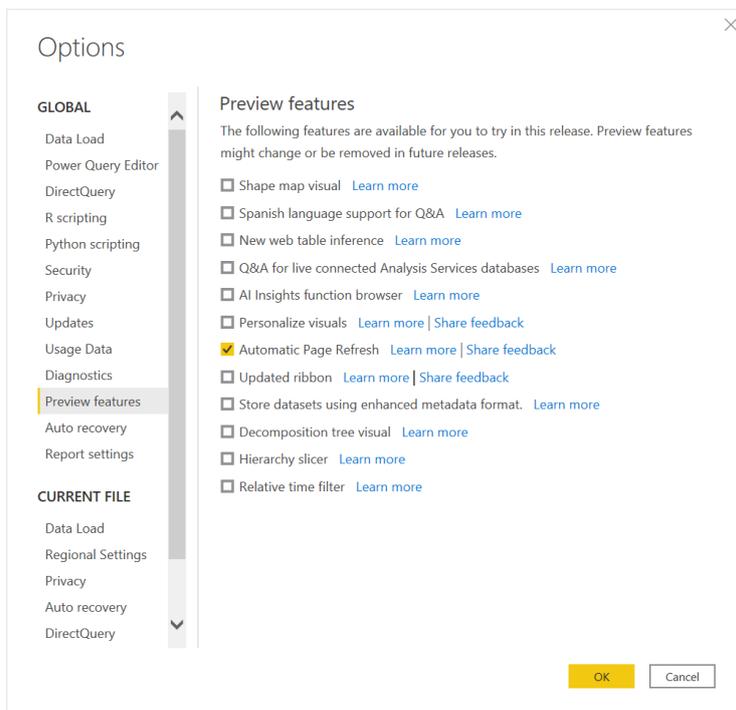
After you have turned on the Preview switch, there are several ways to access this new capability:

• go to the Modeling section in the Ribbon and select 'Change detection'
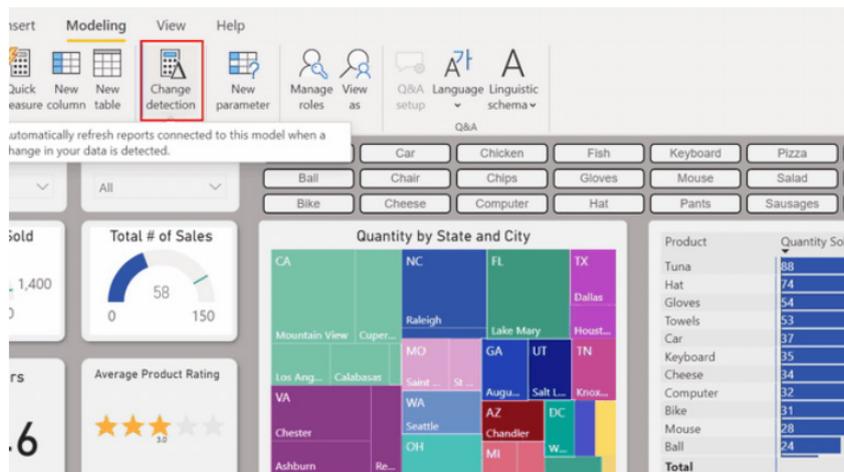
• right-click in the field list and select 'Change detection' for the same outcome
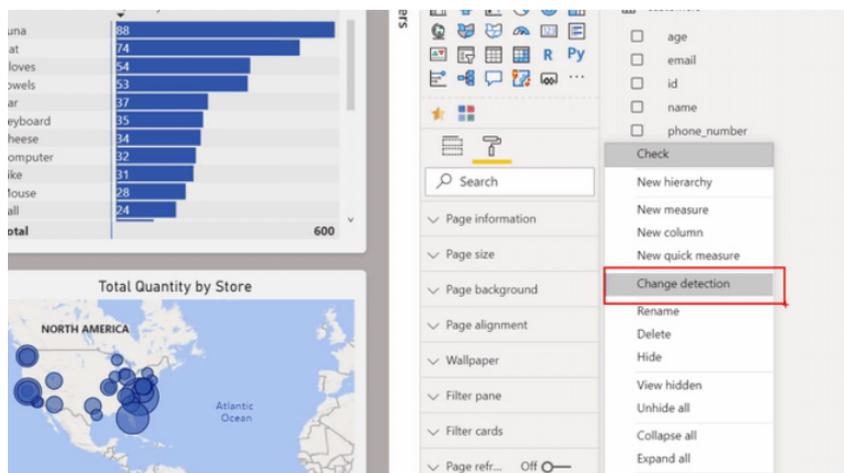
• go to the 'Page Formatting' pane and select 'Add change detection' in the page refresh section.
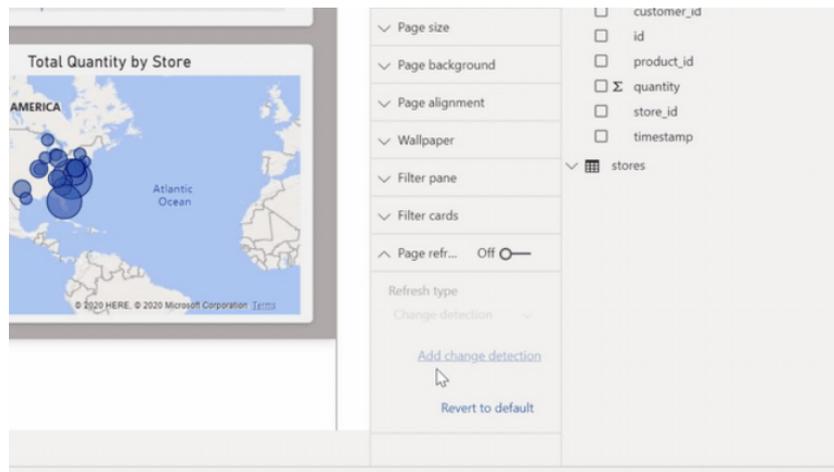
Authors have two options to create a change detection measure. You can

1. choose one that is already in their model
2. create a new one based on common scenarios, such as latest date or count of rows.

Finally, you will need to specify how frequently we should check for changes to that measure.
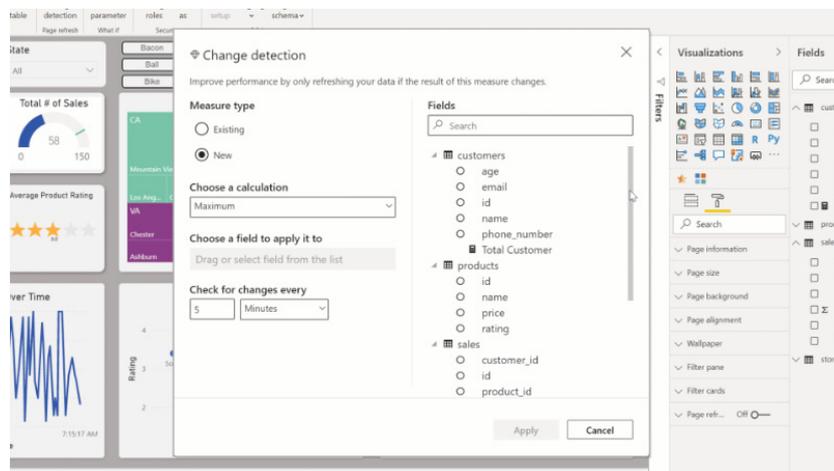
Once this is done in Desktop, you can publish the report to Power BI Service. Change detection will only work if the report is published to a Premium workspace and the feature is enabled in the Premium capacity. Also, since administrators can define the minimum interval allowed for change detection, Power BI will respect that minimum even if the author set up a more frequent interval to check for data changes.

For clarity and summary, here are important considerations for this new capability:

• only DirectQuery sources are supported
• you are only allowed to specify one change detection measure per model
• in Desktop, when you set up change detection, visuals will not refresh. You will have to publish to the Service for page refresh to work, which includes re-authenticating with the same credentials for refresh
• This is a Premium only feature unfortunately
• Premium capacity administrators must turn this on in the admin portal.
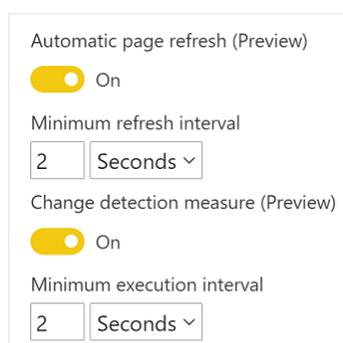
Relative time filter (Preview)

Microsoft has recognised the need to filter to a smaller window of time has become a very popular request. In response, they have announced a new type of filter: relative time filter.

When the filter is applied to the page / report level, all visuals under that level are synchronised to the same time range.
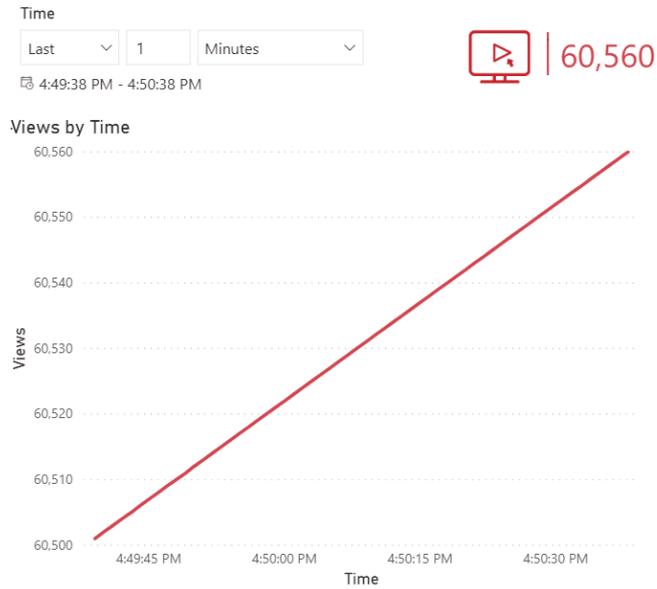

This 'Relative time filter' is in Preview, so, yet again, you will need to make sure you turn it in the Options dialog:
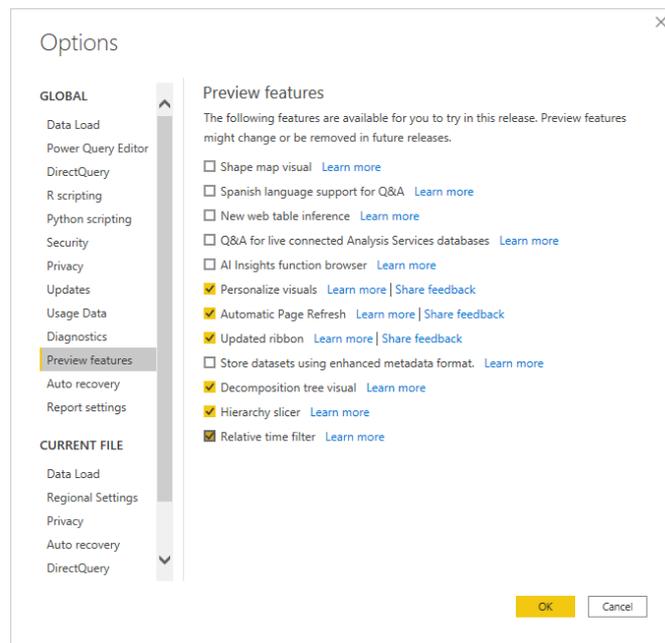

You do not have to use the feature in conjunction with 'Automatic Page Refresh'; however, many of your relative time scenarios will pair best with the automatic or 'Change detection' page refresh feature.

With this new filter type, you will have the option to filter based on **Last**, **Next** or **This** time period for any datetime column in UTC:
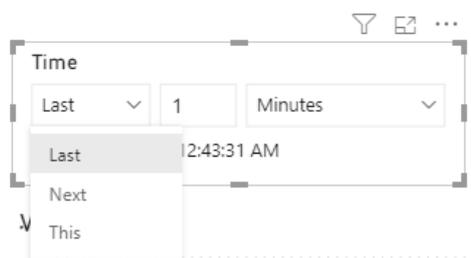
You will be able to specify the time period to be in **Minutes** or **Hours**:
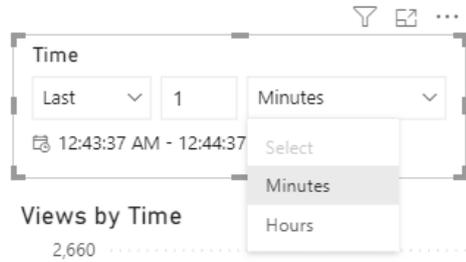
If you need to save reporting real estate, you can also create the relative time filter as a Filter card in the Filter pane:
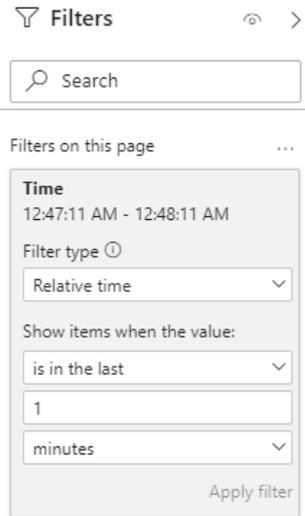
Rectangular lasso select across visuals

You can now select your visuals and other report elements by clicking and dragging over the canvas to create a **rectangular lasso**. All visuals that are entirely encapsulated within the lasso will be selected. If you are holding down **CTRL** or **SHIFT** (as you would multi-select by **CTRL +** clicking individual visuals), further lassoing will add visual selections to the current multi-selection. If a visual is already selected and is lassoed, it toggles off that selection. The lasso will not select single visuals within groups but can select groups by encapsulating the entire group.
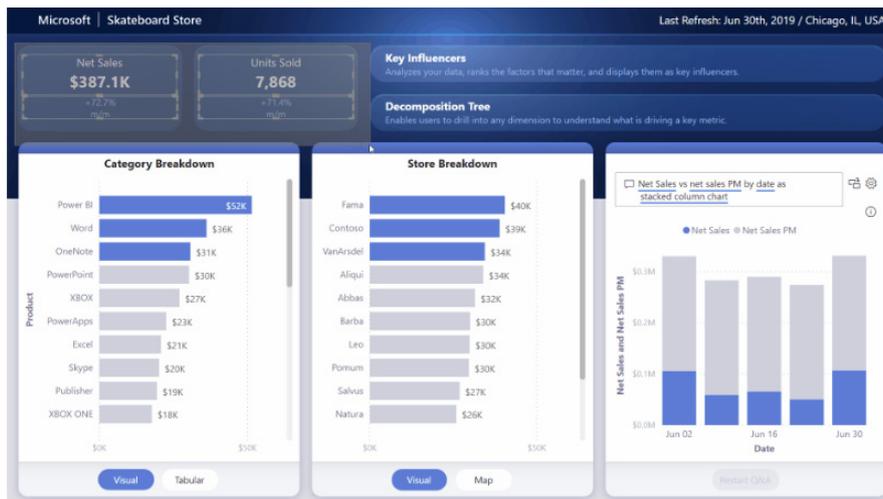
It should be noted that the canvas will not automatically scroll with your rectangular lasso selection, which is a little bit of a pain. This should only affect authors whose report pages are larger than the canvases on their screen.

Conditional formatting for totals and subtotals in table and matrix

At last!! Members of the team are whooping for joy, shouting from the rooftops with this update. Conditional formatting for totals and subtotals has finally come to tables and matrices. Yay!

**Conditional Formatting for Total and Subtotals in Matrices**

4,951 votes

Vote

The recent addition of conditional formatting for values is wonderful. However, it would be great to have the ability format subtotals and totals, as the variation on those fields are often even more important to draw attention to.

518 comments · Custom Visuals · Flag idea as inappropriate…

Yes, you can now apply conditional formatting rules to your totals and subtotals in table and matrix visuals. You will be able to find this new option in the 'Apply to' dropdown in the conditional formatting advanced controls dialog. This feature will work for setting background colour, font colour, icons and web URL.
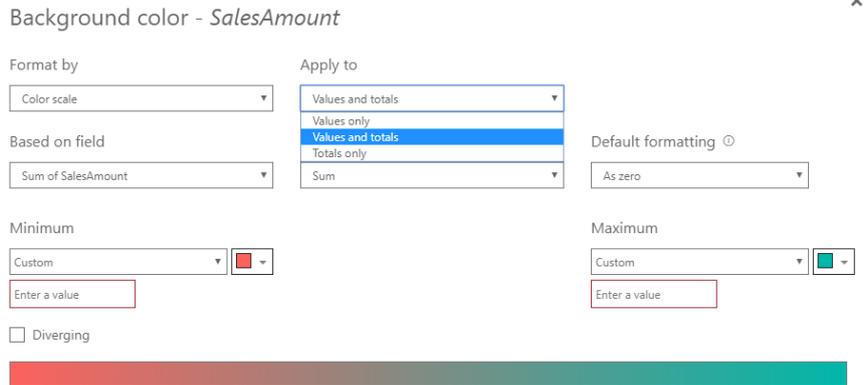
Keep in mind that you will have to manually set the thresholds or ranges for your conditional formatting rules, and that for matrices, Values will still refer to the lowest visible level of the matrix hierarchy.

This is something I know many of our readers / clients have been asking for too, and Microsoft has observed that the capabilities added today won't cover every eventuality. However, Microsoft has gone on record stating that they "…have got (sic) more planned for this feature, but we hope our current solution addresses some of your more basic needs…". Hey, it's a start!

The best way to improve / modify this feature is to ensure that you send Microsoft regular feedback on this feature so that they can modify this latest most welcome addition.

Customize theme dialog is now Generally Available

The new theme dialog is now Generally Available. Let's revisit the details for all the updates to the 'Customize theme' dialog.

CUSTOM THEME SECTION

If you customise a theme in the theme dialog, an icon will represent that custom theme in a separate section in the theme dialog. This icon will update whenever you customise your theme. If you hover over the icon, a ToolTip will show up that explains that the theme is a custom theme. If you define a theme name, it will also show up in parentheses.
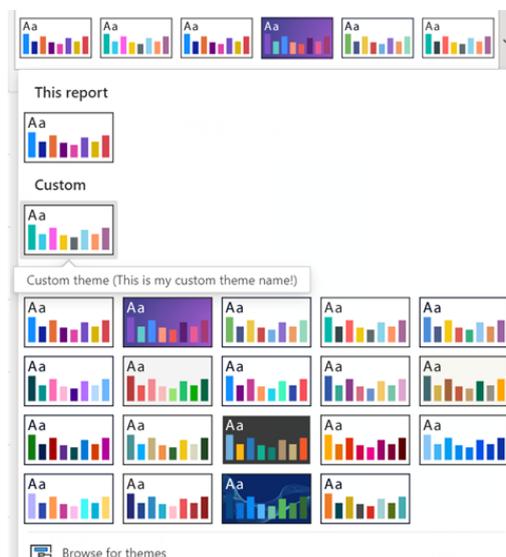
Do bear in mind that the custom theme section currently holds a history of one theme, and if you customise a theme in the theme dialog, those changes will not be saved to your custom theme until you save your theme in the dialog.

SAVE CURRENT THEME

Previously, there was an 'Export current theme' option in the theme dropdown. This text has been updated to 'Save current theme'. You MAY use this option to save a theme in a JSON file.

UPDATE BASE THEME

If you adopt one of the older Power BI themes (Classic, City Park, Classroom, Color Blind Safe, Electric, High Contrast, Sunset or Twilight), you may have noticed that text formatting options were disabled. Now, you can upgrade your base theme right in the report themes dialog to activate these text styling options. Again, remember that you need to save your theme.
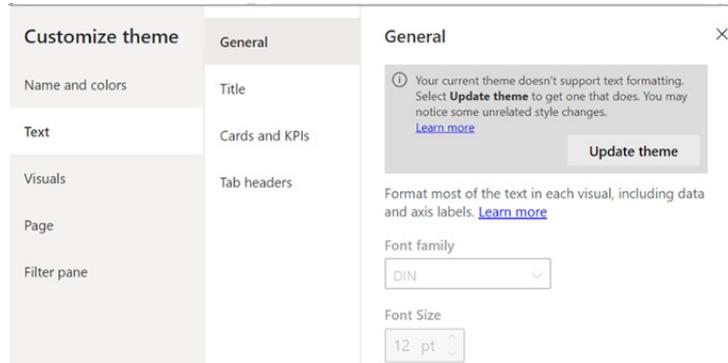
Improved discoverability for conditional formatting

Now that conditional formatting is available for a wider array of objects (like visual titles, tables, matrices and background colours), it has not gone unnoticed that the functionality was difficult to find. Therefore, this update sees the entry point into the conditional formatting dialog made "more discoverable". Now, to access the dialog, simply click the **fx** button to the right of the object you would like to format.

For example, consider the 'Visual title text' option in the Formatting pane:
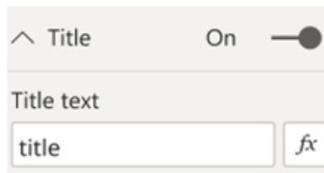
Clicking the **fx** button will bring up the 'Conditional formatting' dialog. After applying a conditional formatting rule, the input field should now look like this:

Since the title text is no longer static, the input box has been replaced by a button taking you back into the conditional formatting dialog. The eraser button on the right clears the conditional formatting rules you have set on the object.

Curate featured tables for Excel (Preview)

With the May release of Power BI Desktop, you can now curate featured tables to be referenced in Excel (Insider or Beta build). This can help you easily link your Excel sheets with authoritative enterprise data.

In Excel's data types gallery, you will be able to find data from featured tables in Power BI datasets, For example, you can feature data on Customers, Product and Suppliers:
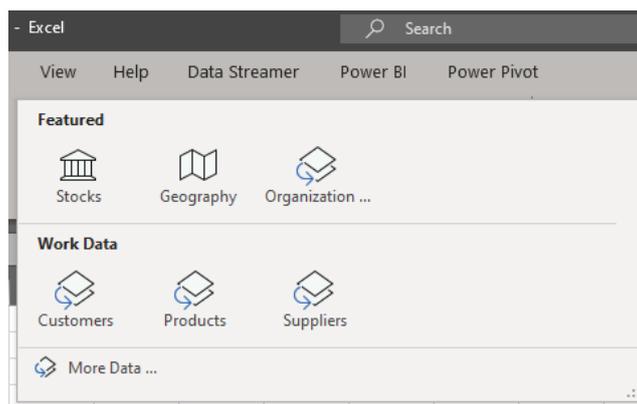
Additionally, by using Power BI's certified and promoted datasets capabilities, you can enable members of your organisation to find and use relevant / refreshable data to assist in decision-making.

In the example below, the 'Let's Stop N Shop' cell is linked to curated, organisational data from Power BI, so you can find the contact information for the owner of the store right within your spreadsheet, *viz*.
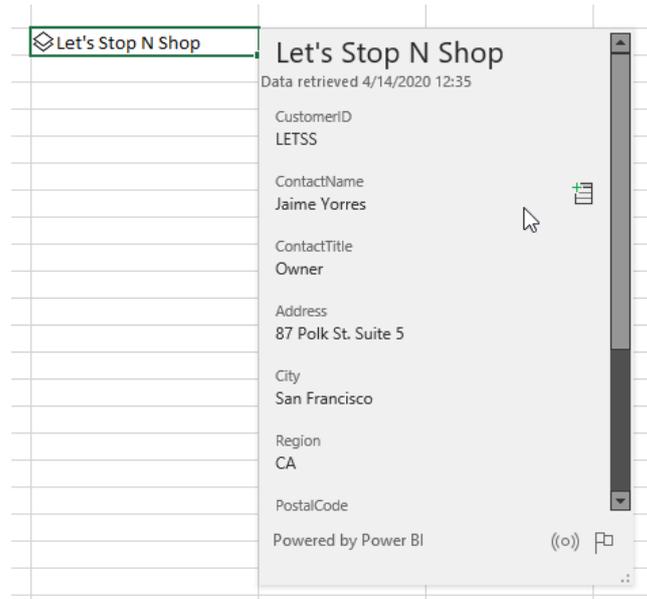

To curate a featured table in Power BI Desktop, you will need to first turn on the Preview switch by going to **File -> Options and Settings -> Options -> Preview features** and selecting 'Featured tables':
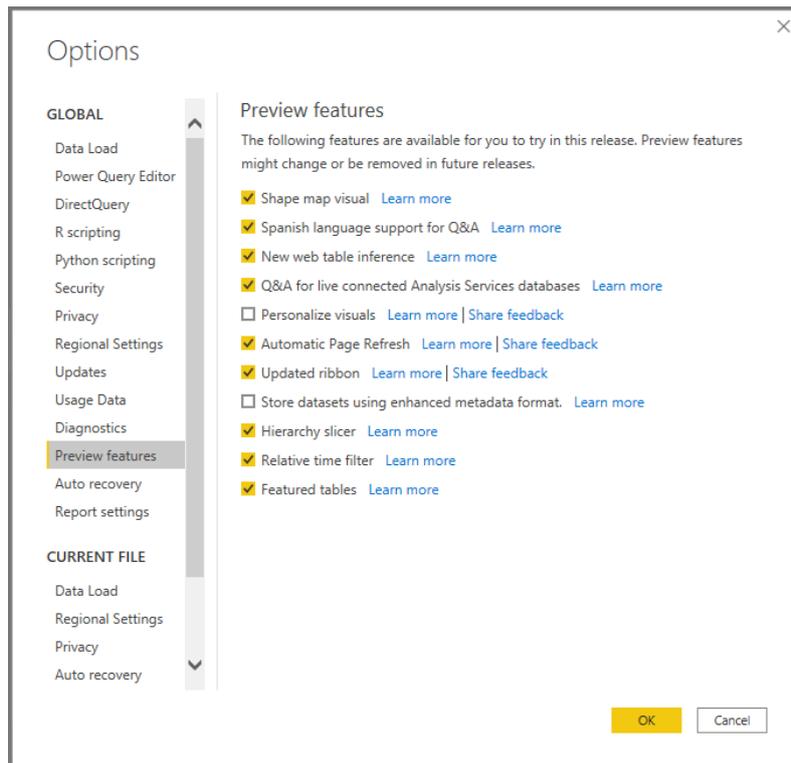
In the model view of Desktop, you can then pick the table that you want to be a featured table to use in other products like Excel. You can do so by selecting the table and setting the 'Is Featured' table toggle to Yes:
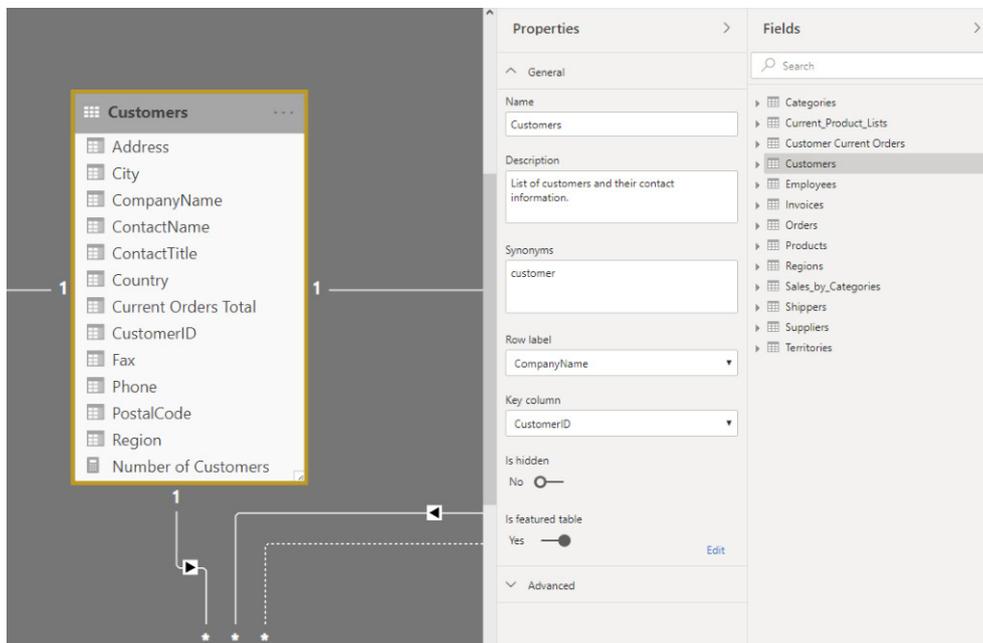
You will then need to use the 'Set up this featured table' dialog to provide the required fields in the table.
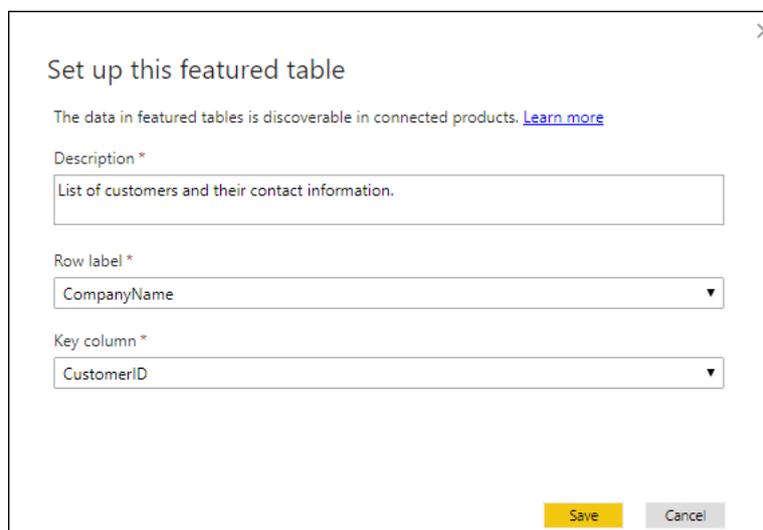
A featured table must have a description, a row label and a key column:

- the 'Row label' field value is used in Excel so users can easily identify the row. It appears as the cell value for a linked cell, in the 'Data selector' pane and in the Information card
- the 'Key column' field value provides the unique ID for the row. This enables Excel to link a cell to a specific row in the table.

For the last point, you will need to publish the dataset to the Power BI Service. After you publish or import the dataset to the Service, the featured table is displayed in Excel's data types gallery.

Excel caches the list of data types, so you'll need to restart Excel to see newly published featured tables. Note that some datasets are not supported in the Preview; featured tables defined in those datasets won't appear in Excel.

If you're a Power BI administrator, you can control who in the organisation may use featured tables in the Excel data types gallery. In your tenant settings, you can find the control to 'Allow connections to featured tables':
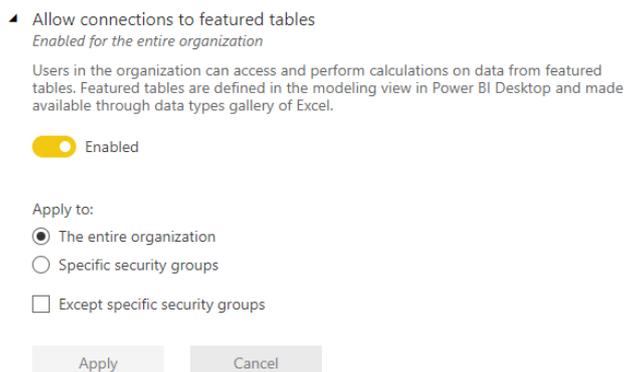
Note that if the 'Export data tenant' setting is set to Disabled, connections to featured tables are also disabled.


Apply all filters (Preview)

Another new feature that will help optimise the Filter pane for query reduction by applying all filter changes at once. Previously, you had two options for filter queries:

1. apply basic filters instantly (the default option) *or*
2. add an apply button to each basic filter.

The first option, to apply the basic filter instantly, was ideal for those who prefer instant interactivity over query reduction. Then, the second option, add an apply button to each filter card, optimised for query reduction instead. However, it required an additional click every time you needed to apply a filter.

Now, Microsoft has added a new option for you to add a single apply button to the Filter pane, essentially, allowing you and your end users to apply all filter modifications at once. This capability will be useful if you want to defer when to apply filter changes, so you only have to wait once after you are ready to apply any filter changes to the report or visuals.
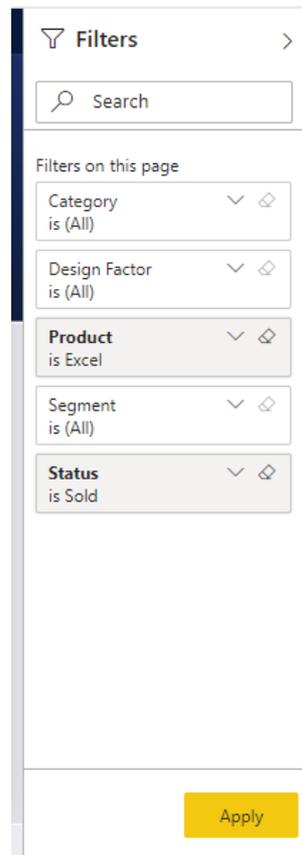
Note that you can set this this feature at a report-level; however, the feature will be off by default. You may turn on this new option in Power BI Desktop by going to **File -> Options and settings -> Options -> Query reduction -> Filters** and selecting the option to 'Add a single Apply button to the filter pane to apply changes at once (preview)'.

Currently, the formatting options for the 'Apply' text for the button are controlled by the following settings in the Filter pane section of the Format pane:

- Font and icon color (controls text color)
- Header text size (controls text size)
- Font family (controls font).

*Enhancements to change detection (Preview)*

Previously mentioned was the capability to have page refresh for DirectQuery sources based on a detected change instead of a fixed refresh interval. This update adds the ability to improve and optimise the performance of your change detection measure through:

- change detection simulation in Desktop
- change detection queries in Performance Analyzer.

CHANGE DETECTION SIMULATION IN POWER BI DESKTOP

Like automatic page refresh, you can now preview the behaviour of your change detection measure in Power BI Desktop. Previously, you had to do this in Power BI Service. To access this simulation, just define your change detection measure and turn on page refresh with the 'Change detection' option turned on and you will be able to preview how the visuals in your report page refresh based on changes detected by the measure. This will help you confirm that your change detection measure is behaving the way it's supposed to and to troubleshoot any issues you might have with this new capability.
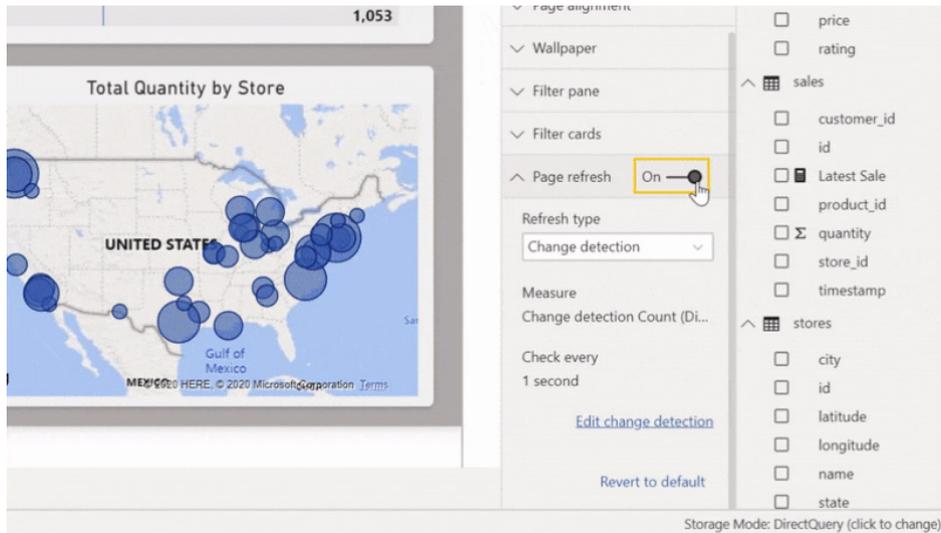

It's important to highlight that to make change detection work on the Service, these restrictions will apply:

- this is a Premium only feature so you need to publish the report to a Premium workspace to enable it
- Power BI will respect the settings and minima defined by the capacity administrator, so if the feature is off, it won't work. Also, if the frequency you set up is lower than the minimum set up by the administrator, Power BI will respect the capacity limits.

CHANGE DETECTION QUERIES IN PERFORMANCE ANALYZER

The Performance Analyzer has been helping users to improve their reports since May 2019. Now, there is a new capability to analyse queries beyond visuals with change detection being the first of this type. To see how your change detection measure is performing, you need to open the Performance Analyzer through the View tab in the Ribbon, click on start recording, and turn on change detection in the 'Page refresh' section in the 'Page formatting' pane. Once you do, you will see the Performance Analyzer populate with information of all actions, including each run of the change detection measure. You will also notice that this measure has its own section including time spent in the DAX query, the Direct query and other tasks.
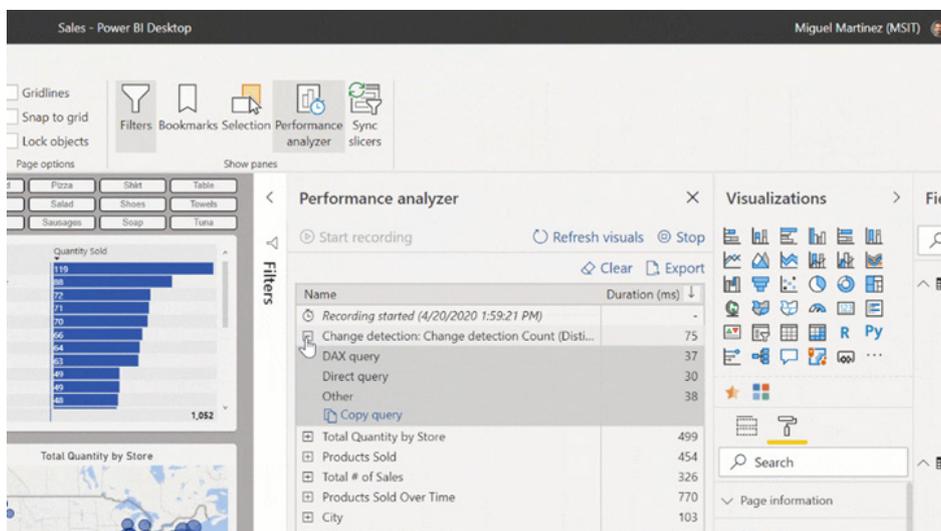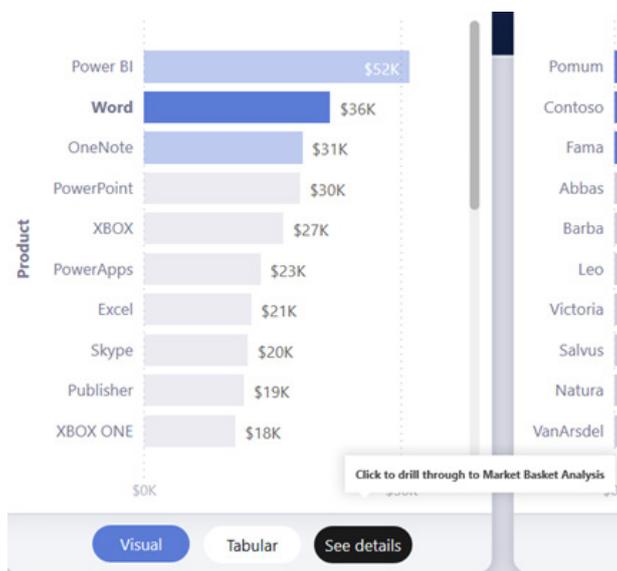
To use these new capabilities, you need to enable the 'Automatic Page Refresh' Preview:
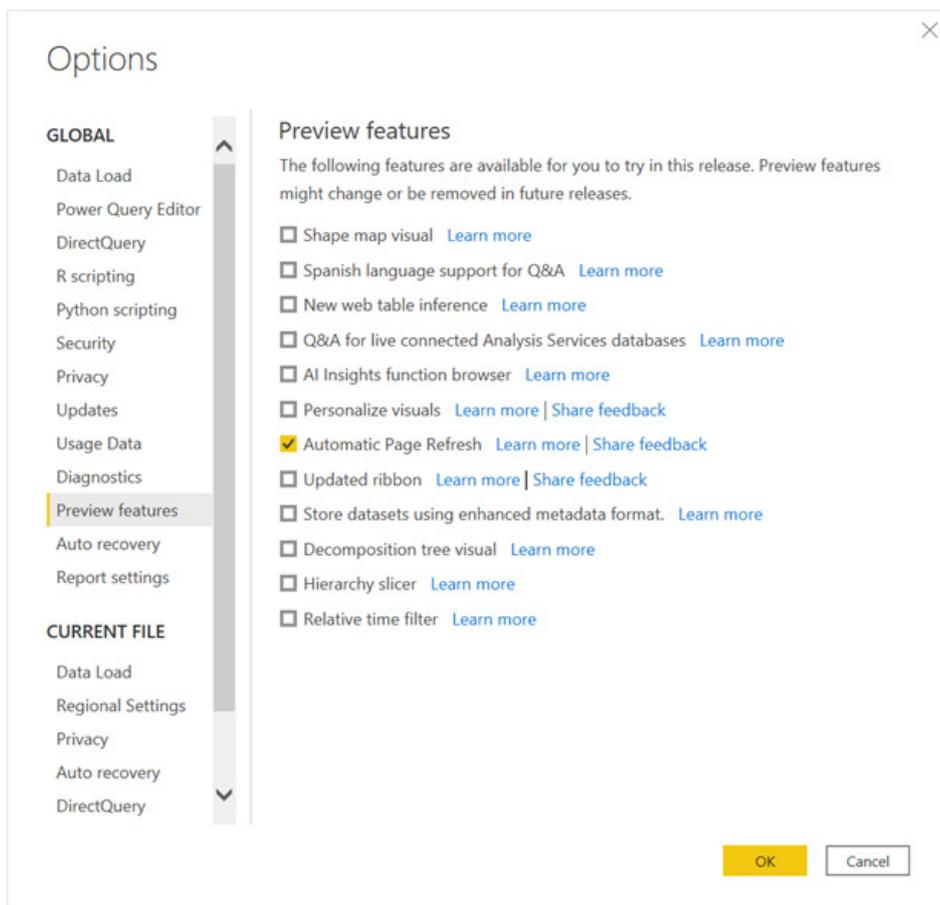
Drill through button action is now Generally Available

Back in March, Microsoft released a Preview of a new action type for buttons: drill through. As a recap, the new action type allowed you to contextually navigate to a drill through page.

With considerable valuable feedback provided, this new action type is now Generally Available. As part of this release, Microsoft has now added the ability to:

- conditionally set the drill through destination for the button
- conditionally format the ToolTips for the enabled and disabled button state
- individually customise the formatting for the disabled state of the button.

CONDITIONALLY SET THE DRILL THROUGH DESTINATION

You can now use conditional formatting to set the drill through destination based on the output of a measure. There are some scenarios where you might want the button's drill through destination to be conditional:

- you only want to enable drill through to a page once a specific condition has been met, else the button is disabled. For example, you want the user to select a single product and a single store before they can drill through to the Market details page, else the button is disabled

- you want the button to support multiple drill through destinations based on the user's selection(s). For example, if you have multiple destinations (*e.g.* Market details and Store details) that the user can drill through to, you can have the user select which destination they want to drill through to before the button becomes enabled for that drill through destination
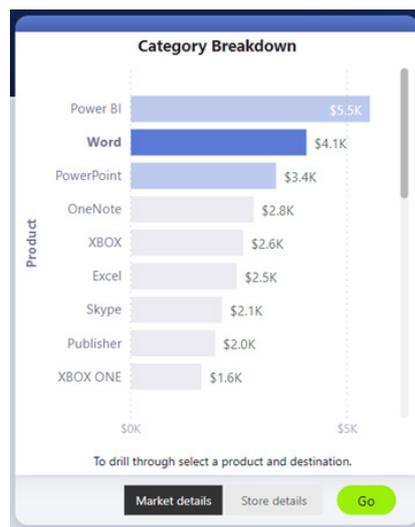

- you may also have interesting use cases for a hybrid scenario, to support both multiple drill through destinations and specific conditions, where you want the button to be disabled.

For the first use case, where you want to keep the button disabled for additional conditions, you simply need to create a DAX measure that will output an empty string ("") unless the condition has been met, then it should output the name of the drill through destination page.

Here's an example DAX measure that requires a Store to be selected before the user can drill through on a Product to Store details page:

Destination logic = IF(SELECTEDVALUE(Store[Store], "")=="", "", "Store details")

Once you have the measure created you can click the conditional formatting (**fx**) button:
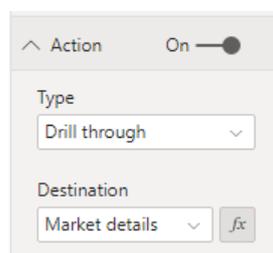
For the last step you just need to select the DAX measure you created as the field value for the destination:
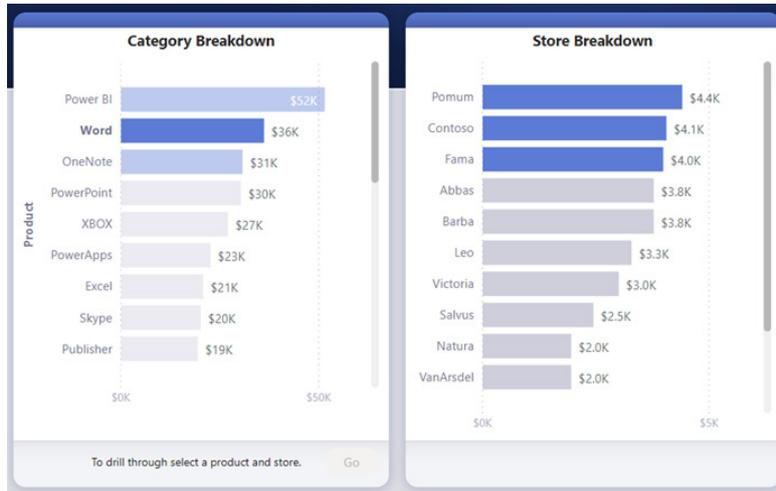

Now, you will see the button is disabled, even when single product is selected, because the measure requires a single store to also be selected:

For the other common use case, where you want to support multiple destinations, you can start by creating a single-column table that has the names of the drill through destinations:

Note that Power BI uses an exact string match to set the drill through destination, so you will want to double check that the entered values exactly align with your drill through page names.

Once this is created, you can add it on the page as a single-select slicer:

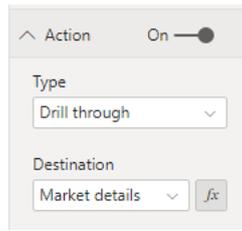If you need more vertical real estate, you can convert the slicer from vertical to horizontal orientation:
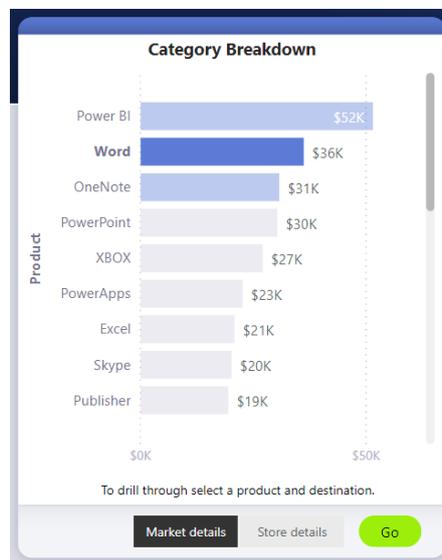
Then for the destination input for the drill through action, you will need to click the conditional formatting (**fx**) button:

For the last part, you will then select the name of the column you created:

Then you will see that drill through button will only be enabled when a product and destination has been selected:

Alternatively, if you are interested in a hybrid of the two scenarios, you could create and reference a DAX measure if you want to add additional logic for the destination selection.

Here's an example DAX measure that requires a Store to be selected before the user can drill through on a Product to any of drill through pages:

Destination logic =
IF(SELECTEDVALUE(Store[Store], "")=="", "",
SELECTEDVALUE('Table'[Select a destination]))

Then you would need to select the DAX measure you created as the field value for the destination. Therefore, in this example, the user would need to select a Product, Store and destination page before the drill through button would be enabled:

CONDITIONALLY FORMAT DISABLED AND ENABLED STATE TOOLTIPS

Another improvement added is the ability to conditionally format the ToolTip for the drill through button when it is enabled or disabled. This can be particularly useful if you have used conditional formatting to dynamically set the drill through destination and you want the ToolTip for the button state to be more informative based upon your end user's selection. Here are some examples:

- you may set the disabled state ToolTip to be prescriptive on a case-by-case basis using a custom measure. For example, if you want the user to select a single product and a single store before they can drill through to the Market Analysis page, you can create a measure with the following logic:
  - o if neither a single product nor store is selected, the measure can return "Select a single product and **CTRL + Click** to also select single store"
  - o if a single product has been selected but a single store has not been selected, the measure can return "**CTRL + Click** to also select a single store"
- Similarly, you may set the enable state ToolTip to be specific to the user's selection. For example, if you want the user to know which product and store the drill through page will be filtered to, you can create a measure that will return:
  - o "Click to drill through to [drill through page name] to see more details on sales for [product name] at [store name] stores."
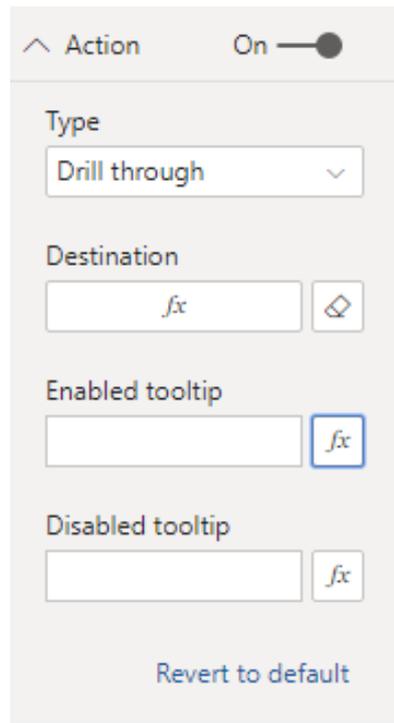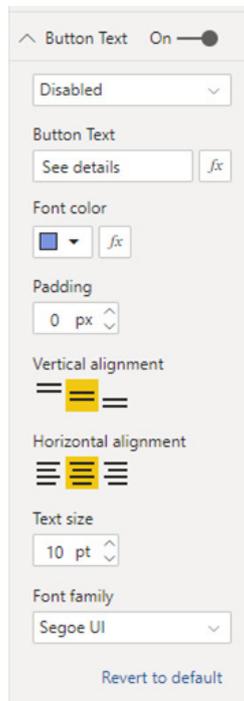

CUSTOMISE FORMATTING FOR THE DISABLED STATE

Previously, the disabled state look and feel could only be controlled through the report's theme. Now, this update adds several new formatting options for the disabled state.
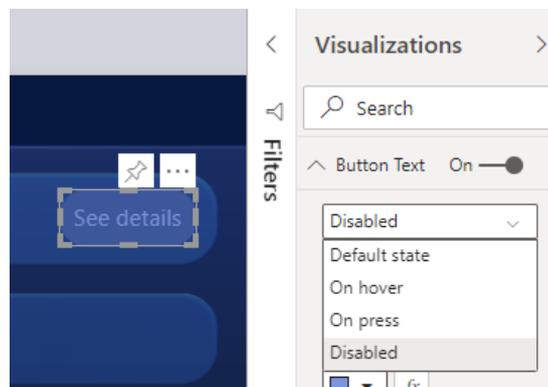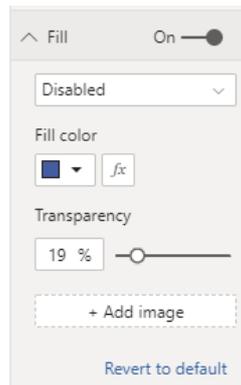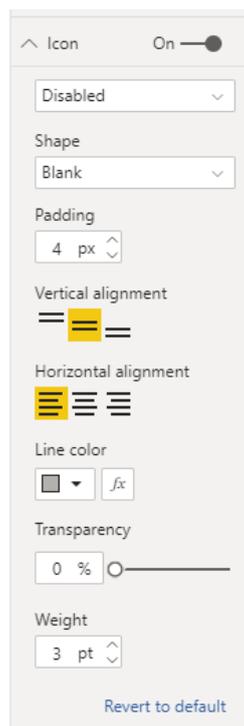

These formatting options include:

- **button text controls:** text, colour, padding, alignment, size and font family
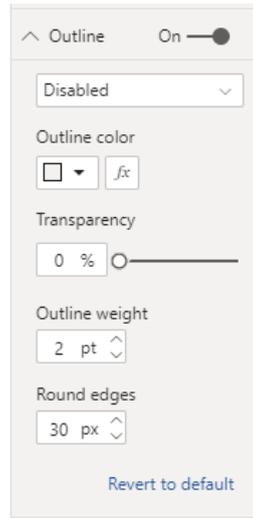
- **button fill controls:** colour, transparency, and a new fill image *(more on this below)*

- **icon controls:** shape, padding, alignment, line colour, transparency and weight

- **outline controls:** colour, transparency, weight and round edges.

Enhancements to page navigation action

In March's release, a built-in button action for page navigation was issued, which allowed you to quickly create entire navigation experiences, without having to use a single bookmark. Now this update sees a couple of enhancements to the feature:
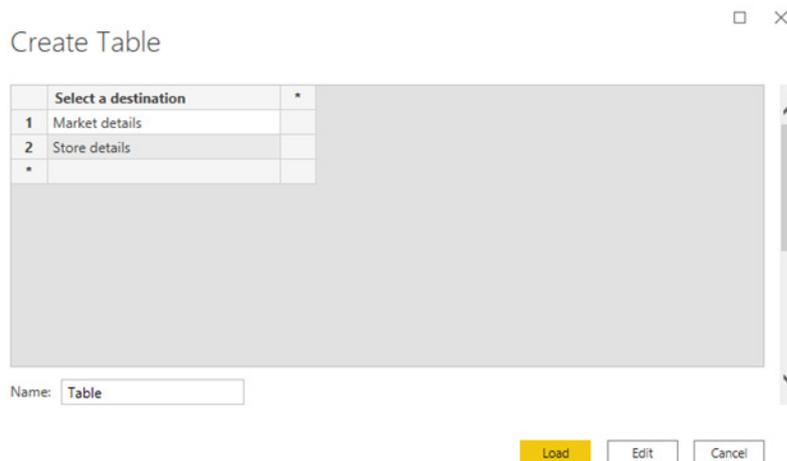
- conditionally set the navigation destination
- support for shapes and images.

CONDITIONALLY SET THE NAVIGATION DESTINATION

You can now use conditional formatting to set the navigation destination based on the output of a measure. This can be useful if you want to save on real estate by having a single button to navigate to different pages based on the user's selection.
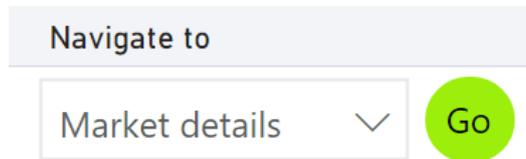

In order to create the example shown above, you can start by creating a single-column table that has the names of the navigation destinations:

Note that Power BI employs exact string match to set the navigation destination, so you will want to double check that the entered values exactly align with your page names.

Once this is created, you can add it on the page as a single-select slicer:
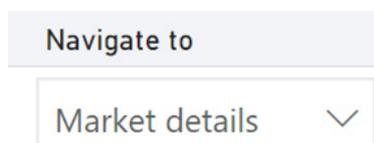
Then you will create a page navigation button and select the conditional formatting option for the destination:
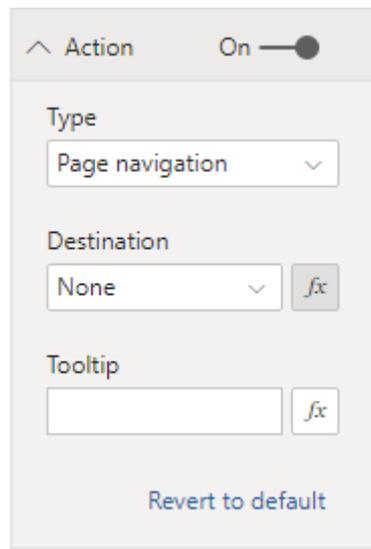
For the last part, you will then select the name of the column you created:
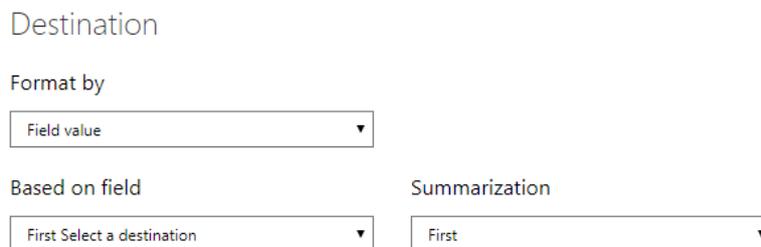
Then you'll see that based on the user's selection the button can navigate to different pages.
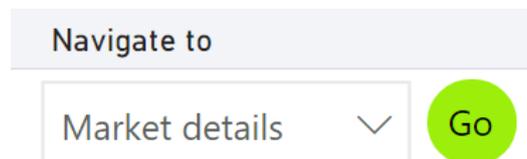
SUPPORT FOR SHAPES AND IMAGES

Page navigation action is now supported for shapes and images, not just buttons. Here's an example using one of the built-in shapes:

Here's an example using an image:
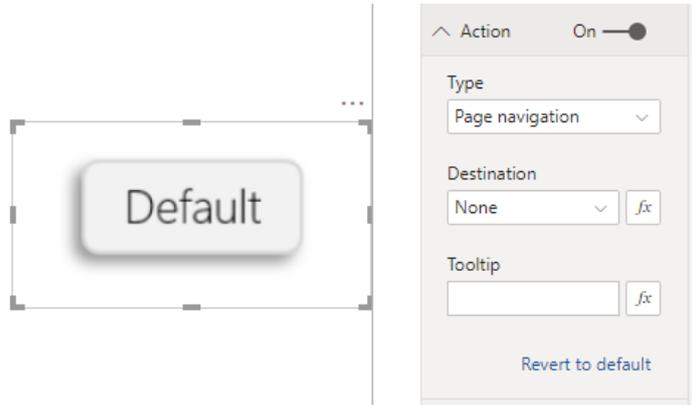
Buttons now support fill images

From this update, all buttons now support fill images. This can prove useful because you can now customise the look and feel of your button using fill images while also taking advantage of the built-in button states: default, on hover, on press and disabled (for drill through).
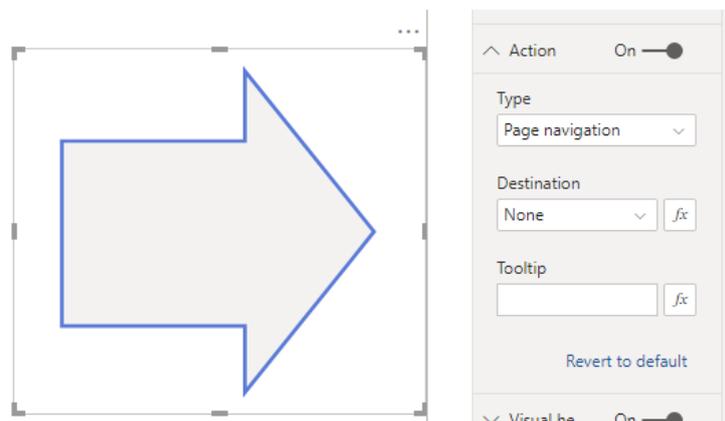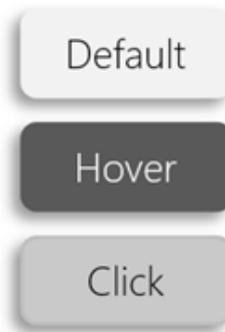

Drop shadow support for visuals

This month also sees a new formatting feature for all visuals: drop shadows. Toggling this option on in the Formatting pane will display a shadow behind the border of your visual.

In the Shadow tab, you may customise the look and feel of each shadow. You can choose between a number of presets, or adjust individual properties of the drop shadow with the Custom setting.

Shadow controls whether the shadow appears in or outside of the visual border.
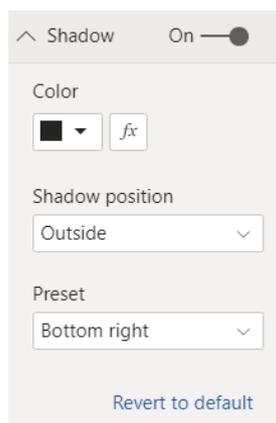
If you are using Custom settings, you will see several additional options:

- the **Size** controls the radius or thickness of the shadow
- **Blur** controls how gradually the shadow will fade into the background. Keep in mind that this **Blur** extends beyond the range set by **Size**
- **Angle** controls where the shadow will show up. The shadow will move clockwise. In other words, zero (0) degrees is horizontal and to the right; 90 degrees is vertically down
- **Distance** controls the shadow's offset from the centre of the visual
- **Transparency** controls the **Transparency** of the shadow.
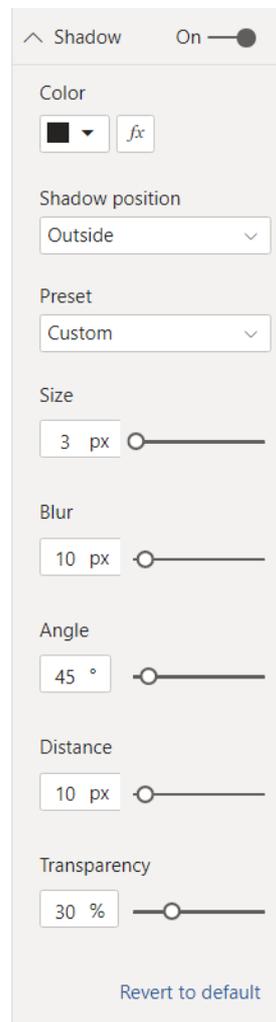
Filter pane migration

As warned in the introduction to this section, this update has officially moved over to the Modern Filter experience, meaning any reports with the old Filter pane have been automatically migrated to the new experience.
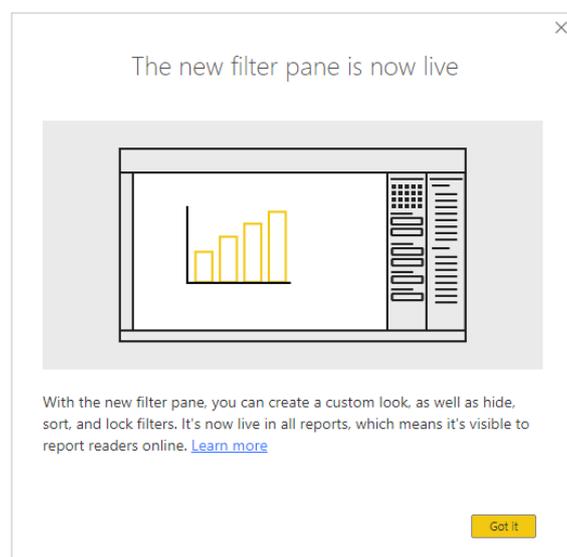
Be sure to take advantage of all the new capabilities in the modern experience, including:

- Quick filter view
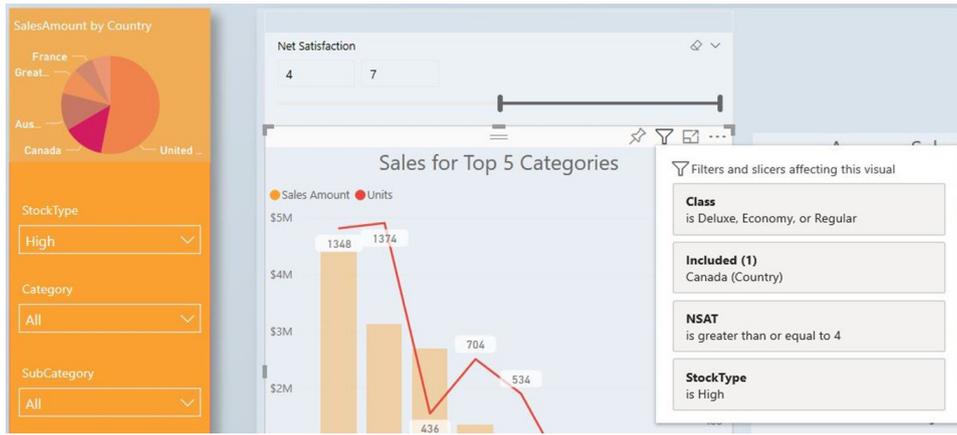
- lock or hide filters
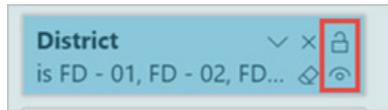
- sort the filters (custom or alphabetical sort)
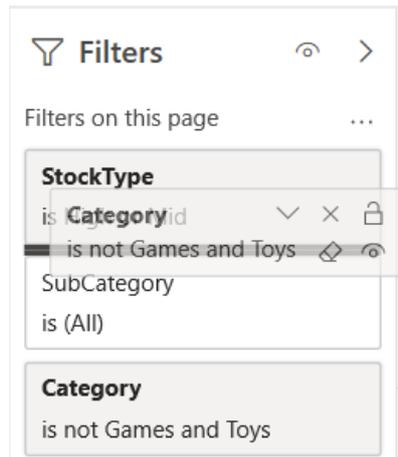
- rename filters
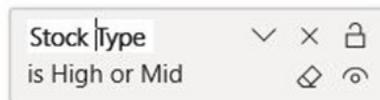
- Theme and Formatting options

- capture Filter pane state in a bookmark
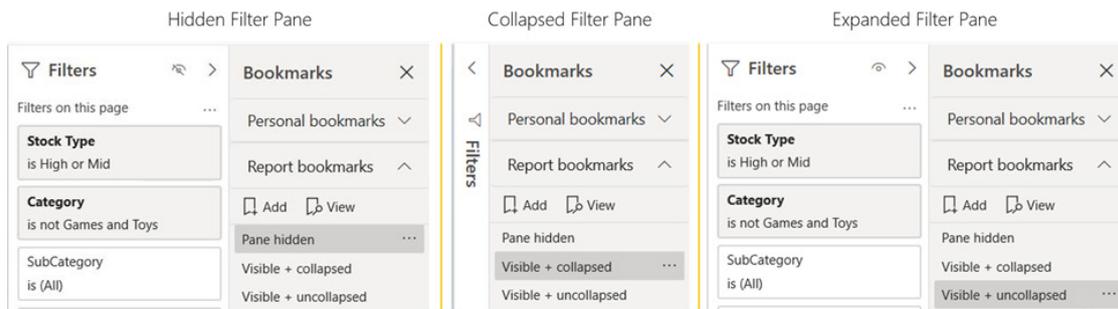
- show / hide the Filter pane for the end user
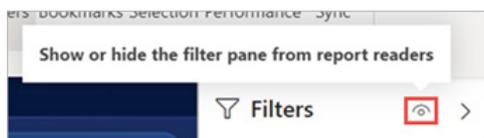
- show / hide the Filter pane while editing
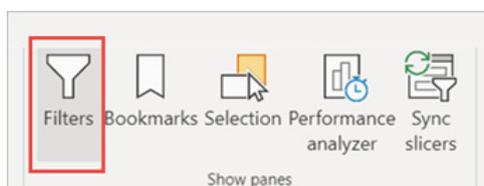
- allow / restrict changes to Filter type

- search for filters
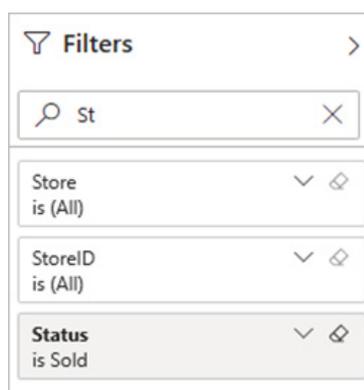
Direct Query support for AI visuals

Two of Power BI's AI visuals will now work in Direct Query (DQ) mode:

- Decomposition tree (Preview)
- Key influencers (Preview).

However, there are a couple of limitations to remember:

- DQ Query Parameters are not supported
- Automatic page refresh is not supported.

Decomposition tree now supports ToolTips

The latest updates now allow the decomposition tree to support ToolTips. You can add additional measures to the ToolTips option in the field well and have them appear when users hover on the data bars in the tree:
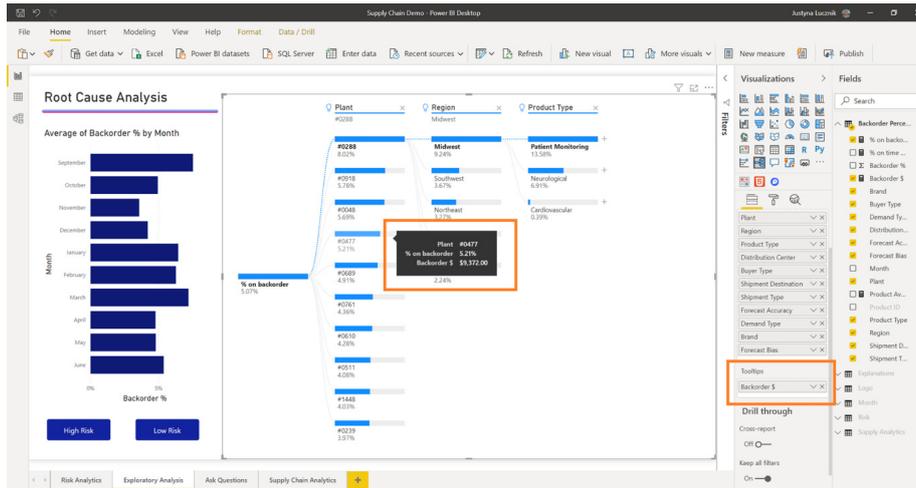
Decomposition tree is now Generally Available

It's now been announced that decomposition trees are now Generally Available. As part of this release, there are several updates to the visual:

- **conditional formatting:** the decomposition tree now supports conditional formatting by a second measure
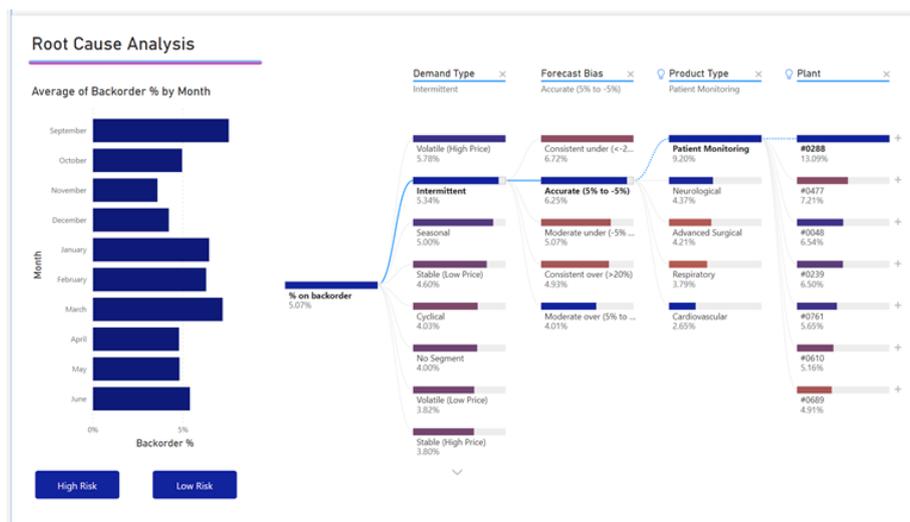
- **drill through support:** you may drill through on any node of the tree
- **sort capabilities:** you may sort the tree alphabetically or by the measure
- **responsive design:** the design of the tree has been improved to fit better into more compact spaces and on mobile. When you resize the tree, the layout changes to better fill the available space
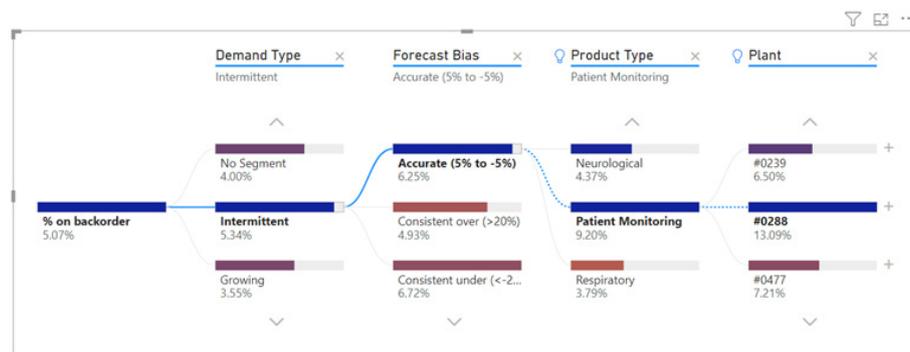
- **cross-highlight support:** the tree can now be cross-highlighted as well as cross-filtered
- **accessibility:** screen reader, keyboard navigation and high contrast mode are now supported for the decomposition tree
- **improved behaviour for filtering out of the visual:** selecting any node in the tree will now always results in a cross-filtering action (instead of collapsing the tree)
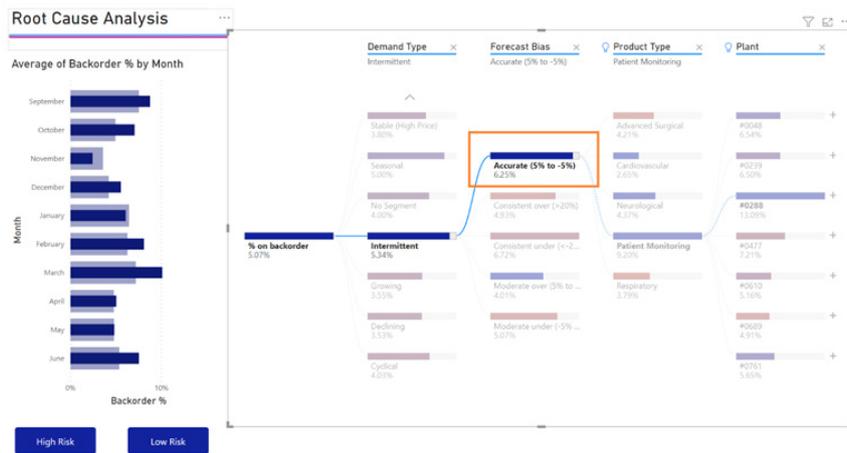
- **improved scrolling behaviour:** when a user scrolls down a level in the tree, the path they selected will be retained (instead of automatically collapsed)
- **right-click menu options:** you now have the ability to include and exclude datapoints as well as show as table
- **pinning visuals to the dashboard:** you may now pin a decomposition tree to your dashboard (without AI splits).

Q&A updates

There are some new updates to Q&A:

- you can now suggest your own questions to help your end users
- Teach Q&A now supports measure conditions
- Q&A is now supported in Power BI datasets.

SUGGEST QUESTIONS

To get users of the Q&A visual started, Power BI automatically suggests some questions to start with. This update adds the option to define your own questions to show up in the Q&A visual. In the new 'Suggest questions' section in Q&A setup, you can create a list of questions to be shown in the Q&A visual. The questions will show up in Q&A in the same order as they were created.
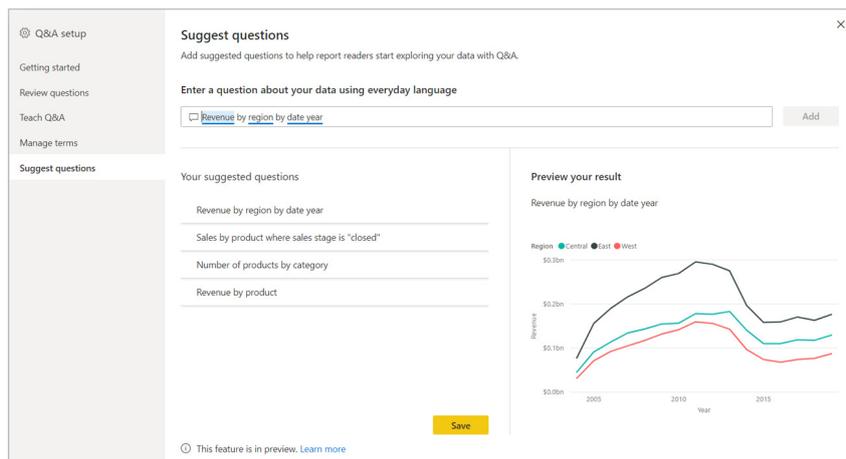
TEACH Q&A NOW SUPPORTS MEASURE CONDITIONS

With Teach Q&A, you can add definitions to make Q&A work better with your data model. For example, if you have a table with **Customer** and **Total Spend** columns, you could define that "high-spending customers" are customers that spend more than $100. In the first release of Teach Q&A, you could only create definitions on columns. This update adds support for measure conditions. In the example above, this means that if "total spend" is a measure, calculating the sum of all sales for one customer, you can use that to define "high-spending customer" in the Teach Q&A experience. You can also calculate the measure in the Q&A expression itself. For example, if "profitable customers" are customers with at least 20 orders in the order column, you can define customers with "count of orders > 20" as profitable, *etc.*
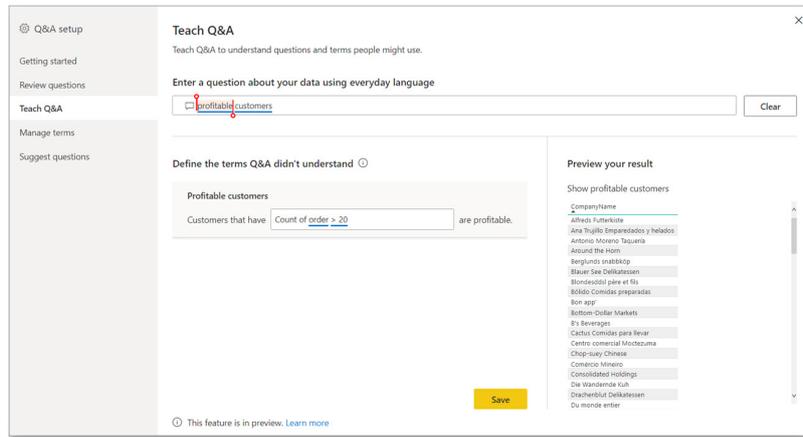
Q&A IS NOW SUPPORTED ON POWER BI DATASETS

You can now use Q&A when connected to a Power BI dataset. When you are working on a PBIX file connected to a Power BI dataset, you can use add a Q&A visual to the canvas and ask questions. Currently, this only supports direct usage of Q&A on Power BI datasets. Q&A setup and the linguistic schema options are not yet accessible.
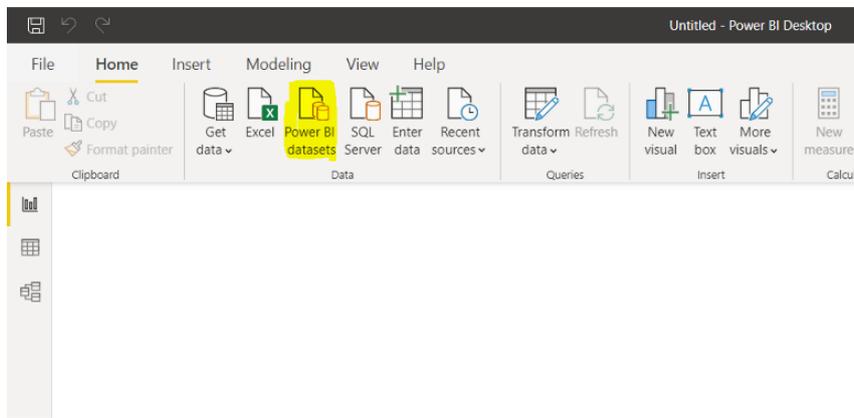
Radar/Polar chart by xViz

The radar/polar chart (also known as radial chart, spider chart, web chart) by xViz may be used for visualising multivariate data similar to a parallel coordinates chart. Radar charts are useful for showing outliers and commonality by comparing one or more categories across different variables. For example, they may be used to compare product performance across various metrics like ease of use, aesthetics and durability.

The xViz radar/ polar chart delivers several important features posted on Power BI Ideas, specifically around axis scaling, data labels customisation and support for legends:

- 3-in-1 chart: choose between radar, polar and radial chart
- 10+ series options: display line, column, area, stacked and stacked percentage charts
- Advance data label customisation with support for totals display in case of stacked radial chart
- Axis customisation: automatically or manually set the axis minimum and maximum values
- Support for a legend
- Advance conditional formatting for visually highlighting outliers based on different rules
- Number formatting options to customise values based on various business scenarios
- Summary table: tabular view of data.
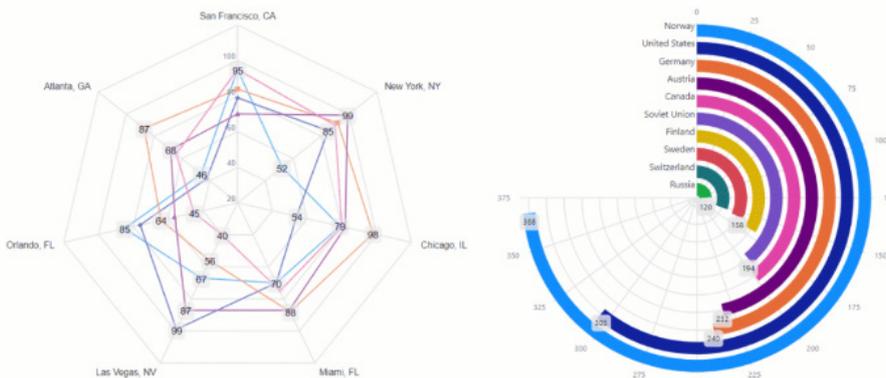
Comicgen by Gramener

Well, this one's different. Comicgen by Gramener adds comic characters whose emotion, pose and angle may be controlled by data.
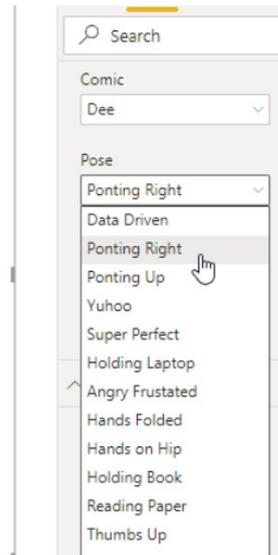
Users can show up to two Key Performance Indicators (KPIs) at a time. Each KPI can be visualised as an emotion (*e.g.* happy or sad) and a pose (*e.g.* Thumbs Up or Angry). You can choose to keep the visual emotion or pose or have both static by selecting the appropriate emotion and pose from the visual settings. Users can choose different comics: currently, it supports Dee and Dey.

This visual may be downloaded from AppSource. We look forward to your new Board Reports with interest.

Pareto by sio2Graphs

You can also graph cause and frequency using a Pareto chart to understand the key drivers of a process.
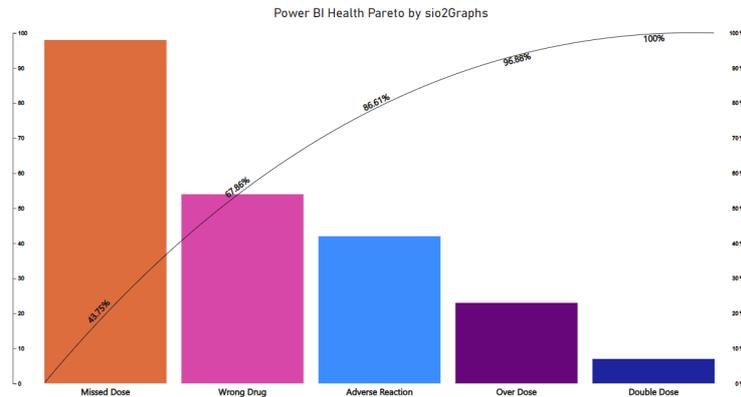
Pareto charts are used to visualise the results or outcomes for any process in order to identify the specific factors driving or impeding an effective conclusion.

This visual may also be downloaded from AppSource.

Growth Rate Combo Chart by Djeeni

The Growth Rate Combo Chart by Djeeni is a visual that displays the percentage difference between consecutive category values, with the base for comparison being the category on the left. This visual may be useful to show metric growth rates over time:
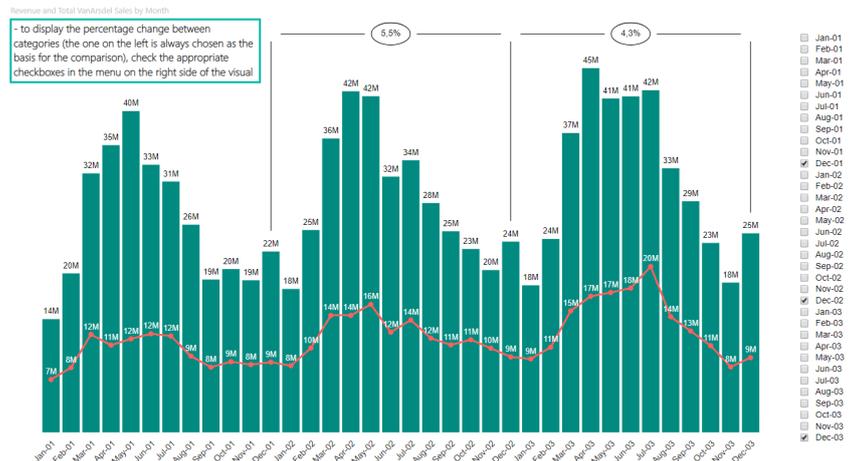
Examples where it may be used:

- show percentage change between two or more categories
- show percentage change between two or more time periods.

Key features include:

- Line or Column chart
- you may choose two or more categories / time periods to see the percentage change
- you may deselect categories or time periods
- hide or show Selection pane.

This is another visual you can download from AppSource.

Smart Filter Pro by OKViz

Smart Filter Pro by OKViz is the premium version of Smart Filter. It provides a compact slicer that applies filters in many different ways, including autocomplete and incremental search in a dropdown list.
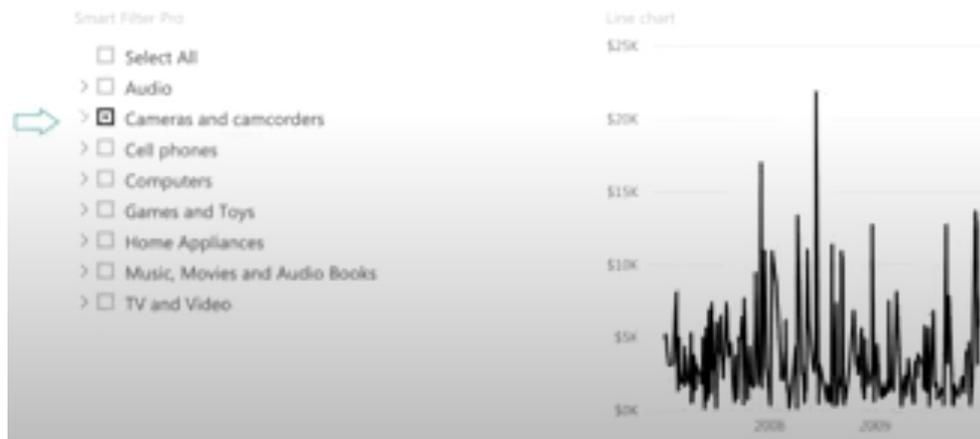
Its key features include:

- unlimited rows (the free version is limited the 30,000 rows)
- Filter mode
- copy / paste a list of items
- Autocomplete
- performance boost
- dropdown list customisation
- additional ToolTips
- Themes support
- enhanced observer mode
- Hierarchy mode
- Bookmarks support
- synchronise slicers.

In the Pro version, with the Autocomplete enabled, Smart Filter Pro works like a browser search bar, meaning when you start typing a few characters, the input box will autocomplete the word with the first result from underlying data:
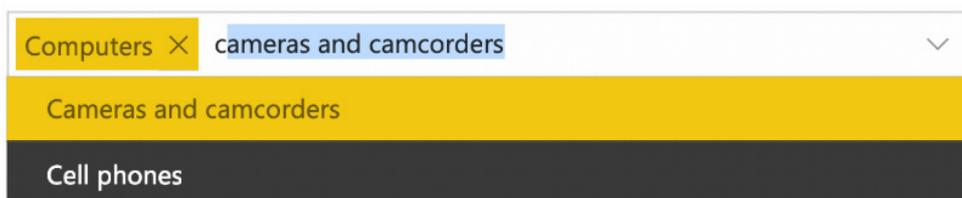
Working with huge datasets and loading all data in memory can be very expensive. In Smart Filter Pro you can use the Filter mode, which allows the querying of data by defining filter conditions. This way, there are no limits on which elements in the column to filter. You can write filters with a simple syntax and get instant results.

Sales Amount by Date
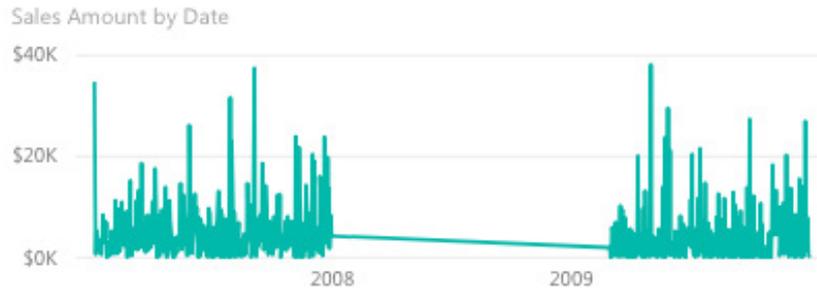
The Filter mode supports textual fields, dates, and numbers. For each Data Type, you can use specific operators such as less than (<) or greater than (>) for numbers and dates, or quotation marks for strings. You can hover over the question mark icon (?) in the visual to see various examples of the query syntax.
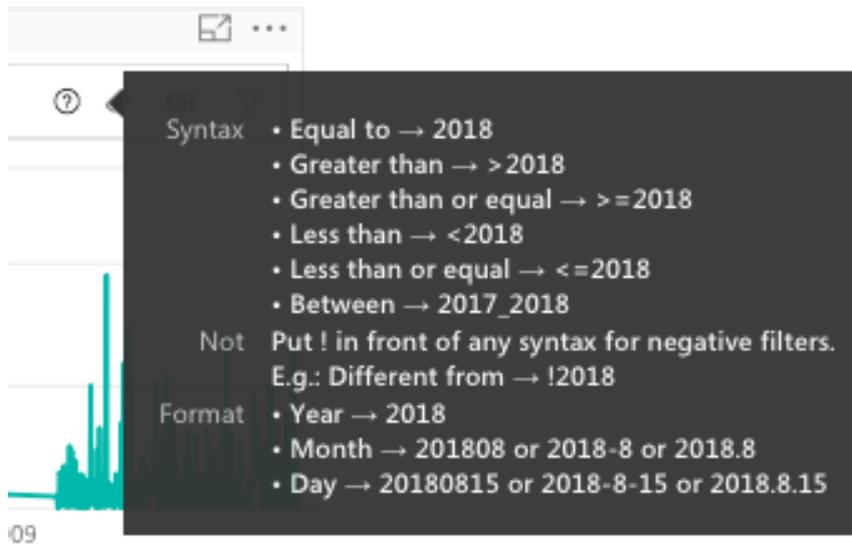
You can also choose how to connect the keywords. Both **AND** and **OR** logical operators are available:

You can paste a long list of items (like SKUs) in Smart Filter Pro in filter mode. This action applies the filter to the desired custom list in a very efficient way, giving instant results with hundreds of items pasted in the visual.

And guess where you can download it from..? That's right: AppSource.

New Visualization icons

You may have noticed Power Bi's visualization (sic) icons have a new look:
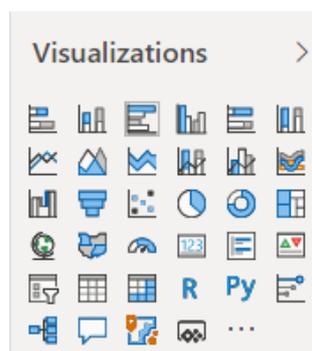
These new icons have a higher colour contrast to improve accessibility, and they are consistent with their counterpart icons that you may be familiar with in Excel.

You will see these new icons in both the Visualizations pane and in the 'Personalize visuals' experience:
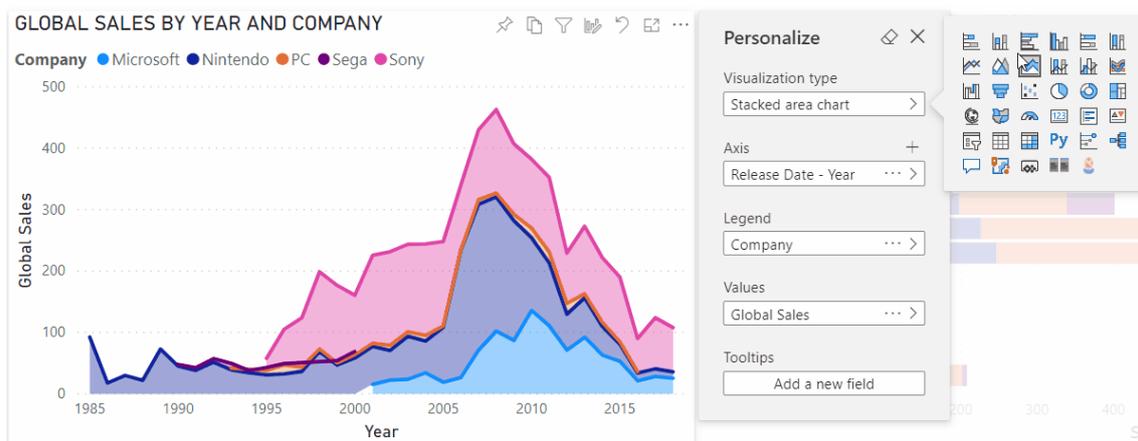
Packed bubble chart by xViz

Packed bubble chart by xViz is similar to a bubble chart ,except that the bubbles are tightly packed rather than spread over a grid of **x** and **y**-axes.

A single category and value field is all that is required to create the visual. The Category field defines the individual bubbles and value represent the bubble size. You can enable interaction features like drill down, grouping or clustering by adding additional category fields. Additionally, you may use conditional formatting to highlight the bubbles based on different business rules.

Listed below are some of the frequently requested features from the Power BI community that are available with this new packed bubble chart:

- **bubble clustering** and **grouping capability** based on assigned legend field
- **data label customisation:** choose from different data label formats to display combinations of category, value and percentage of total
- **word wrap and responsive text:** enables easier readability of data labels
- **advanced conditional formatting:** visually highlights outliers based on different rules
- **bubble size customisation:** define the minimum or maximum bubble size
- **drill down support**
- **number formatting:** enables customisation of values based upon various business scenarios
- **summary table:** tabular view of data.
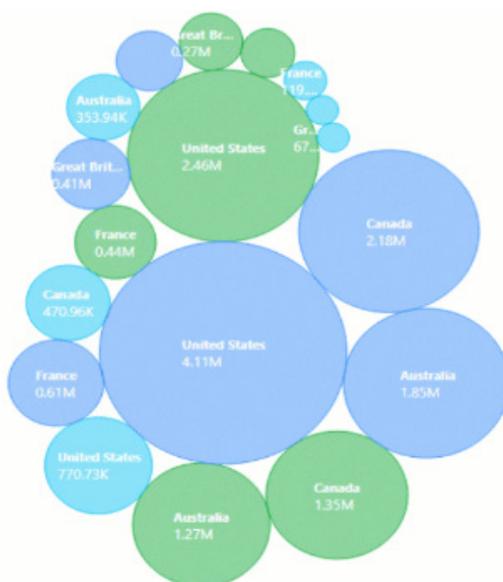
Updates to hierarchy filter by xViz

xViz has also released a new version (1.1.3) of the hierarchy filter that has been re-engineered to support many new features with a modern interface and wide range of enterprise hierarchy filter scenarios. The hierarchical navigation, along with conditionally formatted value field, makes it simpler to understand the importance and performance of each node.

The xViz hierarchy filter caters to some of the most requested features by enterprises like search, unbalanced hierarchy support (hide blanks), formatting and interaction capability along with other additional features listed below:

- ability to **add value** (measure) along with category
- support for **measure filter**
- conditional formatting: alert induced selection (text and background)
- **search** capability
- **support for unbalanced hierarchies:** hide blank categories and values
- **single child display:** customise tree structure with single child nodes
- **context menu** for runtime capabilities like expand / collapse all nodes, enable / disable different conditional formatting rules, and rearrange nodes on the fly
- **node level formatting:** top node, parent and child

- **interaction customisation:** on hover and on node selection
- **display mode:** list and dropdown
- **single and multi-select options**
- display **child count**
- **hierarchy icon customisation:** arrow, plus / minus
- default **expand to a particular level**
- **appearance tab:** customise filter look and feel
- **column header** for category and value.
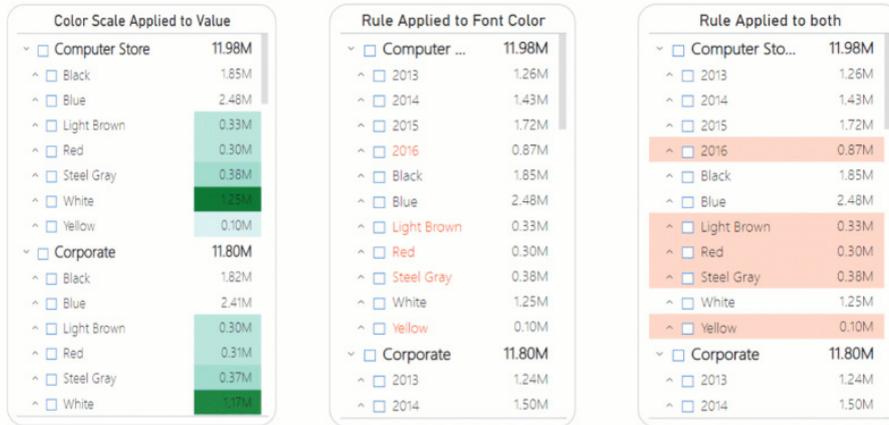
Power Apps visual is now compatible with all languages supported in Power BI

The title says it all!

Power Platform Center of Excellence StartKit

The Power Platform CoE StartKit provides a holistic view of the resource usage in your tenant, including environments, Power Apps apps, Power Automate flows, connectors, connection references, makers and audit logs.
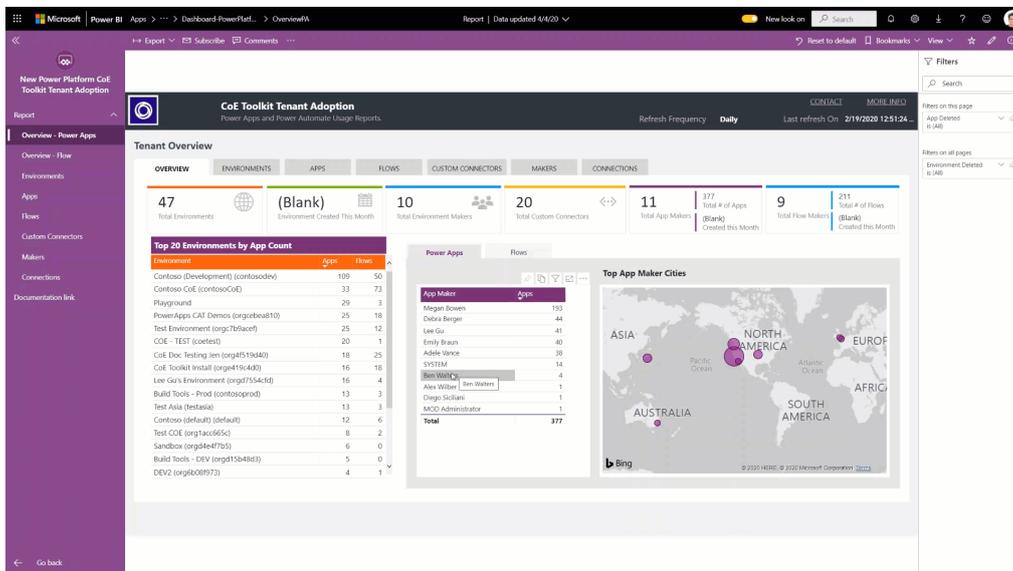
Examples where you could use it include:

- detect who are the star app makers and which departments have organically discovered Power Apps and Power Automate
- dive deeper to see which resources (apps, flows) are using a specific connector. This can help you perform risk assessments or identify users who use Premium features
- analyse app usage by specifically tracking unique users and sessions of an app to identify spikes or popular apps
- discover what connectors and flows are used heavily throughout the tenant
- identify business important components based on who they are shared with and how often they are used to ensure they receive the support needed.

To connect your data, follow these instructions to set up the StartKit CoE and make the data available:

- click Connect
- enter your Environment URL
- choose OAuth2 for the Authentication method and sign in.
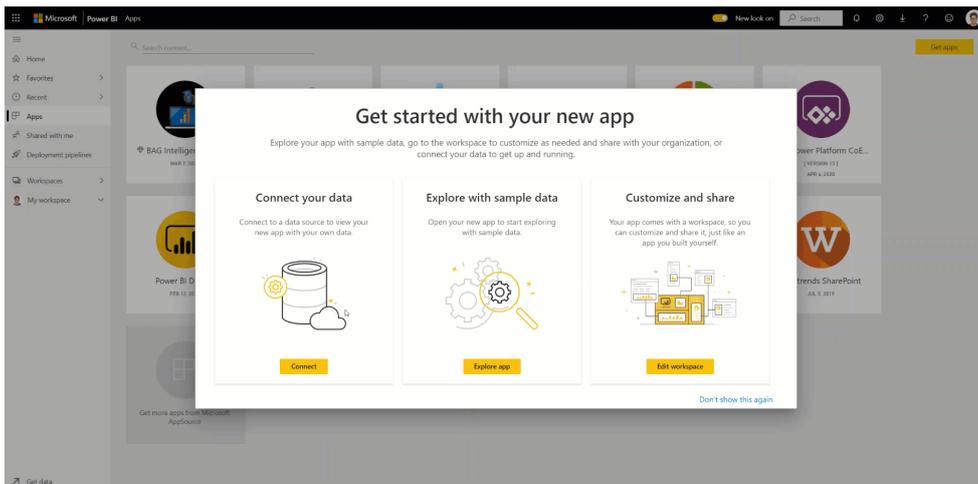
AppSource again.

Azure Cognitive Search: analyze logs and metrics

Azure Cognitive Search is a cloud search service with built-in AI capabilities that enriches all types of information to easily identify and explore relevant content at scale. Azure Cognitive Search allows you to store operation logs and service metrics from your search service into an Azure Storage account. This Power BI template app specifically enables you to analyse those operation logs and metrics so that you can obtain better insights about your search service. The Power BI app provides detailed metrics about queries, indexing requests, operations, and more.
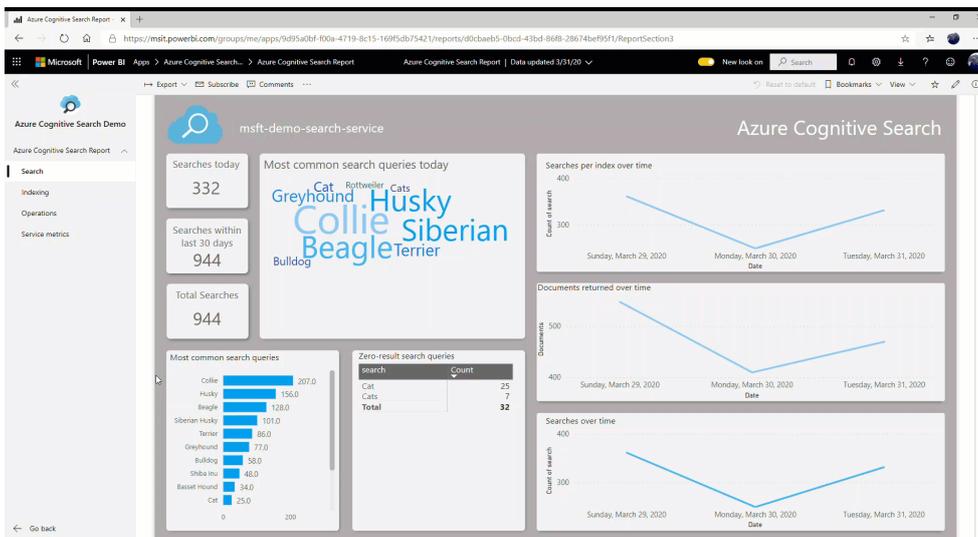
Download from AppSource.

COVID-19 Apps

You cannot take a step outside your front door before the world reminds you of the COVID-19 pandemic. As healthcare providers and local governments work to slow the spread of the virus and ultimately save lives, it's critical that these organisations are equipped with accurate information in a timely manner. To help these organisations and individuals stay informed, several of Microsoft's Power BI partners have created template apps tracking the COVID-19 pandemic, *e.g.*

- COVID-19 US tracking
- COVID-19 daily cases
- COVID-19 global cases.

After you download them, you can use them as is, personalise them or share them inside your organisation. All the following template apps connect to anonymous data sources.

COVID-19 US TRACKING

The Power BI team has created a solution that provides a report of COVID-19 metrics that local governments, organisations or any other Power BI user can use to publish up-to-date information to their communities or for themselves.
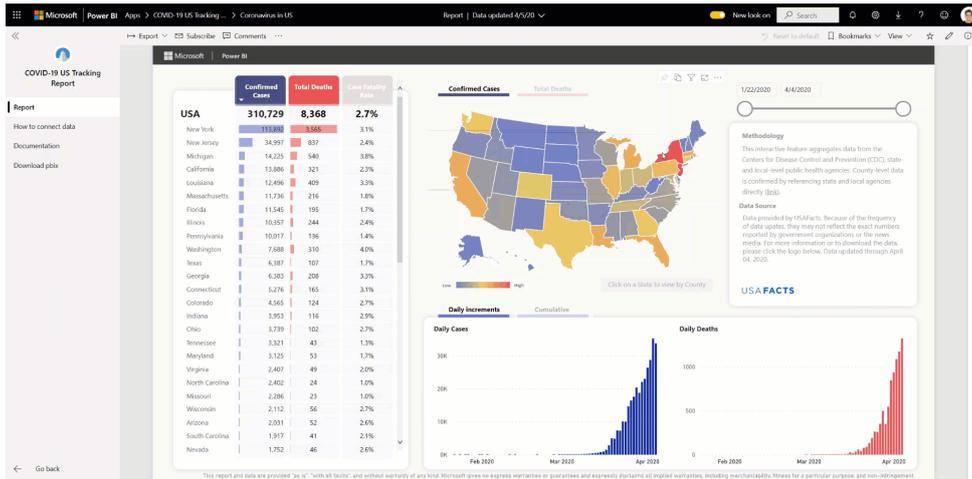
COVID-19 DAILY CASES

For those of us who remember there are more countries in the world than the United States, this COVID-19 report, which was developed by Pragmatic Works, provides information on daily cases, recoveries and death rates by country and state / province from the Center of Disease Control (CDC) and John Hopkins University.
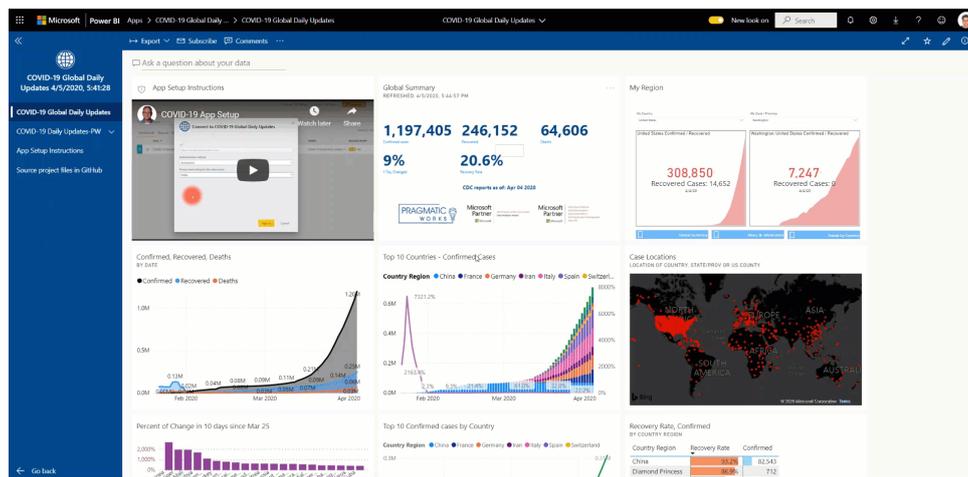
ANALYSE COVID-19 GLOBAL CASES

With DataChant's latest template app, you may analyse COVID-19 global cases in a daily refreshed report, which includes advanced time intelligence measures to offset all countries by the number of estimated active cases per capita since the first day that 100 cases were reported. You can also hit the play icon to see the animated progression over the last 30 days if you really want to scare (or reassure) yourself.
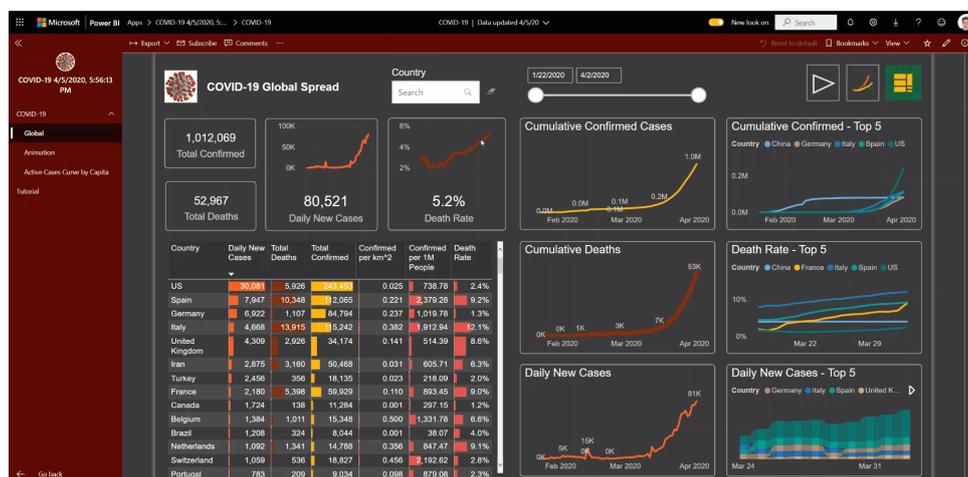
List separator and decimal symbol will now default to the standard DAX separators

DAX authoring will now default to using the standard DAX characters of comma (,) as the list separator and period (.) as the decimal symbol. Before this change, Power BI required you to type the list separator and decimal symbols defined by your machine's Region settings.

Behind the scenes, Power BI would convert your localised DAX to the standard separators required by the AS engine before saving. At times, this led to some confusion and made it hard for customers in different regions to easily share DAX snippets. Therefore, as an improvement, Power BI now defaults to the standard DAX separators. If you want to default back to the list separator and decimal symbols defined by your machine's Region settings, you can find this DAX separators option under **Options and settings -> Options -> Global -> Regional settings:**
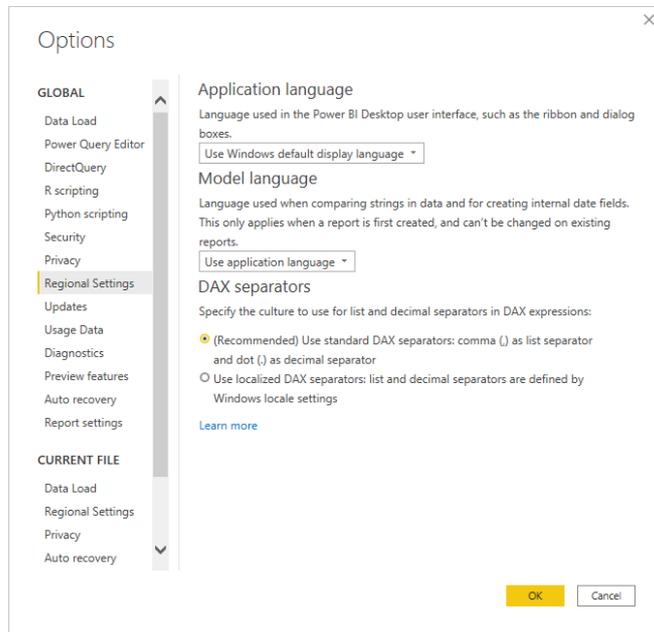
Enhancements to Query Diagnostics

After the General Availability release of Query Diagnostics last month, Microsoft is continuing to enhance it. This update brings you Query Diagnostics Options, which will allow you to configure your diagnostics and performance output for Query Diagnostics.

Power BI Desktop has added a new button to the Tools tab in the Power Query Editor Ribbon to let you configure Query Diagnostics.
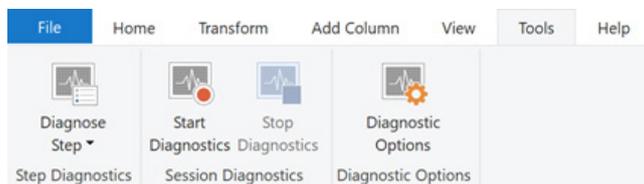
When you click it, it will take you to the Diagnostics page in Options dialog, which will allow you to configure what kind of outputs you want when you run Query Diagnostics. This will help minimise the number of tables you have to clean up.
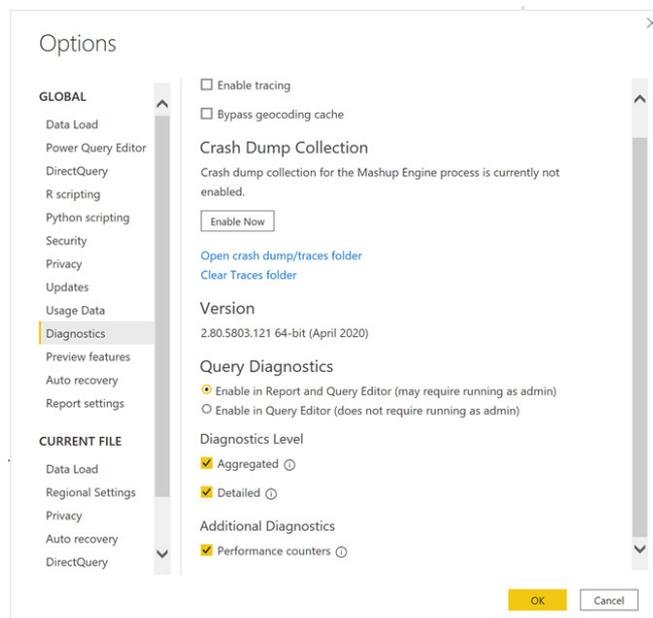
You'll notice a new option there: Performance counters. These are a new output for Query Diagnostics. When you run Performance counters, every half second Power Query will take a snapshot of resource utilisation. This isn't useful for very fast queries but can be helpful for queries that use up a lot more resources. Performance counters reuse the "Id" concept of Query diagnostics, as well as introducing a number of new columns:

- Processor Time
- Total Processor Time
- IO Data Bytes per Second
- Commit (Bytes)
- Working Set (Bytes).

Direct Query on Dataflows

You may now connect to dataflows in Direct Query (DQ) mode. In order to get started, you will need to have the dataflow configured on a Premium workspace and you will need to ensure the enhanced compute property on the capacity is enabled. With these two conditions met, when connecting to a dataflow inside Power BI Desktop, you will now be prompted if you wish to use import or Direct Query mode.

N.B. This feature is incompatible with the enhanced metadata Preview. Please turn this Preview off in order to use Dataflows with Direct Query.

Web by example now automatically suggests tables by default

Web by example now provides automatic recognition of tables by default. Previously, this option was off by default, but it is now readily available from the Navigator dialog.
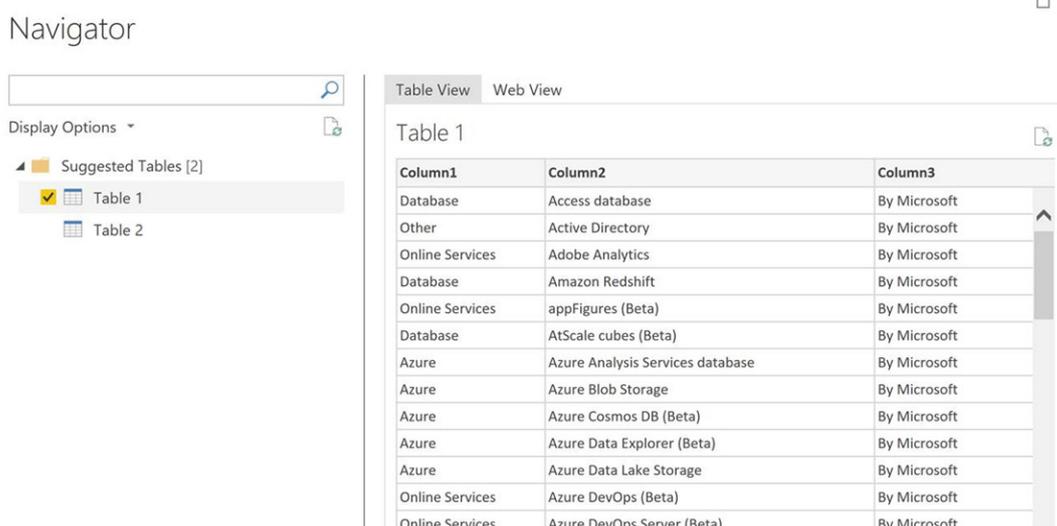
Automatically recognised tables via Web by example will save you time; instead of needing to go through the Extract tables using examples experience, users can pick from the automatically recognised tables on a given webpage. However, users can also continue to go into the 'Extract tables using examples' experience to select different data as needed.

Enhancements to Query Diagnostics: Privacy Level partitions

This update also adds Privacy Level partitions to Power BI. These are the logical partitions used to isolate data for privacy when running queries. You can find the option to turn on or off 'Data privacy partitions' in the Diagnostics menu for Power BI. These query diagnostics reuse the 'Id' concept from previous diagnostics, with a number of new columns:

- **Id:** same as the id for the other query diagnostics results. The integer part represents a single activity id, while the fractional part represents a single evaluation
- **Partition Key:** corresponds to the query / step that is used as a firewall partition
- **Firewall Group:** categorisation that explains why this partition has to be evaluated separately, includes details on the privacy level of the partition
- **Accessed Resources:** list of resource paths of all the resources accessed by this partition, generally uniquely identifying a data source
- **Partition Inputs:** list of partition keys upon which the current partition depends (this could be used to build a graph)
- **Expression:** the expression that gets evaluated on top of the partition's query / step. In several cases it coincides with the query / step
- **Start Time:** time when evaluation started for this partition
- **End Time:** time when evaluation ended for this partition
- **Duration:** End Time – Start Time
- **Exclusive Duration:** if partitions are assumed to execute in a single thread, exclusive duration is the "real" duration that can be attributed to this partition
- **Exclusive duration %:** Exclusive Duration as a percentage
- **Diagnostics:** this column only appears when the query diagnostics "Aggregated" or "Detailed" is also captured, allowing the user to correspond between the two diagnostics outputs.

CDM Folder view for Azure Data Lake Storage Gen2

This Power BI update brings into beta the CDM Folder view for the Azure Data Lake Storage Gen2 connector. This will allow you to select if you want to view content in your data lake as CDM entities.
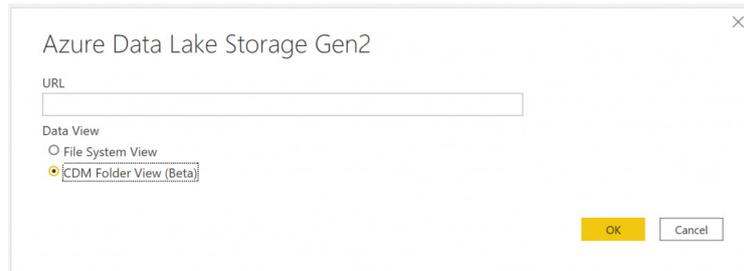
The folder in the lake will be considered a CDM Folder and brought into the Navigator view if it has at least one of the manifest files with the following name patterns:

- ***.manifest.cdm.json**
- **model.json**
- **odi.json.**

You can see below how a CDM folder might be represented in the Navigator.
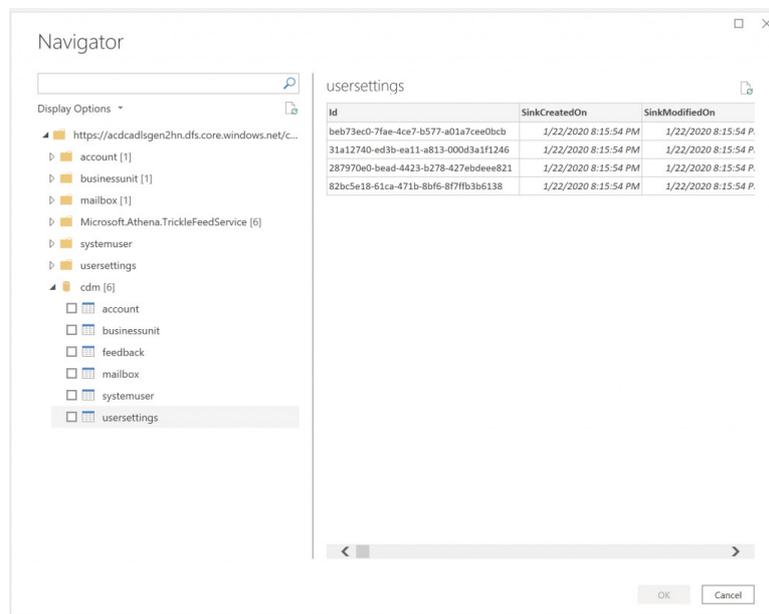
Witivio connector

Witivio is an enterprise chatbot platform for employees with a deep integration in Microsoft 365 and the Power Platform. Without code, users can design and monitor chatbots for HR, IT Help Desk and change management. With the Witivio Power BI connector, chatbot administrators can track the usage and the performance of their chatbots to build advanced analytics.

You can find this connector in the 'Online services' section of the 'Get data' dialog.

Linkar connector

Linkar is a suite of components that facilitates efficient connectivity to MultiValue Databases. Linkar SERVER works with almost all MultiValue Database platforms centralising connections and optimizing DBMS licence usage. Client apps use Linkar CLIENT libraries to interact with the database through Linkar SERVER, with bindings for popular languages.

Linkar Power BI connector allows easy integration with MultiValue Databases through the Linkar platform.

You can find this connector in the Database section of the 'Get data' dialog.

Webtrends connector

Webtrends Analytics is a Microsoft-preferred solution built from the ground up for measuring performance of your website or SharePoint environments. The Webtrends Analytics Power BI data connector allows you to import your data into Power BI via Microsoft's Data Extraction API (REST) with a simple point and click. All reports on an individual profile are now available at once; no more limited report lists. The date range options have been expanded to allow standard report periods as well as custom date ranges. A customer account with Webtrends is required to use the connector.

You can find this connector in the 'Online services' section of the 'Get data' dialog.

Planview ProjectPlace connector

ProjectPlace lets you plan, collaborate and track progress of all projects and assignments in a user-friendly way.

This connector is supported by Planview as the preferred method of reporting on ProjectPlace moving forward. Existing users of the ProjectPlace connector should consider rebuilding their reports on this new, Planview maintained, certified connector.

You can find this connector in the Other section of the 'Get data' dialog.

Shortcuts Business Insights connector

ProjectPlace lets you plan, collaborate and track progress of all projects and assignments in a user-friendly way.

This connector is supported by Planview as the preferred method of reporting on ProjectPlace moving forward. Existing users of the ProjectPlace connector should consider rebuilding their reports on this new, Planview maintained, certified connector.

You can find this connector in the Other section of the 'Get data' dialog.

Shortcuts Business Insights connector

The Shortcuts Business Insights connector enables you to consume, read and analyse your data collected via your Shortcuts point of sale product of choice. Gaining access to this data will enable you to realise business insights from your appointment, transactional, client, employee, product and service data. These insights will allow you to better serve your customers and anticipate their needs, while growing your business.

You can find this connector in the Other section of the 'Get data' dialog.

Vessel Insights connector

Vessel Insight is a vessel *(how did we guess?)* to shore data infrastructure delivered as a service. The service enables shipowners, operators and charterers to capture data from onboard systems such as propulsion, navigation, cargo or VDR, as well as alarm and engine management systems. Vessel Insight aggregates and contextualises the data before transferring it to the cloud using the KONGSBERG Global Secure Network.

The Vessel Insight Power BI connector makes it straightforward to integrate and combine vessel data with existing systems and streamline reporting and decision making.

You can find this connector in the Other section of the 'Get data' dialog.

Zoho Creator connector

Zoho Creator is a low-code cloud software which lets you create custom applications for your business. Zoho Creator can collect data, automate business processes or workflows, analyse the data in reports and collaborate with your application users. The Zoho Creator connector allows you to analyse data and share insights based off all data in Zoho Creator, aside from the pivot report.

You can find this connector in the 'Online services' section of the 'Get data' dialog.

New instructor-led training

Given the aforementioned global health concerns, Microsoft has changed its Dashboard in a Day (DIAD) program to accommodate online delivery. The events will be scheduled on Microsoft Teams instead of in person classrooms.

But we know you will still come to SumProduct's training – which has been available online *for years* (see https://www.sumproduct.com/courses and https://www.sumproduct.com/subscriptions for more details).

Dataset impact analysis

As a dataset owner, you might want to understand how your dataset is being used within the workspace and in other workspaces. With the dataset impact analysis, you can judge how carefully you need to be when making changes to your dataset. For example, if your dataset is being used in multiple workspaces (that feed multiple applications), with hundreds of end users consuming its data, then you will want to provide the relevant contacts heads-up notification about changes that may impact their reports so they may take any necessary action.
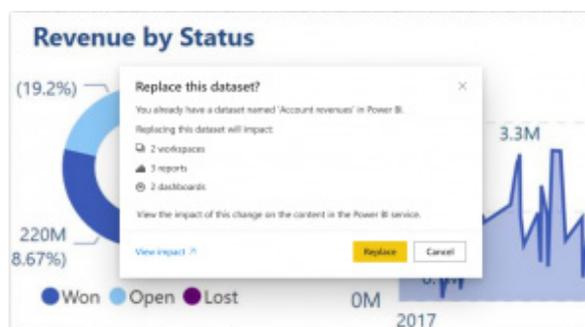
When you re-publish a dataset from Power BI Desktop to the Service, you'll get a message that summarises for you the potential impact, *e.g.* how many reports and dashboards are already built on top of this dataset, and in how many workspaces. If you want to see more details, such as usage metrics and take action, you can click on the 'View impact' link. This will take you to the Power BI Service where you will see the full, detailed analysis.

Somehow, I think normal service will resume and there will be more Power BI Desktop updates next month.

The A to Z of Excel Functions: ERROR.TYPE

This function returns a number corresponding to one of the error values in Microsoft Excel or returns the *#N/A* error if no error exists. You can use **ERROR.TYPE** in an **IF** function to test for an error value and return a text string, such as a message, instead of the error value.

The **ERROR.TYPE** function employs the following syntax to operate:

ERROR.TYPE(error_value)

The **ERROR.TYPE** function has the following arguments:

- **error_value:** this is required and represents the error value whose identifying number you want to find. Although **error_value** can be the actual error value, it will usually be a reference to a cell containing a formula that you want to test.

If error_value is	ERROR.TYPE returns
#NULL!	1
#DIV/0!	2
#VALUE!	3
#REF!	4
#NAME?	5
#NUM!	6
#N/A	7
#N/A	8
#SPILL!	9
#CONNECT!	10
#BLOCKED!	11
#UNKNOWN!	12
#FIELD!	13
#CALC!	14
Anything else	#N/A

Note the newbies, because Microsoft hasn't.

Please see an example below:

	A	B	C
1	**Data**		
2	#NULL!		
3	#DIV/0!		
4			
5			
6	**Formula**	**Description**	**Result**
7	*=ERROR.TYPE(A2)*	Number of the *#NULL!* error (1).	1
8	*=IF(ERROR.TYPE(A3)<3,CHOOSE(ERROR.TYPE(A3) ,"Ranges do not intersect","The divisor is zero"))*	Checks cell **A3** to see whether the cell contains either the *#NULL!* error value or the *#DIV/0!* error value. If it does, then the number for the error value is used in the **CHOOSE** worksheet function to display one of two messages; otherwise, the *#N/A* error value is returned.	**The divisor is zero**
9			

The A to Z of Excel Functions: EUROCONVERT

If you use this function, then I suppose **EUROCONVERT!** This function has several features:

- it converts a number to Euros
- it converts a number from Euros to a euro member currency
- it converts a number from one euro member currency to another by using the euro as an intermediary (triangulation).

The currencies available for conversion are those of European Union (EU) members that have adopted the euro. The function uses fixed conversion rates that are established by the EU.

If this function is not available, and returns the *#NAME?* error, install and load the Euro Currency Tools Add-in. To install and load the Euro Currency Tools Add-in:

1. On the **File** tab, click **Options**, and then click **Add-Ins**
2. In the **Manage** list box, select **Excel Add-ins**, and then click **Go**
3. In the **Add-Ins Available** list, select the **Euro Currency Tools** box, and then click **OK**
4. If necessary, follow the instructions in the setup program.

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

EUROCONVERT(number, source, target, full_precision, triangulation_precision)

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

- **number:** this is required and represents the currency value you want to convert or a reference to a cell containing the value
- **source:** this is also required. This is denoted by a three-letter string or reference to a cell containing the string, corresponding to the International Organization for Standardization (ISO) code for the source currency. The following currency codes are available in the **EUROCONVERT** function:

Country/Region	Basic unit of currency	ISO code
Belgium	franc	BEF
Luxembourg	franc	LUF
Germany	deutsche mark	DEM
Spain	peseta	ESP
France	franc	FRF
Ireland	pound	IEP
Italy	lira	ITL
Netherlands	guilder	NLG
Austria	schilling	ATS
Portugal	escudo	PTE
Finland	markka	FIM
Greece	drachma	GRD
Slovenia	tolar	SIT
Euro member state	euro	EUR

- **target:** again, required. This too is a three-letter string or cell reference, corresponding to the ISO code of the currency to which you want to convert the number. See the previous source table *(above)* for the ISO codes.
- **full_precision:** this is another required field. This is a logical value (**TRUE** or **FALSE**), or an expression that evaluates to a value of TRUE or FALSE, that specifies how to display the result:

Use	If you want Excel to
FALSE	Display the result with the currency-specific rounding rules, see the table that follows. Excel uses the calculation precision value to calculate the result and the display precision value to display the result. FALSE is the default if the full_precision argument is omitted.
TRUE	Display the result with all significant digits resulting from the calculation.

- the following table shows the currency specific rounding rules, *i.e.* how many decimal places Excel uses to calculate a currency's conversion and display the result:

ISO code	Calculation precision	Display precision
BEF	0	0
LUF	0	0
DEM	2	2
ESP	0	0
FRF	2	2
IEP	2	2
ITL	0	0
NLG	2	2
ATS	2	2
PTE	0	2
FIM	2	2
GRD	0	2
SIT	2	2
EUR	2	2

- **triangulation_precision:** this is also required. This represents an integer greater than or equal to three (3) that specifies the number of significant digits to be used for the intermediate euro value when converting between two euro member currencies. If you omit this argument, Excel does not round the intermediate euro value. If you include this argument when converting from a euro member currency to the euro, Excel calculates the intermediate euro value that could then be converted to a euro member currency.

It should be further noted that:

- Excel truncates any trailing zeros in the return value
- if the source ISO code is the same as the target ISO code, Excel returns the original value of the number
- invalid parameters return *#VALUE!*
- this function does not apply a number format
- this function cannot be used in array formulae.

Please see the example below:

	A	B	C
1	**Amount**	**Source**	**Target**
2	1.20	DEM	EUR
3	1.00	FRF	EUR
4	1.00	FRF	EUR
5	1.00	FRF	DEM
6	1.00	FRF	DEM
7			
8			
9	**Formula**	**Description**	**Result**
10	=EUROCONVERT(A2,B2,C2)	Converts 1.2 deutsche marks to the equivalent in euros by using a calculation and display precision of 2 decimal places (0.61)	0.61
11	=EUROCONVERT(A3,B3,C3,TRUE,3)	Converts 1 franc to the equivalent in euros by using a calculation and display precision of 3 decimal places (0.152)	0.152
12	=EUROCONVERT(A4,B4,C4,FALSE,3)	Converts 1 franc to the equivalent in euros by using a calculation and display precision of 2 decimal places (0.15)	0.15
13	=EUROCONVERT(A5,B5,C5,TRUE,3)	Converts 1 franc to the equivalent in deutsche marks by using an intermediate calculation precision of 3 and displaying all significant digits (0.29728616)	0.29728616
14			

Further observations:

- these examples assume conversion rates of 1 euro = 6.55957 French francs and 1.95583 deutsche marks. The **EUROCONVERT** function uses the current rates established by the EU. Microsoft will update the function if the rates change. To get full information about the rules and the rates currently in effect, see the European Commission publications about the euro
- The examples show the resulting value stored in the cell, not the formatted value
- In the sample spreadsheet, trailing zeroes are truncated.

More Excel Functions next month…

Beat the Boredom Suggested Solution

Earlier in the newsletter, we published a set of data comparing original budgeted numbers with their reforecast counterparts, *viz.*

Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Original Budget	50	72	75	59	63	77	71	86	98	88	95	77
Reforecast	81	79	79	96	55	62	89	68	72	77	67	83
Variance	31	7	4	37	(8)	(15)	18	(18)	(26)	(11)	(28)	6

The challenge was to re-format this data for a typical management report:

Required Reporting Format

	Jan			Feb			Mar		
Budget	Reforecast	Variance	Budget	Reforecast	Variance	Budget	Reforecast	Variance
50	81	31	72	79	7	75	79	4

Most analysts will come up with a solution akin to the following:

Required Reporting Format

	Jan			Feb			Mar		
Budget	Reforecast	Variance	Budget	Reforecast	Variance	Budget	Reforecast	Variance
50	81	31	72	79	7	75	79	4
=E5	=E6	=F14-E14	=F5	=F6	=I14-H14	=G5	=G6	=L14-K14

The problem is there is a different formula in each cell in the row. That means plenty of opportunities to reference the wrong cell as well as making it impossible to copy the calculation across the row.

The challenge was to create just one formula you could copy across this row that would achieve the same result.

Our suggestion is as follows:

That's right; it's a nice simple formula:

=OFFSET($D$4,MOD(COLUMNS($E13:E13)-1,COLUMNS($E$13:$G$13))+1,ROUNDUP(COLUMNS($E13:E13)/COLUMNS($E$13:$G$13),0))

I think that might need some explanation! Let's start with the principle and take a closer look at the source data:

Imagine your cursor is positioned in cell **D4** (the cell with the red **X** in it):

- to get to the January budget data, you would have to move **one** cell down and one column to the right
- to get to the January reforecast data, you would have to move two cells down and one column to the right
- to get to the January variance, you would have to move three cells down and one column to the right
- to get to the February budget data, you would have to move one cell down and two columns to the right
- *etc.*

Do you see? To get to any data in January, you have to move **one** column to the right; to get to any data in February you have to move **two** columns to the right, and so on. To get to any budget number you have to move **one** row down; to get to any reforecast number you have to move two rows down; to get to any variance figure, you have to move **three** rows down.

There's a function that can help us with this: **OFFSET**. We could get a formula to work as follows:

We need the number of rows reference in the **OFFSET** function to go

<div align="center">1, 2, 3, 1, 2, 3, 1, 2, …</div>

as the formula is copied across and we want the number of column references in the **OFFSET** function to go

1, 1, 1, 2, 2, 2, 3, 3, …

Using **COLUMNS($E13:E13)** as our counter (**COLUMNS** simply determines the number of columns in the cited range), we can generate both of these functions easily.

To generate the first sequence (1, 2, 3, 1, 2, 3, 1, 2, …), the **MOD** function works wonders:

<div align="center">=MOD(COLUMNS($E13:E13)-1,COLUMNS($E13:$G$13))+1</div>

This reverts to **MOD(Counter-1,3)+1**. The COLUMNS function has been used to avoid both a counter and the hard-coded value of 3. This is in accordance with our Best Practice modelling principles of Flexibility and Transparency.

The **ROUNDUP(value,n)** function rounds the amount value up to n decimal places (so zero will be to the next whole number or integer). Therefore,

<div align="center">=ROUNDUP(COLUMNS($E13:E13)/COLUMNS($E13:$G$13),0)</div>

rounds 1/3, 2/3, 3/3, 4/3, … to the next whole number (1, 1, 1, 2, …).

Putting this all together gives us our horror formula

<div align="center">=OFFSET($D$4,MOD(COLUMNS($E13:E13)-1,COLUMNS($E13:$G$13))+1,ROUNDUP(COLUMNS($E13:E13)/COLUMNS($E13:$G$13),0))</div>

once more.

Next month we'll consider partial derivatives of Non-Linear Diophantine Approximation Theory…

Location	Course	Date	Duration
Online	Excel Tips and Tricks	18 Aug 2020	1 Day
Online	Financial Modelling	19 - 20 Aug 2020	2 Days
Online	Power Pivot, Power Query and Power BI	7 - 9 Sep 2020	3 Days
Online	Power Pivot, Power Query and Power BI	9 - 11 Nov 2020	3 Days
Online	Excel Tips and Tricks	16 Nov 2020	1 Day
Online	Financial Modelling	17 - 18 Nov 2020	2 Days
Online	Power Pivot, Power Query and Power BI	14 - 16 Dec 2020	3 Days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This month, we thought we would see whether you have adequate **CTRL** over your keyboard shortcuts. Take a letter, Ms. Jones:

Keystroke	What it does
CTRL + 0	Hide columns
CTRL + 1	Format cells
CTRL + 2	Bold (toggle)
CTRL + 3	Italic (toggle)
CTRL + 4	Underline (toggle)
CTRL + 5	Strikethrough (toggle)
CTRL + 6	Toggle Show, Hide and Show Placeholders for Objects
CTRL + 7	Excel 2003 and earlier: toggle Standard toolbar visibility
CTRL + 8	Toggle showing outline symbols
CTRL + 9	Hide row

There are c.550 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file at 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:
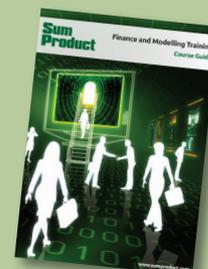
Drop us a line at training@sumproduct.com for a copy of the brochure or download it directly from http://www.sumproduct.com/training.