Happy new year!

Let's hope it's a good one, to quote John & Yoko. 2020 started out with so much hope and potential, only to be scuppered by COVID-19, economic recession and mass hysteria. Surely things will be better in 2021. Time will tell!

It might be holiday season, but we don't seem to have taken a holiday! There are two pieces of news on SumProduct itself to kick the New Year off (we are moving in Melbourne and there is an update on the second financial modelling book too). We also have the big piece of news over what may turn out to be the final piece in Excel's jigsaw, **LAMBDA**, that "completes" the spreadsheet. Rest in piece *(sic)*, Excel!

The regulars are all here too: we have another Beat the Boredom Challenge, Visual Basics, Power Pivot Principles, Power Query Pointers, Power BI updates, you may even **FIND** the A to Z of Excel Functions a little searching this month, and the Keyboard Shortcuts come up with a monthly idea for the new year.

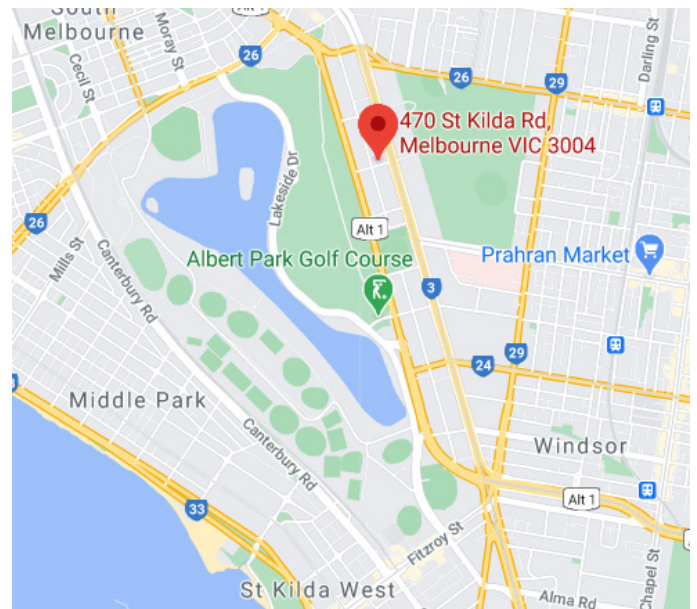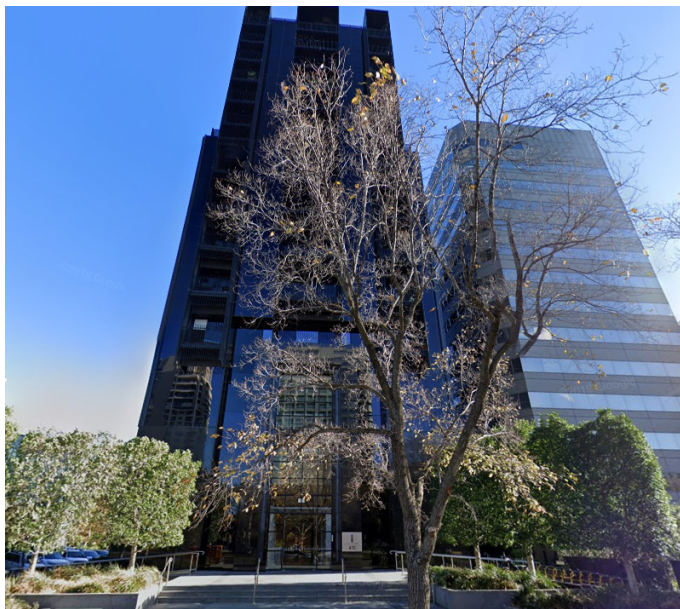Happy reading and remember: stay safe, stay happy, stay healthy.

Good riddance 2020 – and so say all of us!

Liam Bastick, Managing Director, SumProduct

SumProduct On The Move

Having pretty much stayed stationary in 2020 with the COVID-19 lockdowns, the New Year sees the Melbourne office moving.
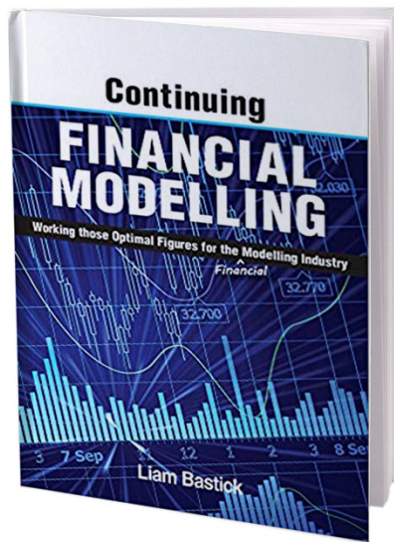
Our new address is:

Ground Floor
470 St Kilda Road
Melbourne
VIC 3004

A new place for a new year!

Continuing Financial Modelling Book Available This Month

You may recall that Liam Bastick's second financial modelling book, *Continuing Financial Modelling*, was released on Kindle in September last year. Due to current pandemic circumstances, the physical release was understandably delayed, but, as at the time of writing you *should* be able to purchase physical copies of this book from your local Amazon website by the middle of this month (January). We have had many readers asking about this and we are delighted it's coming very, very soon!!

This sequel contains no SQL, but it does contain what-if? analysis, discussions on inventory modelling, depreciation modelling, debt sculpting, valuations modelling, rolling budgets and charts, and some of the latest features coming out of Excel (no **LAMBDAs** though), amongst other things. It also has all the usual terrible puns and appalling sense of humour that you have come to know and expect from its author, yours truly.

And be warned – we will have an announcement on Volume 3 *very* soon…

LAMBDA Slaughter: Creating Custom Functions Using LAMBDA

Now, not just Mary can have a little **LAMBDA…**

For those in Office 365 Beta, there has been a fantastic recent announcement for Excel. After **LET** was made Generally Available just a couple of weeks ago, its sister function, **LAMBDA**, has been released into the wild. The power of this latest addition to the Excel family of functions cannot be overstated. This is going to REVOLUTIONISE how you build formulae in Excel.

This function "completes" Excel *(more on that below)*, as a key programming feature – missing forever in the world's favourite spreadsheet software – is now made available as well as the ability to create your own reusable formulae.
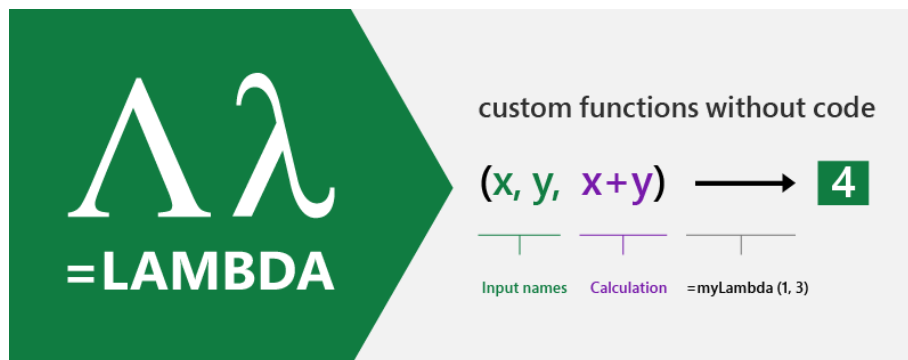
Confusingly, **LAMBDA** has *nothing* whatsoever to do with previous Greek-named functions such as **BETA** and **GAMMA**. The name dates back to Alonzo Church, a mathematician and logician who made major contributions to mathematical logic and the foundations of theoretical computer science. He coined the term as part of **lambda calculus**, in which all functions were deemed "anonymous", *i.e.* one that is not bound to an identifier. If this means nothing to you and you are now possessing a glazed expression, don't worry, welcome to my world.

Simply put, **LAMBDA** allows you to define your own custom functions using Excel's formula language. It's User Defined Functions without a PhD in VBA or JavaScript. In Office 365 Beta, **LAMBDA** allows you to define a custom function in Excel's very own formula language. Moreover, one function can call another (including itself!), so there is no limit to the power you can deploy with a single function call. And as Microsoft

states, "…for folks with a computer science background, you're probably already familiar with the concept of lambdas, and the introduction of LAMBDA makes the Excel formula language Turing Complete...". You can now sleep at night.

With **LAMBDA**, you can take any formula you've built in Excel and wrap it up in a **LAMBDA** function and give it a name (like "**CUSTOM1**"). Then, anywhere in your Excel workbook, you can refer to **CUSTOM1**, re-using that custom function throughout your sheet.

So here's the rub. If you create such a **LAMBDA** called **CUSTOM1**, you can call **CUSTOM1** within the definition of **CUSTOM1**. This is known as recursion and this is what "completes" Excel. This is something that before was only possible in Excel through script (like VBA / JavaScript). This is what makes lambda functions so powerful *(again, see below)*.

Reusable Custom Functions

One of the more challenging parts of working with formulas in Excel is that you often get fairly complex formulas that are re-used numerous times through the sheet (often by just copy/pasting). This can make it hard for others to read and understand what's going on, put you more at risk of errors, and make it hard to find and fix the errors. With **LAMBDA**, you have re-use and composability. Create libraries for any pieces of logic you plan to use multiple times. It offers convenience and reduces the risk of errors.

So how does it work?

The syntax of **LAMBDA** is perhaps not the most informative:
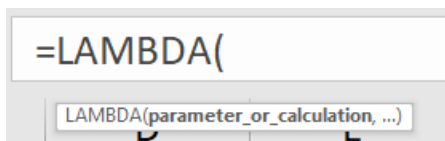
That's, er, great. Perhaps a run-through might be best.

There are three key pieces of **=LAMBDA** to understand:

1. **LAMBDA** function components
2. Naming a lambda
3. Calling a lambda function.

1. LAMBDA function components

Let's take a simple example. Consider the following formula:

$$=LAMBDA(x, x+1)$$

This is a very exciting formula, where we have **x** as the argument (oh no it isn't, oh yes it is – see, I told you it was an argument), which you may pass in when calling the **LAMBDA**, and **x+1** is the logic / operation to be performed.

For example, if you were to call this lambda function and define **x** as equal to five (5), then Excel would calculate
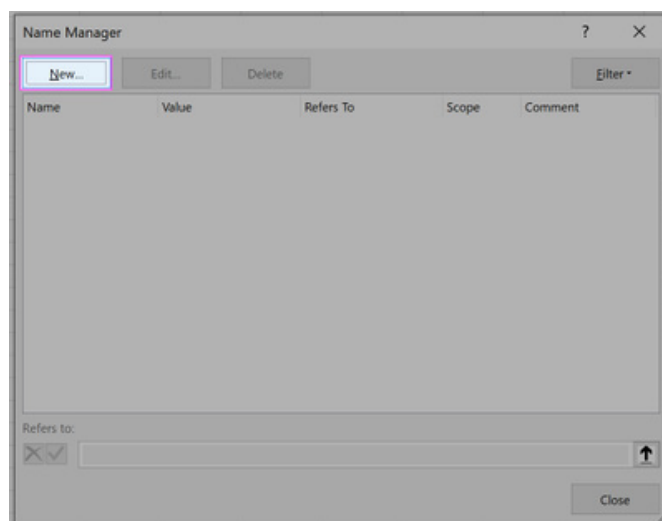
$$5 + 1 = 6$$

Except it wouldn't. If you tried this you would get *#CALC!* Oops. That's because it's not quite as simple as that. You need to name your little **LAMBDA**.

2. Naming a lambda

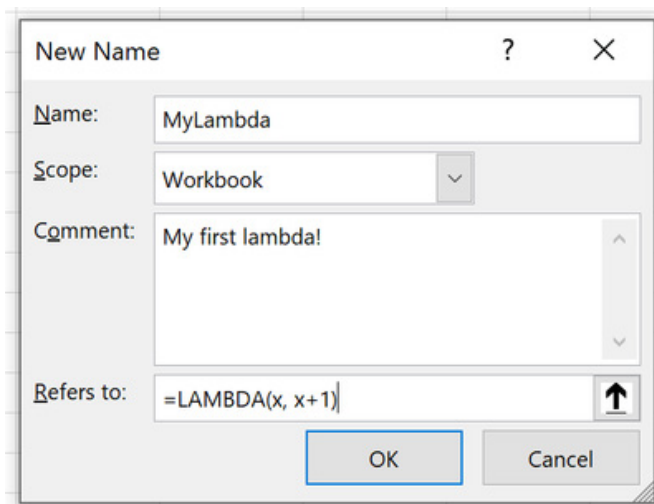To give your **LAMBDA** a name so it can be re-used, you have to use the Name Manager (**CTRL + F3** / go to the Ribbon and then go to **Formulas -> Name Manager**):
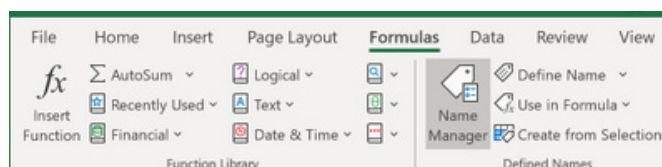
Once you open the Name Manager you will see the following dialog:

You then click on 'New' and fill out the related fields, *viz.*

To be clear:

- **Name:** the Name of your function (this is where you name it!)
- **Comment:** a description and associated ToolTip, which will be shown when calling your function
- **Refers to:** your lambda function definition (this is where you put your formula – *NOT* in the Excel worksheet!).

Once completed, you may press 'OK' to store your lambda and you should see the definition returned in the resultant window.
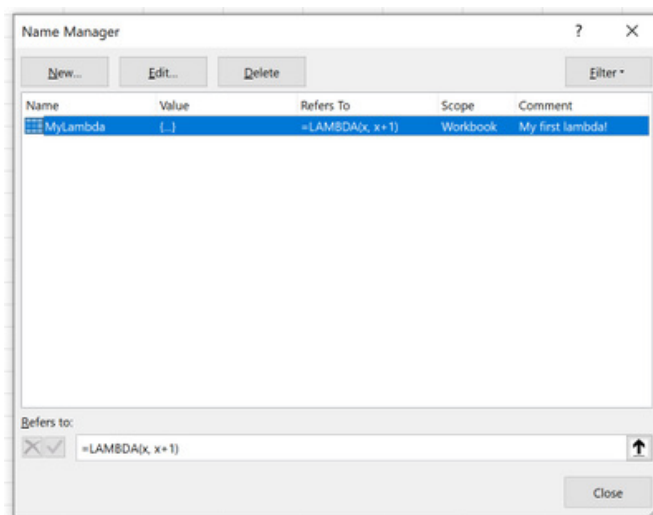

3. Calling LAMBDA

Now that you have done this, your first new lambda function may be called in just the same way as every other Excel function is cited, *e.g.*

=MYLAMBDA(5)

which would equal six (6) and not *#CALC!* as before.

You DON'T have to do it this way though if you don't want to. You may call a lambda without naming it. If we hadn't named this marvellous calculation, and simply authored it in the grid as we had first attempted, we could call it by simply typing:

=LAMBDA(x, x+1)(5)
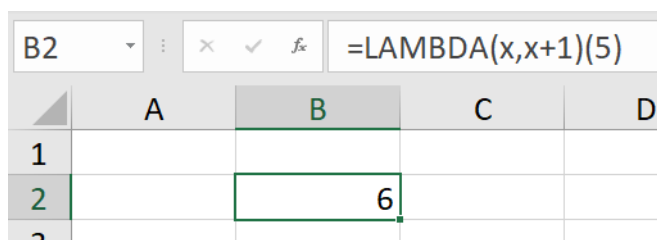
The sky's the limit. You are not restricted to just numbers and text. You can also use:

- **Dynamic arrays:** rather than passing a single value into a function, you can pass an array of values, and functions can also return arrays of values
- **Data Types:** the value stored in a cell is no longer just a string or a number. A single cell can contain a rich Data Type, with a large set of properties, as discussed previously.

Functions can take data types and arrays as arguments, and they can also return results as data types and arrays. The same is true with the lambdas you build.

To show you just how useful these functions are, I want to finish with recursion. To show you just how useful these functions are, I want to finish with recursion. To show you just how useful these functions are, I want to finish with recursion. To show you just how useful these functions are, I want to finish with recursion… *(ad lib to fade)*

Recursion

One of the big missing pieces in Excel formulae has been the ability to loop or create a function that calls itself. This is something modellers have wanted for years with common calculations such as calculating optimum debt whilst taking account of interest and other similar iterative computations. Where you can, it is often better to solve formulaically (*e.g.* calculating interest using simultaneous equations), but sometimes you find yourself in a situation screaming for a lambda function.

Here is an example that Microsoft came up with to demonstrate the idea.

Imagine you have a set of text strings and want to specify which characters should be removed from those strings dynamically:

String	Remove	Desired Result
Brian Jones 206	1234567890	Brian Jones
excel85	abcdefghijklmnopqrstuvwxyz	85
River!@# On The Water	*!@#$%	River On The Water

Because the set of characters you're specifying are not static, there really isn't any good way of doing this. If you knew it was always a fixed set of characters, you could calculate using nested logic, but that would be pretty complex and error prone to author.

With **LAMBDA**, you could create a function called **REPLACECHARS** that references itself allowing you to iterate over the list of characters to be removed, where **REPACECHARS** has been defined as

=LAMBDA(textString, illegalChars,

   IF(illegalChars="", textstring,

    REPLACECHARS(

    SUBSTITUTE(textString, LEFT(illegalChars, 1), ""),

    RIGHT(illegalChars, LEN(illegalChars)-1)

)))

Notice that in the definition of **REPLACECHARS**, there is a reference to **REPLACECHARS**! The **IF** statement says if there are no more illegal characters, return the input **textString**, and otherwise remove each occurrence of the leftmost character in **illegalChars**. Recursion kicks in with the request to call **REPLACECHARS** again with the updated string, and the rest of **illegalChars**. This means it will keep calling itself until it has parsed over every character to be removed, giving the desired result.

String	Remove	Desired Result	
Brian Jones 206	1234567890		
excel85	1234567890		
River!@# On The Water	1234567890		

Points to Note

- **LAMBDA** doesn't have to be used in a named range, as shown above. You must remember to pass the required parameters to avoid the *#CALC!* error, *e.g.*
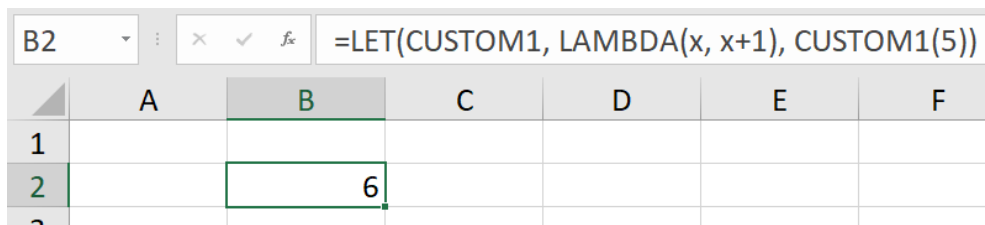
  =LAMBDA(x, x+1)(5)

  will return six [6] if entered in a cell

- **LET** requires at least one variable to work; **LAMBDA** can take between zero [0] and 253 variables (e.g. an exception to the first point is **=LAMBDA(RAND())**, which will work

- **LAMBDA** inside a **LET** function *will* work, *e.g.*

  =LET(CUSTOM1, LAMBDA(x, x+1), CUSTOM1(5))

will return six [6] if entered into a cell:

- When you begin writing a **LAMBDA** function, the intellisense is presently working inside all lambda parameters except for the first one (Microsoft would like to know if that's not the behaviour any reader sees). Of course, intellisense should also work for the first parameter, but there is presently a bug, which will be fixed shortly.

Word to the Wise

The best thing is just to get going with this powerful addition to the Excel vocabulary. The **LAMBDA** function is available to members of the Insiders Beta program running Windows and Mac builds of Excel 365. It might just be a time to upgrade if you don't already have it!

Universal app support for Macs with M1 is here
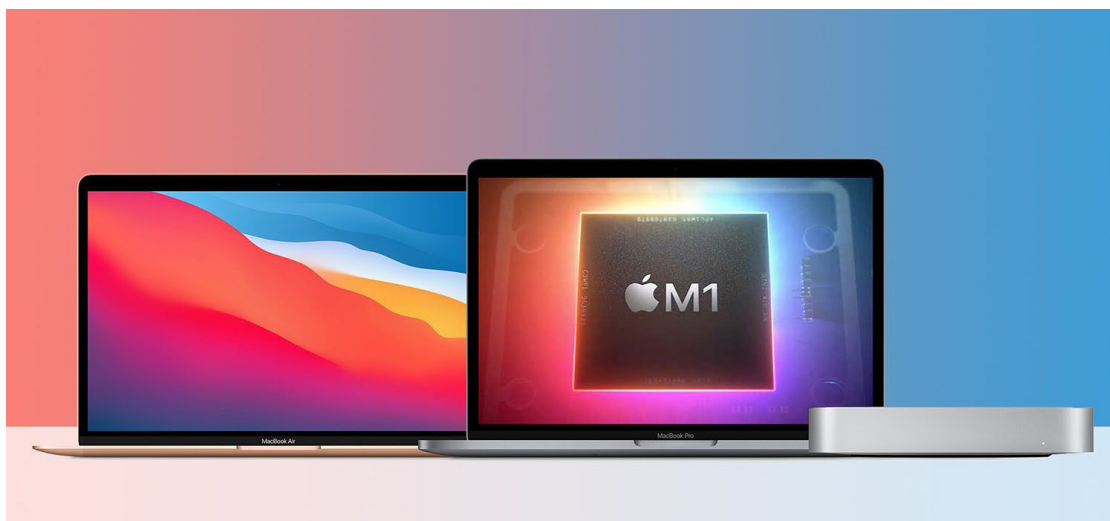
From mid-December, Microsoft has been releasing new versions of their Microsoft 365 for Mac apps that will now run *natively* on Macs with M1. This means that the popular Office apps – including Excel – will run faster and take advantage of the performance improvements on the new Macs too. These new Office apps will be "Universal", *i.e.* they will continue to run (as well as they ever did!) on Macs with Intel processors.

If you have automatic updates turned on, you should have already started receiving these updates. Otherwise, you can go to the Mac App Store and click the Updates tab, or with Microsoft AutoUpdate, you can go to your Office app's Help menu and choose 'Check for Updates'.

That's not all that Microsoft has done. There are quite a few other new features, either out now or coming very soon:

- With more than 115 million active users daily, Microsoft Teams has become a critical part of the way many people are navigating the current situation. **Microsoft Teams is currently available in Rosetta emulation** mode on Macs with M1 and the browser. Furthermore, Microsoft is working on universal application support for M1 Macs

- The new Outlook for Mac has been redesigned to match the new look of macOS Big Sur. The new Outlook for Mac will support shared calendars for customers subscribed to the Office Insider Mac Beta Channel in the first months of this year
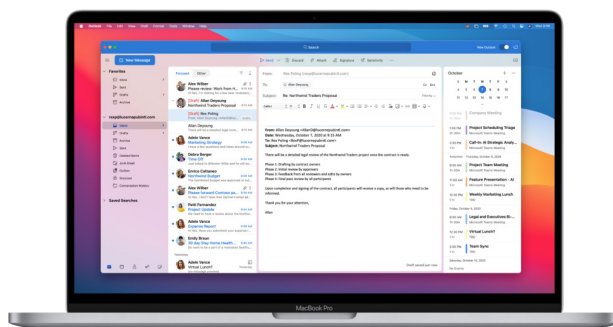
- There is an **updated Office Start experience** for Excel, OneNote, PowerPoint and Word for Mac that incorporates the Fluent UI design system, which will be available this month

- 'Tell Me' is a search box that quickly gets you to the Office tools you need or actions you want to take by just typing what you are looking for in Excel, OneNote, PowerPoint and Word for Mac. **Microsoft Search in the new Outlook for Mac** allows you to type out your query or question using language you use every day to find emails, events and files, with no clever phrasing required

- With **Data from Picture**, you can take a photo of a table directly on your iPhone and turn it into data you can edit in Excel for Mac. This handy new feature uses Continuity Camera on your Mac and is also available now
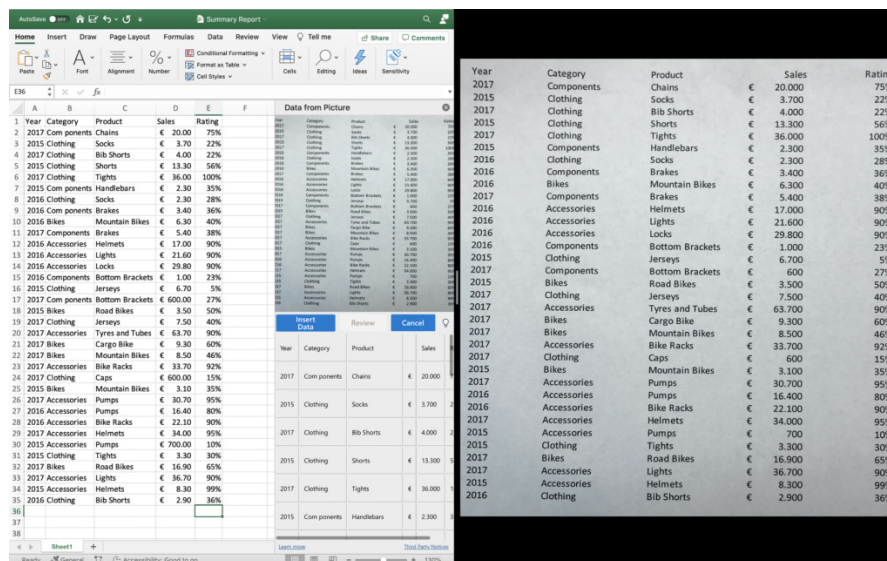
- **Voice input** is a growing part of our digital lives and can be a great way to simplify your workflow. A new dictation toolbar with voice commands for creating content with your voice is coming to Word and Outlook for Mac. In addition, to help you check spelling, correct grammar and get writing style suggestions, **Microsoft Editor has been brought to Word for Mac** (never mind). These updates should be available to customers with access to Microsoft 365 for Insiders in early 2021

- When creating new content as a team, the ability to collaborate around documents and presentations becomes especially valuable when your team is not in the same location / working from home. The **new commenting experience in Word for Mac** enables a contextual view of comments that allows you to focus on your content without missing active comments by contributors and reviewers. Modern commenting also includes improved @mentions in PowerPoint and Word for Mac that make it easier to reply to comments. The new @mentions experience is available now in PowerPoint for enterprise customers. Modern commenting for Word is in the Office Insider Beta Channel now and coming to Current Channel Preview in February 2021
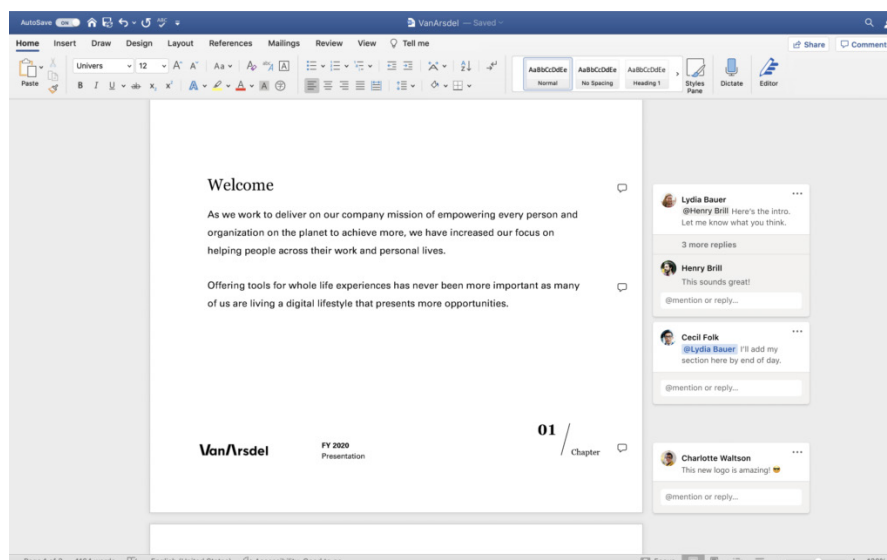

- When an active collaborator adds filters or sorts the data in a table of a shared worksheet in Excel, in the past, your view of a shared workbook would change. As mentioned previously in this newsletter, **Excel Sheet View** is a new way to create customised views to sort and filter your data without disrupting what others see. This is now available on Excel for Mac

- **Microsoft Information Protection sensitivity labels** allow you to classify and protect your organization's data with minimal effort through manual and automatic content labelling. Manual labelling is available in Excel, OneNote, PowerPoint and Word for Mac. Automatic labelling is coming to these same apps for Microsoft 365 E5 customers in early 2021.

Open Multiple Documents in Excel on iPad OS

Since mid-December, Microsoft has made it possible to open multiple documents in Excel on iPad OS. With this latest update, you may take advantage of Split view for better multi-tasking on the iPad. It's not just in Excel either: this feature is also available for Word and PowerPoint too.

To take advantage of the full iPad screen, this feature may be accessed in the following ways:

- In the Excel application, swipe up from the bottom of the screen to open the dock. Then, touch and hold the icon of the Excel app, on the dock, and drag it to the right or left edge of the screen

- Touch, hold, and drag a file from the 'Recent, Shared, and Open' file list to the right or left edge of the iPad screen to open it side-by-side

- In the 'Recent, Shared, and Open' file list, tap the "…" menu for a file in the list, then tap Open in New Window
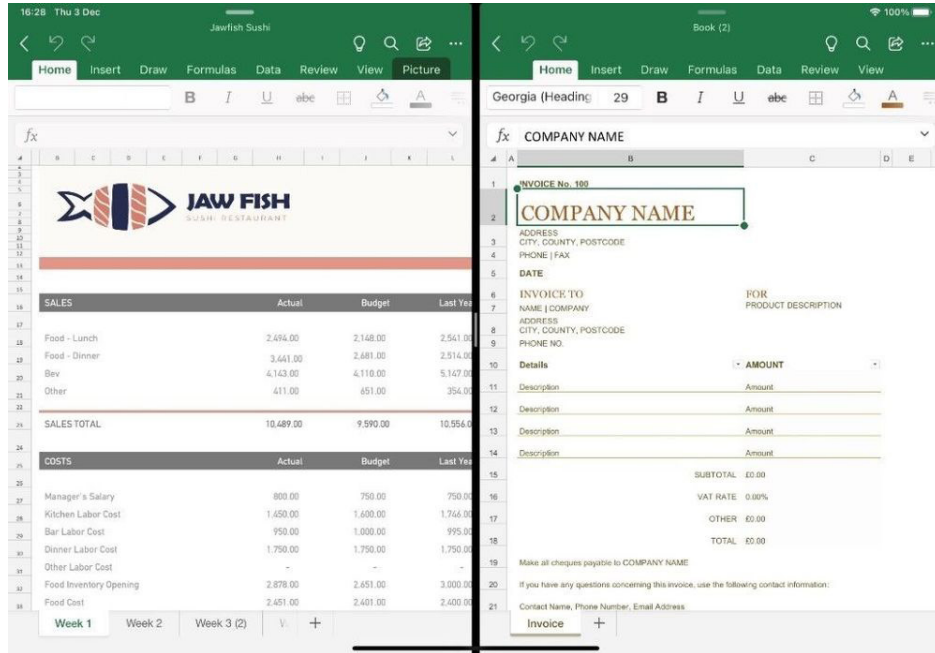
You can also drag and drop content between two files open which are open side-by-side. Simply select your cell or range in one document and long tap the selection to drag and drop it into the other document.
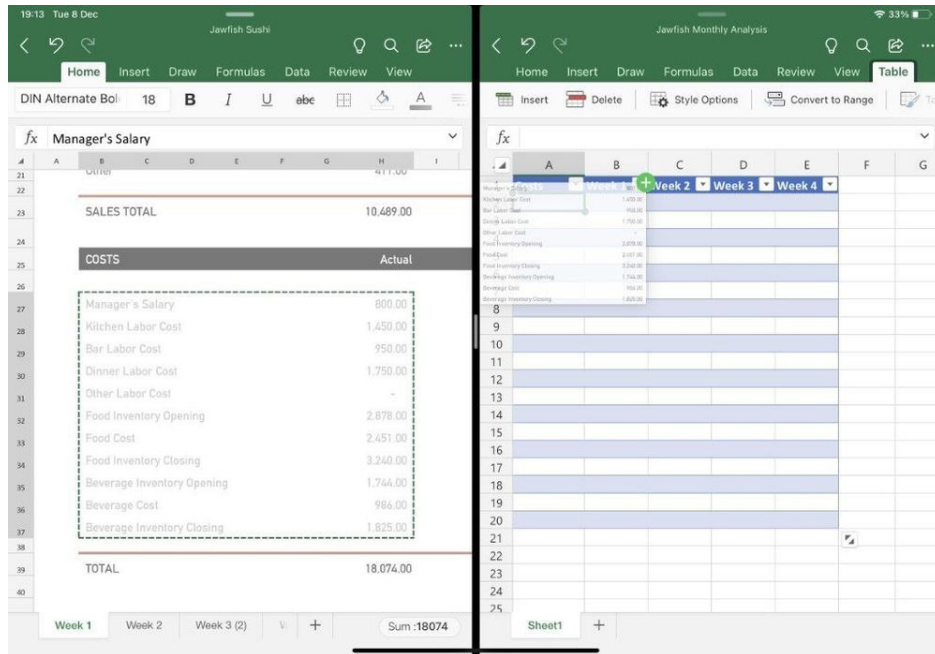

You just need to ensure that you have iPad OS 13 or higher.

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 snacks. 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...

You may be familiar with built-in Fill function in Excel...
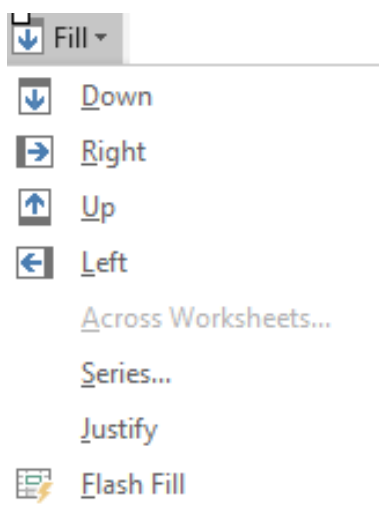
...would it be helpful in this case? Imagine you have thousands of rows in the below structure, how would you fill the blank investment column properly?

	A	B	C
1	**Investment**	**Cash Flow**	**Value ($)**
2	Energy Company	Cash receipts	110
3		Cash paid	120
4		Capex	130
5		Interest paid	140
6		Interest received	150
7	IT Startup	Cash receipts	160
8		Cash paid	170
9		Capex	180
10		Interest paid	190
11		Interest received	200
12	Organic Farming	Cash receipts	210
13		Cash paid	220
14		Capex	230
15		Interest paid	240
16		Interest received	250
17	Bio-tech Company	Cash receipts	260
18		Cash paid	270
19		Capex	280
20		Interest paid	290
21		Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23		Cash paid	320
24		Capex	330
25		Interest paid	340
26		Interest received	350

So that you will have a beautiful table like this, ready for all of your lookup functions:

	A	B	C
1	Investment	Cash Flow	Value ($)
2	Energy Company	Cash receipts	110
3	Energy Company	Cash paid	120
4	Energy Company	Capex	130
5	Energy Company	Interest paid	140
6	Energy Company	Interest received	150
7	IT Startup	Cash receipts	160
8	IT Startup	Cash paid	170
9	IT Startup	Capex	180
10	IT Startup	Interest paid	190
11	IT Startup	Interest received	200
12	Organic Farming	Cash receipts	210
13	Organic Farming	Cash paid	220
14	Organic Farming	Capex	230
15	Organic Farming	Interest paid	240
16	Organic Farming	Interest received	250
17	Bio-tech Company	Cash receipts	260
18	Bio-tech Company	Cash paid	270
19	Bio-tech Company	Capex	280
20	Bio-tech Company	Interest paid	290
21	Bio-tech Company	Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23	Pharmaceutical Company	Cash paid	320
24	Pharmaceutical Company	Capex	330
25	Pharmaceutical Company	Interest paid	340
26	Pharmaceutical Company	Interest received	350

This is an Excel challenge (not a Power Query one, but it's still a nice easy one – hey, it's the New Year!).

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

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 thought we would do some painting.

One of the things we like to set up in Excel is when you click on a cell and something happens. We once had a great idea that you could actually paint in Excel setting up Worksheet events so that every time you would click a cell, it would change to some predefined colour. Then, of course, we realised it had already been done.

This month, we are going to cover the basics of how it would work, using the **Worksheet_SelectionChange** event. This event triggers every time you select a new cell range in Excel. Note that this means if you select the range **A1:A4**, this will trigger an event, but if you then select range **A4:A1** (*i.e.* starting from **A4** and dragging upwards), because the same area is selected, it will not trigger the event again.

```
Worksheet                          SelectionChange

    Private Sub Worksheet_SelectionChange(ByVal Target As Range)


    End Sub
```
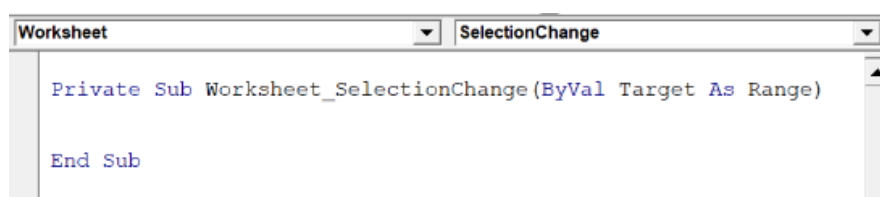
The bit at the end says that we can refer to the actual range selected using the variable called '**Target**'. This means that we can do things to the target area, such as:

- **Target.Address:** this will give us the cell range (*e.g.* "**A1:A4**")
- **Target.Item(X):** this lets us refer to specific cells within the selected range
- **Target.Interior:** this lets us change the cell shading and pattern.

Therefore, if we want to change the cell shading, then we can do so by using the following code:

```
Private Sub Worksheet_SelectionChange(ByVal Target As Range)

With Target.Interior

    .Pattern = xlSolid

    .Color = 123456

End With

End Sub
```

This will take the location that we've selected, change the pattern to a solid background, and set it to be the colour based on colour number 123456 (which in this case, happens to be a bright lime green colour).

Other useful worksheet commands include:

- **Worksheet_Activate:** an event which triggers whenever this sheet is activated (*e.g.* by clicking on the sheet tab)
- **Worksheet_Calculate:** an event which triggers every time the sheet (or the entire workbook) calculates
- **Worksheet_Change:** an event which triggers when a cell value is changed.

More next time.

Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we consider slicers in PivotTables created using Power Pivot.

Slicers display buttons representing the values in a field that we may select to filter the PivotTable data. This field does not need to be in the PivotTable explicitly.

For example:

We can use multiple slicers on the same PivotTable. For instance, we can insert the **SalesTerritoryKey** slicer:
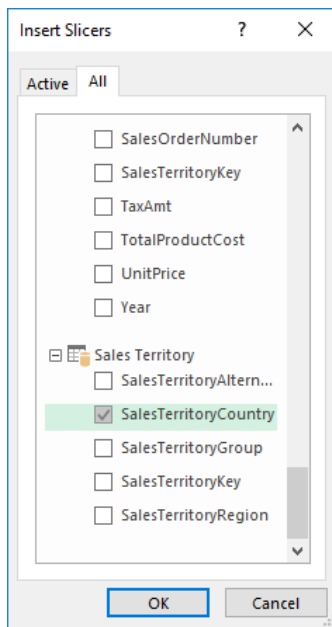

The PivotTable will update to display sales values from January to June, and from the Territory key of 6.

Of course, we can do all of this with ordinary PivotTables. The difference with Power Pivot is that we can insert slicers for fields contained in the different tables that are linked together in the data set.

Notice the 'All' tab on the 'Insert Slicers' dialog box?
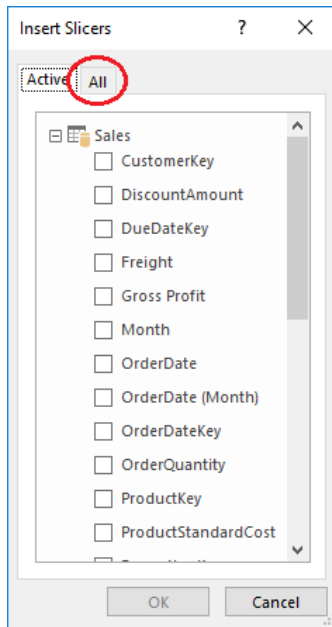
Let's try adding a slicer for the country:

The PivotTable will update to the selections made on any of the slicers. We can add as many slicers as we want from any of the other tables in the data set, as long as those tables have proper relationships established.

Row Labels	Sales	% of All Selected	Sales for Selected Months
1	$315.25	4.42%	$7,126.10
2	$290.80	4.08%	$7,126.10
3	$466.20	6.54%	$7,126.10
4	$466.90	6.55%	$7,126.10
5	$411.20	5.77%	$7,126.10
6	$286.90	4.03%	$7,126.10
7	$648.20	9.10%	$7,126.10
8	$612.05	8.59%	$7,126.10
9	$887.90	12.46%	$7,126.10
10	$647.30	9.08%	$7,126.10
11	$605.20	8.49%	$7,126.10
12	$1,488.20	20.88%	$7,126.10
Grand Total	**$7,126.10**	**100.00%**	**$7,126.10**

More *Power Pivot Principles* next month.

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 another way to remove blank rows and columns, which allows you to keep the column names.

The scenario continues from last month's newsletter: a huge Excel table comes in with lots of columns and rows, but in some cases a column or row is completely empty, and the table needs to be condensed. This may be easy to do by hand for smaller tables, but for larger data sets it would be nice to be able to do this automatically, at the press of a button.

This time we will use the unpivot function, because it includes some functionality which is useful to me to achieve the goal – empty cells are ignored. We start off with the 'Items' table, say, in the example workbook, and this time, we will include column names:

In the Data tab, in the 'Get and Transform' section, we will create a query 'From Table':

The first step will be to create an Index column – we may do this in the 'Add Column' tab. It doesn't matter where the index starts from; we just need a column that will remain constant through our transformations.

Having created this column, we right-click on it and choose to 'Unpivot Other Columns'.

The columns will be unpivoted and the 18 columns and 70 rows are about to change…

The data is now made up of **Attribute** and **Value**. Now, we need to pivot the data again, so we will select the **Attribute** column and choose 'Pivot Column' from the Transform tab.

We are prompted to choose a 'Values Column' for the columns we are going to create using this **Attributes** column. Lets' choose **Value**.

As we don't want to manipulate any of our data, we also go into the advanced options to make sure that we choose 'Don't Aggregate'. We then click 'OK' to pivot the data.

All our blank rows and columns have been removed! We just need to delete the previously-created index column and our data is ready to be loaded. All without losing the column headings too (although do note headers could have been demoted in last newsletter's demonstration).

More next month!

Power BI Updates

Albeit released in mid-December, the first update that we may relate to you for the new year provided two long-awaited features available in Preview: small multiples, and DirectQuery for Power BI datasets and Azure Analysis Services.

There was more though.

Here is this month's list of updates:

Reporting

- DirectQuery for Power BI datasets and Azure Analysis Services (Preview)
- Small multiples (Preview)
- Data protection sensitivity labels in Power BI Desktop (Preview)
- Increased rectangle select data point limit
- Selection pane is now available in the Mobile Layout view
- Automatic page refresh for Analysis Services sources

Data Preparation

- Recent changes to Power Query and Dataflows

Data Connectivity

- Microsoft Dataverse Connector
- Azure Time Series Insights Update
- SurveyMonkey Update
- Cognite Update

Service

- Power BI Search in Microsoft Search in Bing and Office now Generally Available
- Home List experience
- Custom publish message
- New export settings are available in the Power BI admin portal
- Power BI Premium per user public Preview now available
- Quickly create reports in the Service (coming soon)

Mobile

- Dark mode support in the Power BI Android app
- Anomaly detection is now supported in all mobile apps (iOS, Android and Windows)

Data protection sensitivity labels also make their debut in Power BI Desktop and there is a new Home List experience for Power BI Service. With holiday season still in full swing, do note there will apparently be no updates next month – totally understandable given the volume released monthly usually!

Embedded

- New look for Embedded scenarios
- New capabilities in embedding for your organisation
- Personalize visuals experience now fully supported on embedded scenarios
- New Q&A embed experience
- Power BI APIs & Life-Cycle Management
- Coming soon

Visualisations

- New visuals
- Strip Plot by Nova Silva
- Intelligent Narratives by Arria NLG

Template Apps

- Test Your Analytics Maturity
- Apps on AppSource
- Power BI Gold suite

Developers

- New Admin APIs and Service Principal authentication to make for better tenant metadata scanning
- Power BI Visuals Platform adds support for conditional formatting.

Let's take a look at each in turn.

DirectQuery for Power BI datasets and Azure Analysis Services (Preview)

Just over two years ago, Microsoft released composite models, which allowed you to seamlessly add multiple DirectQuery sources and imported data to your models. Now, they have announced that DirectQuery for Power BI datasets and Azure Analysis Services are now in Preview. This addition allows report authors to use DirectQuery to connect to Azure Analysis Services or Power BI Datasets as sources, in combination with other DirectQuery and imported data.

This feature is particularly useful for report authors who want to combine the data from their enterprise semantic model with other data they may own like an Excel spreadsheet, or who want to personalise or enrich the metadata from their enterprise semantic model.

Small multiples (Preview)

This release also sees the public Preview version of the small multiples feature. That's good if you know what they are! Small multiples, or trellising, splits a visual into multiple versions of itself, presented side-by-side, with its data partitioned across these versions by a chosen dimension (*e.g.* splitting a 'sales by category' column chart across product lines or country).

To enable this Preview, go to the 'Options and settings' menu, and enable the 'Small multiples' feature on the 'Preview features' page, *viz.*
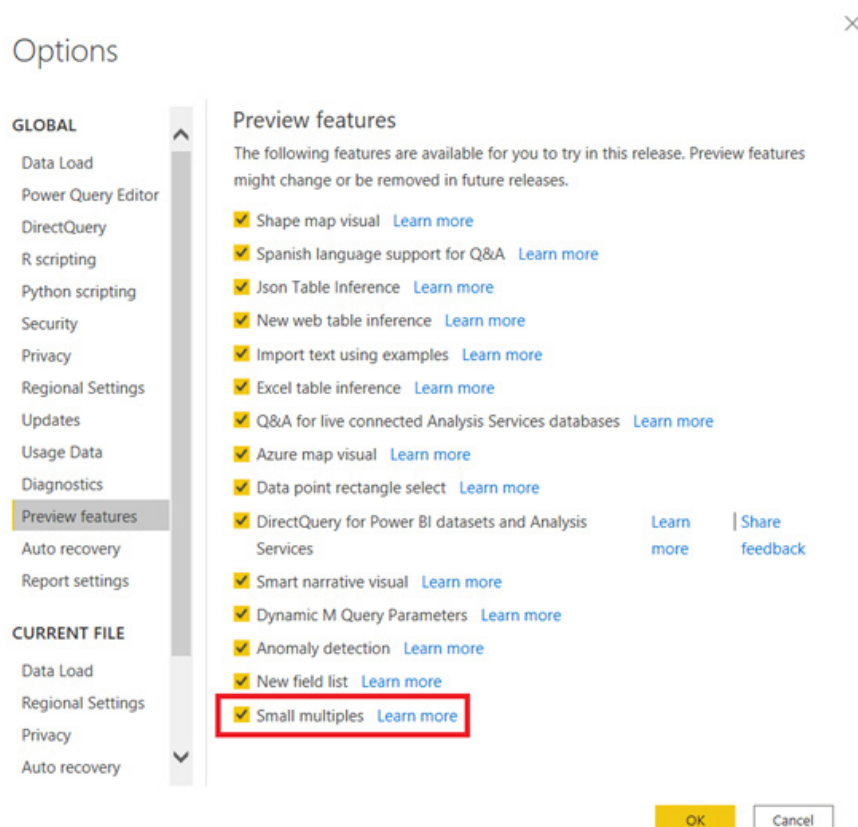
After restarting Power BI Desktop, you will be all ready to go.

To create and format small multiples, you should note that you can create small multiples on your bar / column, line, and area charts. To get started, create one of these visuals and choose a field along which you would like to partition its data. Drag that field into the 'small multiples' well in the Fields pane. You will see your chart split into a 2×2 grid, where the data has been divided along your chosen dimension. The grid should be filled with the small multiples charts, sorted by the sort order of the chose dimension, from left-to-right, then top-to-bottom.
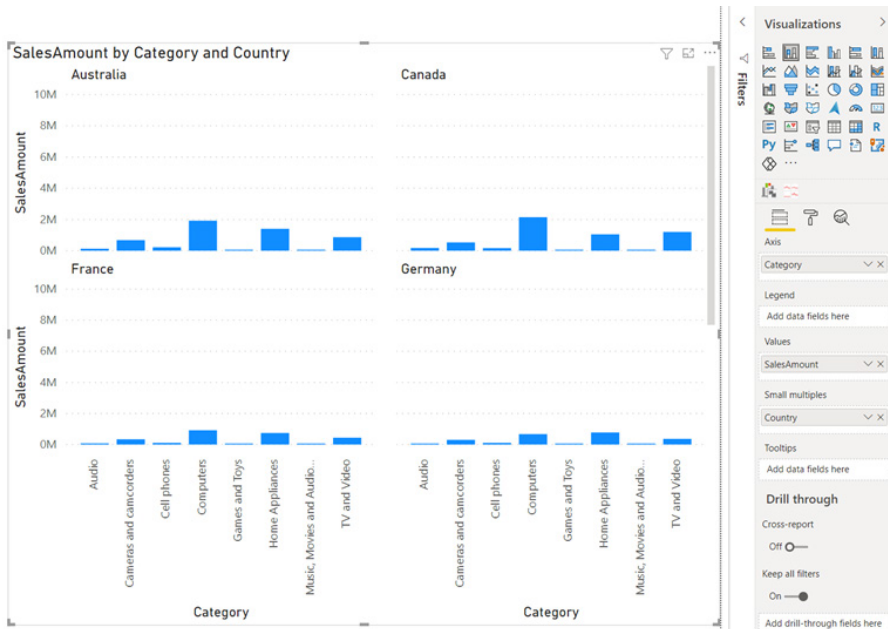
You will see that the axes are synchronised, with one **y** axis at the left of each row and one **x** axis at the bottom of each column.

Furthermore, in the Formatting pane, you will find some new options to allow you to control the look and feel of the grid. You can adjust the style and position of the small multiple titles in the 'Small multiple' title card as shown:
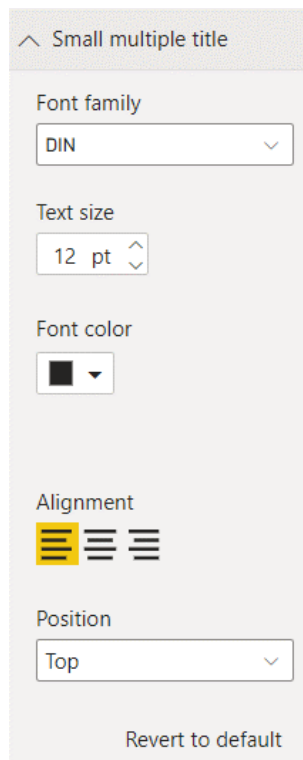
You may also change the dimensions of the grid in the 'Grid layout' card:
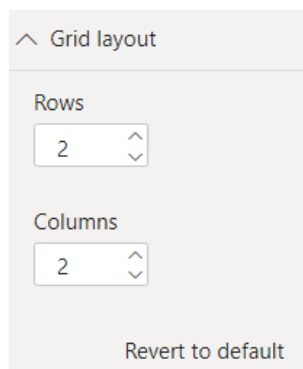
The default is a 2×2 grid of small multiples, but you can adjust the number of rows and columns up to 6×6. Any multiples that do not fit on that grid will load as you scroll down.

While the feature is in Preview, there are some noteworthy limitations:

Fields pane

- **Date (and other continuous) hierarchies:** creating small multiples out of a visual with a date hierarchy in the x axis, like a line chart, will convert that axis into a categorical axis (from continuous)
- **Show items with no data:** the option still exists, but the behaviour "…may not align with your expectations…". Sounds ominous!

Visual interactions

- **Categorical axis load more:** in non-small multiples visuals, when you have many categories in the axis of your visual, scrolling to the end of the axis will prompt the visual to load more categories. Currently, a small multiples visual will not load more categories
- **Small multiples sort by measure:** sorting on small multiples at all is technically a new functionality, but you may be expecting to be able to sort your small multiples by a measure. Currently, you can only sort your multiples by the field's natural sort order
- **Right click / context menu -> Analyze:** disabled for now
- **Right click / context menu -> Summarize:** disabled for now
- **Data point rectangle select:** disabled for now
- **Axis zoom:** disabled for now
- **Accessibility:** keyboard navigation and screen readouts can be adjusted to better support the new "grid" layer that small multiples brings to visuals. Some behaviour is missing, such as keyboard navigation through the categorical axis scrollbar.

Formatting options

- **(General) Responsive toggle:** the option still exists, but the behaviour is not yet "perfect". Since many mobile accommodations are tied to this toggle, the mobile experience will also very closely mirror the experience you find on Power BI Desktop and Service
- **(General) High density sampling:** for line charts, the high-density sampling toggle will still exist, but it is not currently supported by small multiples
- **(Axis) Concatenate labels:** disabled for now
- **(Total labels) Total labels for stacked charts:** disabled for now
- **(Zoom slider) Zoom sliders:** disabled for now
- **(Analytics pane) Trend lines:** disabled for now
- **(Analytics pane) Forecasting:** disabled for now
- **Dynamic formatting for highlight labels:** currently not supported.

Service availability

Authoring small multiples on the web will not be supported while the feature is in Preview. This means that while you will be able to view a report with a small multiples visual and even format the visual, the small multiples field well will not show up for visuals that are do not already have a field in the small multiples well.

Data protection sensitivity labels in Power BI Desktop (Preview)

Back in June, the General Availability of data protection in the Power BI Service was announced. This update extends this capability by bringing Microsoft Information Protection sensitivity labels into Power BI Desktop as well, allowing creators to apply sensitivity labels the minute they start building their datasets and reports in Power BI Desktop.
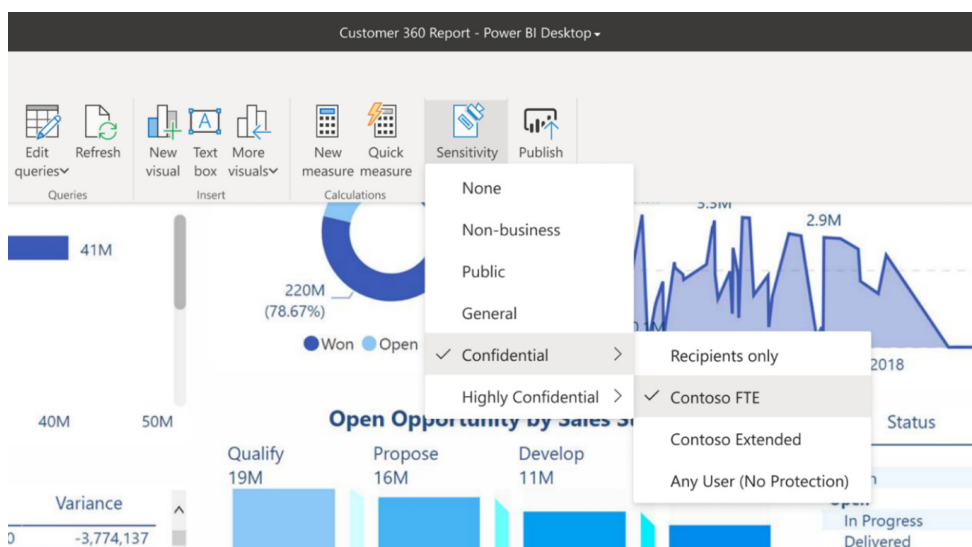
By using sensitivity labels in Power BI Desktop, .pbix files can easily be classified and protected, in a way that is like how you do it with Excel, Word and PowerPoint files. This new support ensures that your data will remain labelled, both when it is published to the Service and when it is downloaded from the Service as a .pbix file. When a labelled .pbix file is published to the Service, both dataset and report inherit the label originally applied to the .pbix file.

Labels can have encryption settings applied. Applying such a label ensures the file is encrypted while stored, regardless of whether it is on a workstation or in online services. Additionally, when a .pbix file is downloaded from a dataset or report in the Power BI Service that has a sensitivity label, the file will automatically inherit the label.

For encrypted .pbix files, Power BI Desktop honours Microsoft Information Protection sensitivity label settings to ensure that only privileged users can view and edit it.

Increased rectangle select data point limit

In August last year, the public Preview version of the data point rectangle select feature was released. Due to the feedback received, Microsoft has decided to raise the limit of data points you may select at once to 3,500 points. This should make selecting points on data-dense charts much more convenient!
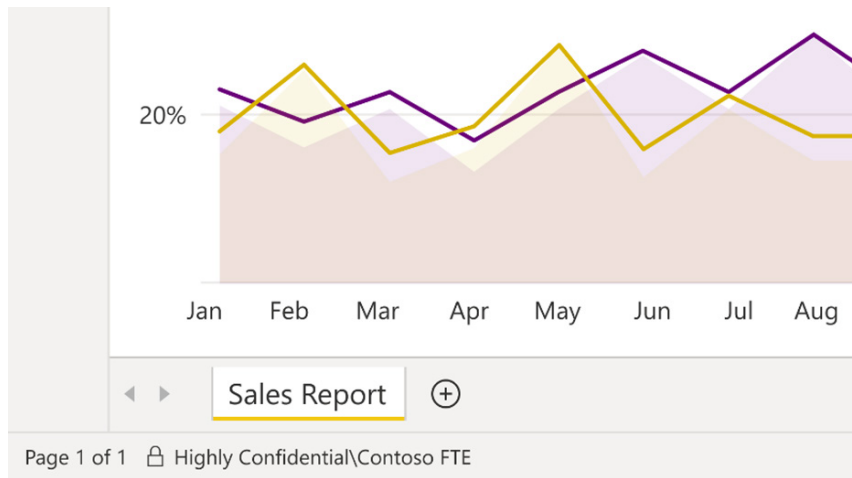
Selection pane is now available in the Mobile Layout view

Starting with this release, when you are building your report layout for mobile phones you can open the Selection pane and now see the layering order of the visuals on the page. You can change the layering order to bring visuals to the front or back in the Mobile Layout. This makes it easier to work with visuals that overlay one another when you want to change their order (changing the order of visuals in the selection pane in mobile layout view affects their order in the mobile layout only – the original order in the web layout stays as is). You also can see an indication of the visibility state of the visual. Note, however, that you cannot change the visibility state in the Mobile Layout view – the visual inherits its visibility state from the web layout.
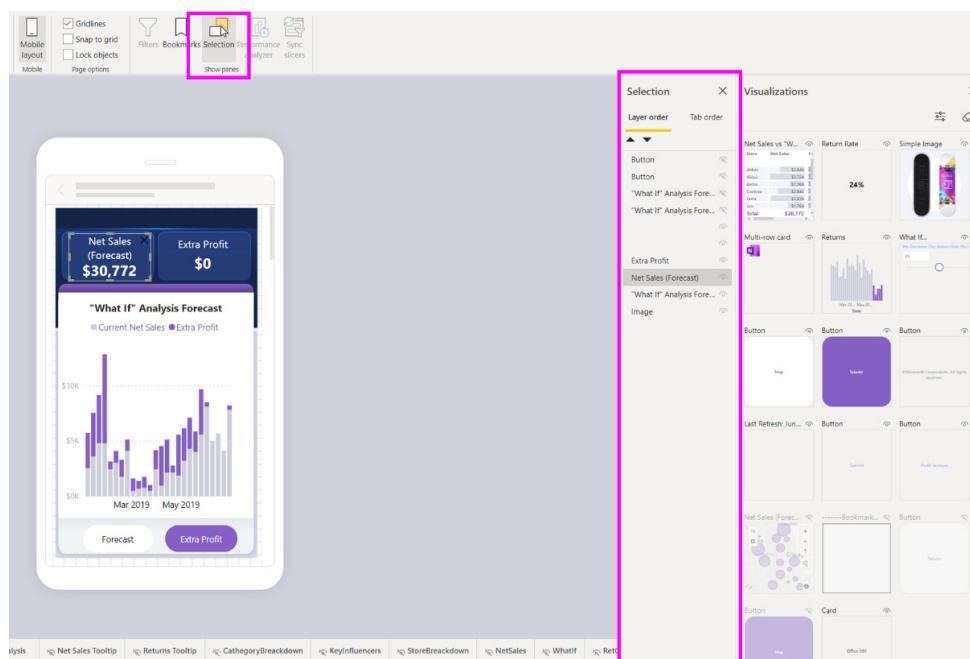
Automatic page refresh for Analysis Services sources

2020 saw automatic page refresh (APR for short) Generally Available. APR allows you to set the refresh interval of visuals in your report when using a DirectQuery source. Now, there has been an incremental improvement for APR, adding support for Azure Analysis Services, SQL Server Analysis Services and Power BI datasets.

To enable APR for these sources, the process is the same as for DirectQuery: connect to a supported source, and head to the 'Page

format' pane to find page refresh and then enable the toggle, select 'Auto page refresh', and define a duration for your refresh. The minimum supported for these data sources will depend on the data source itself and, in the case of Power BI datasets, which type of workspace is hosting the dataset and its type.

Please keep in mind the following limitations for APR in this scenario:

- the minimum refresh interval for Analysis Services and PUSH datasets is 30 minutes
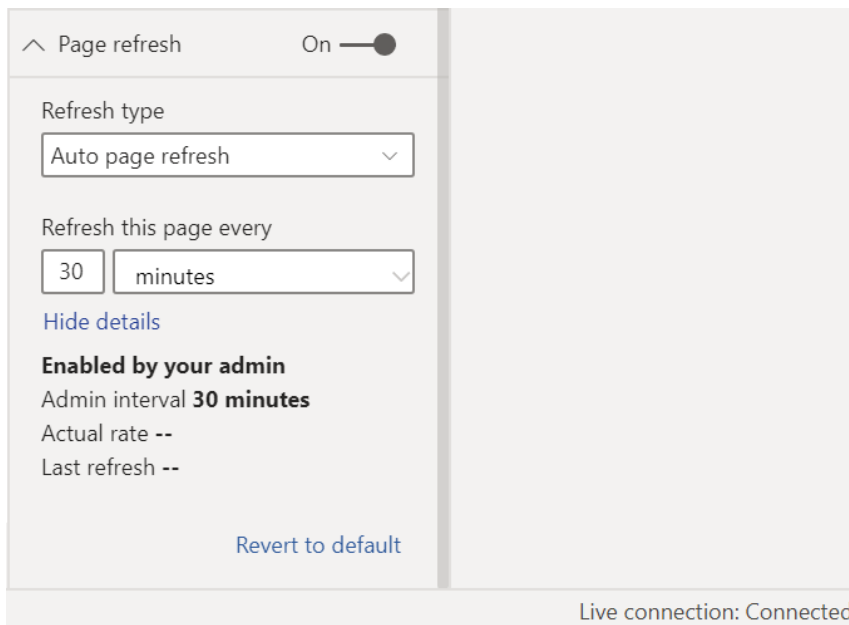- Power BI datasets are only supported if they are connected to a DirectQuery data source
- chaining models is not supported as part of the DirectQuery for Power BI datasets and Azure Analysis Services public Preview
- if your administrator has disabled APR in a premium capacity, you will not be able to turn it on for the Service
- for APR to work in the Power BI Service, you will need to re-enter data source credentials
- change detection is not supported for this type of data sources.

Recent changes to Power Query and Dataflows

To say there have been a few changes, is probably an understatement.

DIAGRAM VIEW

With Power Query, users may easily create complex dependencies between data sources, queries and data transformations. While the Power Query Editor provides ways for users to list queries (Queries' pane) and steps within them ('Applied Steps' pane), many have demanded of Microsoft a more visual representation of all queries and their dependencies. In Power Query Desktop, the Query Dependencies view provides a read-only view allowing users to understand the dependencies between data sources and queries, or between multiple queries. However, feedback received by Microsoft has been that the Query Dependencies view fell short in a few aspects:

- providing only query-level visibility for dependencies, instead of step-level granularity
- not allowing users to make edits (such as adding / deleting / editing) to their queries and steps within those queries

- because the Query Dependencies view is a modal dialog experience, there is friction in transitioning between using the Query Dependenciesview and authoring queries within the main Power Query Editor dialog, which is a highly iterative process.

Based on this feedback, there is now a new Diagram View experience that is more deeply integrated within the Power Query Editor experience; becoming a new pane within this dialog that users can interact with at any point in time during their Power Query authoring experience. Conceptually, this new Diagram View provides a graphical representation of the 'Queries' and 'Steps' panes together, with the ability to both get a high-level view of an entire graph of queries (*e.g.* all queries within a dataflow) as well as digging into query-level and step-level information in a highly visual interactive way.

Hence, Diagram View is now available as a public Preview feature within Power Query Online to author dataflows, which customers can enable from within the View tab in the Ribbon.
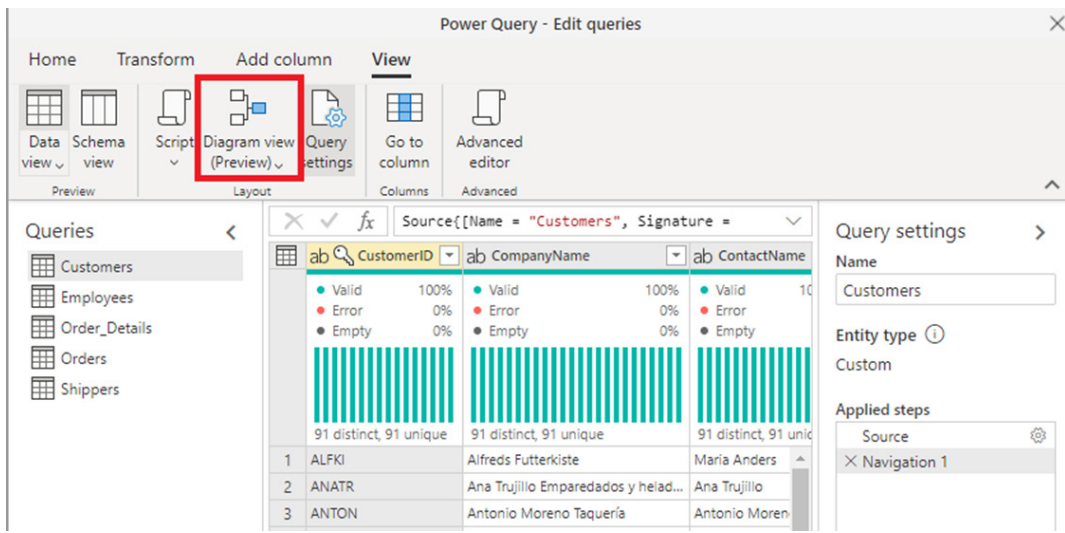
Upon enabling this option, the new 'Diagram View' pane appears on top of the main preview area. At the same time, the 'Queries' and 'Steps' panes are automatically collapsed (since the Diagram View now provides a more visual representation of queries and steps, as well as the same functional capabilities via context menu option on each of these object types).
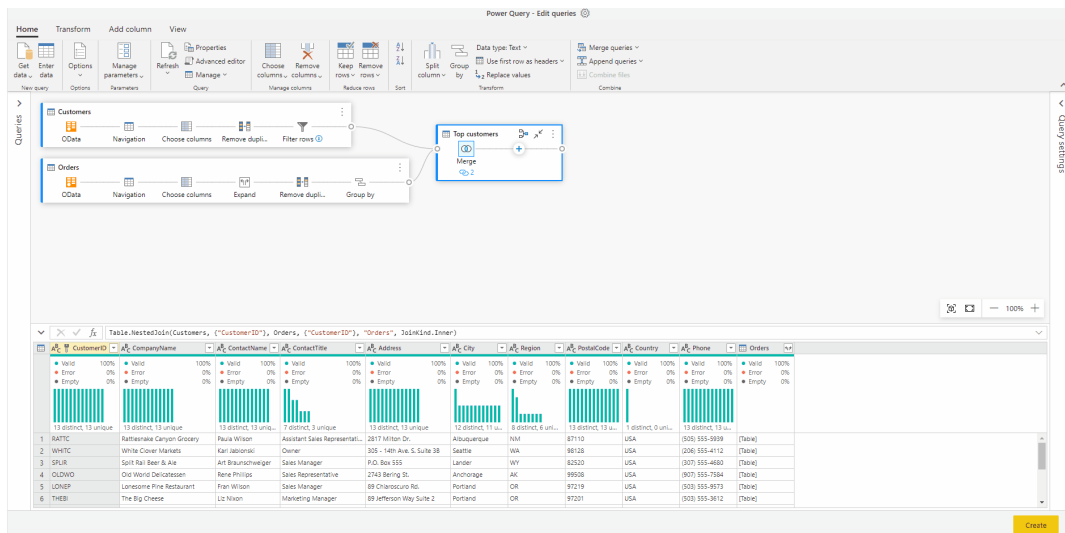
Please note that, currently, Diagram View is in Preview and as such it provides limited capabilities compared to other Generally Available features. In particular, support for Accessibility features (keyboarding, high-contrast mode, screen readers support) is limited or not yet available.

SCHEMA VIEW

When working in the Power Query Editor with tables that have many columns, simple tasks can become incredibly cumbersome, because even finding the right column by horizontally scrolling and parsing through all the data just gets so inefficient.

The newly released Schema view displays your column information in a list that's easy to parse and interact with, making it easier than ever to work on your table schema within Power Query.

In addition to an optimised column management experience, another key benefit of schema view is that transforms tend to yield results faster.

These results are faster because this view only requires the columns information to be computed instead of a preview of the data rows. Therefore, even working with long-running queries with a few columns will benefit from using the Schema view.

You can turn on the new Schema view by selecting Schema view in the View tab within the Ribbon. When you're ready to work on your data again, you can switch back to the Data view from the same location.
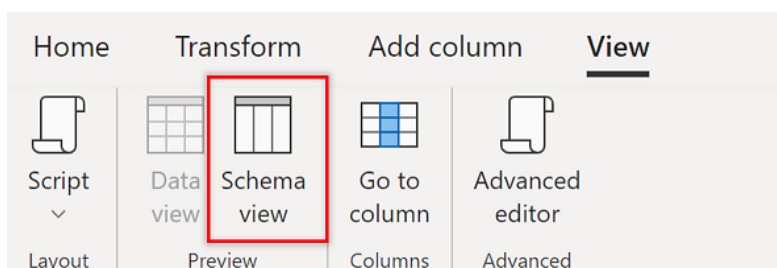
Upon enabling the Schema view, the main preview area switches from Data view to displaying the list of columns in the table results, including their names, data types and several contextual operations, can also be accessed from the Ribbon's new 'Schema tools' tab.
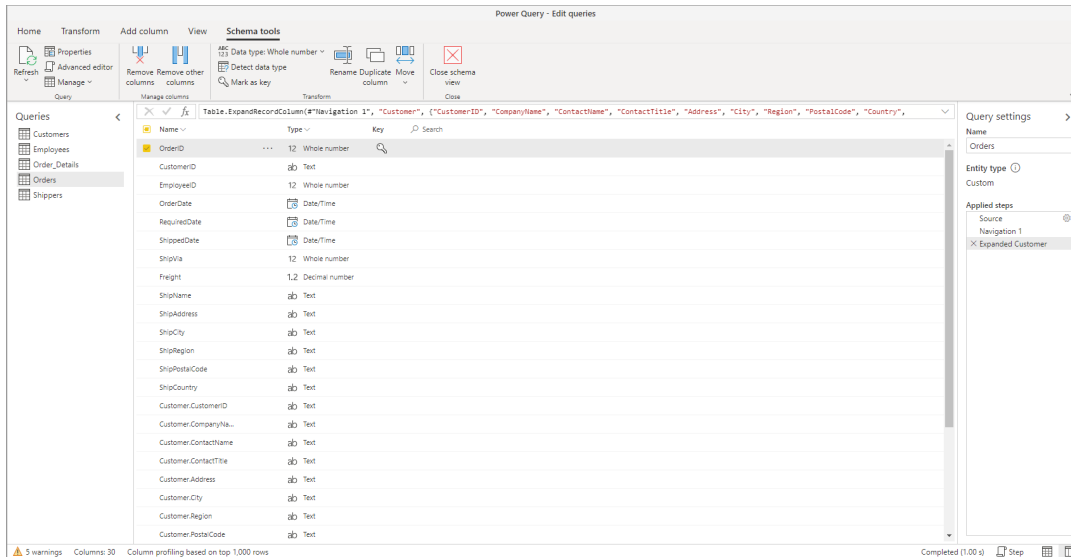
BY EXAMPLE DATA EXTRACTION

One the key capabilities within Power Query is its ability to extract and reshape data by example from a variety of sources, including existing tables in the Query Editor, Web pages, Text and CSV files.

This latest update enables two of these capabilities in Power Query Online: 'Add Column From Examples' and 'Web By Example'.

Add Column From Examples

'Add Column From Examples' enables users to extract and reshape data from existing columns in the Power Query Editor without having to think about the (one or multiple) operations to apply on top of those columns. Instead, using 'Add Column From Examples' (available within

the 'Add Column' tab in the Ribbon) allows you to specify one or more sample output values that you would like to obtain. With just a few examples, Power Query is able to apply smart AI heuristics to infer the best combination of data transformations to get to that result.
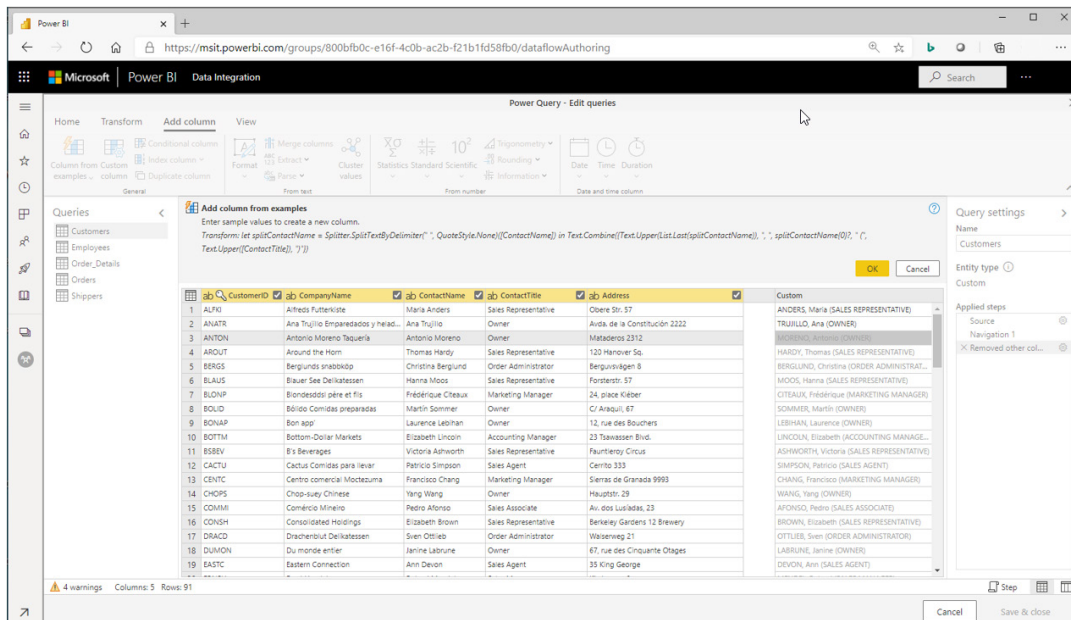
Web By Example

The Web Page connector in Power Query allows users to extract data formatted as HTML tables from a Web Page. Often however, data on Web pages is not in tidy tables that are easy to extract. Getting data from such pages can be challenging, even if the data is structured and consistent.

'Web By Example' makes it very easy to extract data from such Web

pages, by allowing users to specify a few sample output values from a web page and letting Power Query figure out the right transformation steps in order to extract data from the web page.

'Web By Example' can be accessed from the 'Choose Data' screen when using the Web Page connector.
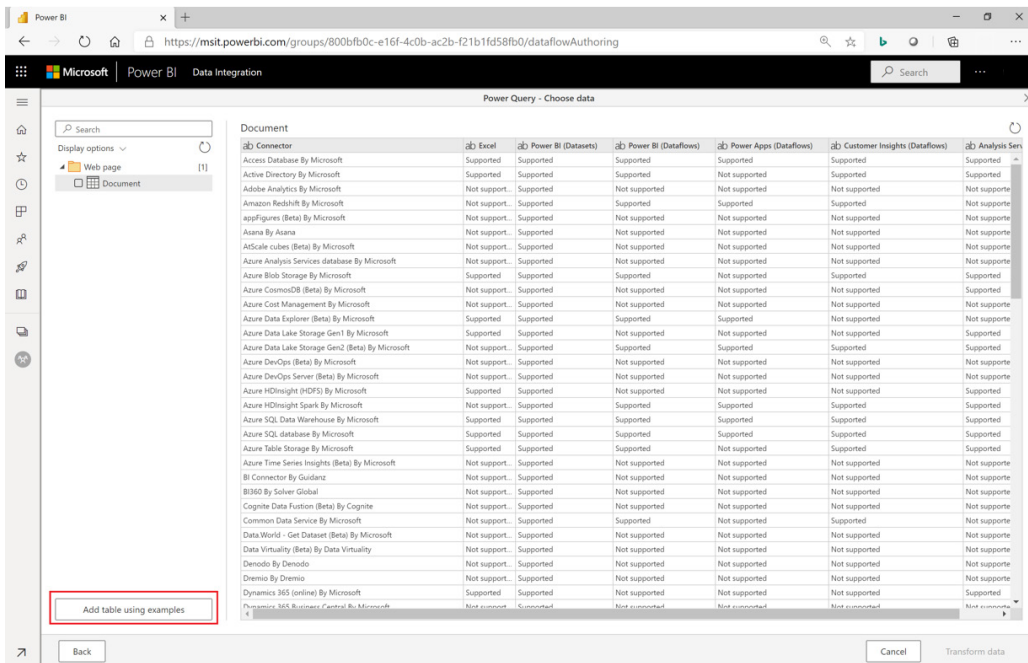
Upon selecting this option, users will be taken into the 'Web By Example' dialog, where they can specify sample output values to extract from this page. Note that, unlike in Power Query Desktop where an inline preview of the web page is displayed, this inline preview is not available within Power Query Online, but users can open it in a different browser window / tab.
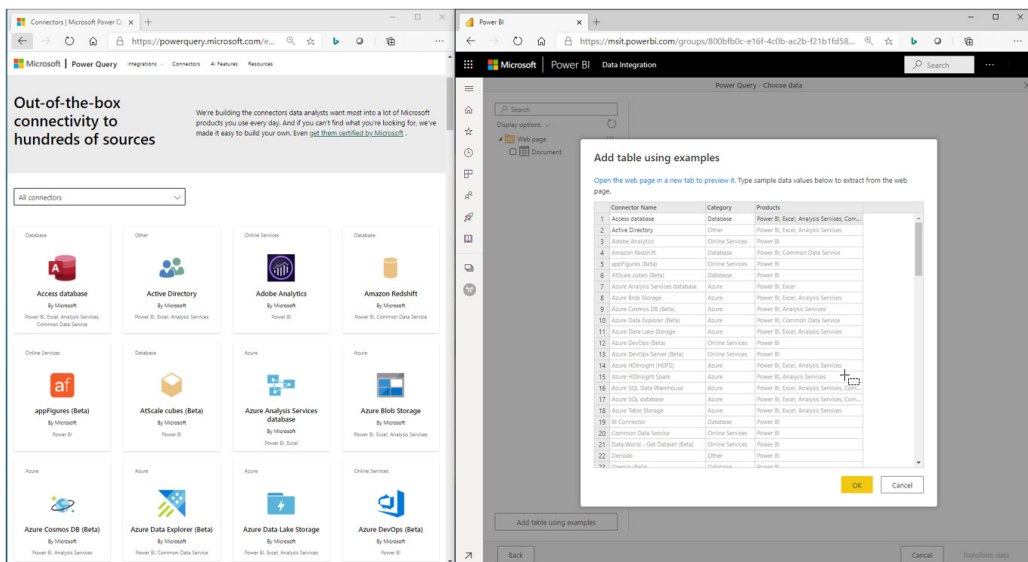
FUZZY MATCHING ENHANCEMENTS

Often when trying to get data into the right shape, you need to deal with reconciling values that are conceptually the same but represented slightly different in their text form. Examples of this include company names, people names, cities, etc. with different representations or, simply, misspellings.

Back in 2019, Microsoft introduced Fuzzy Matching options within the 'Merge Queries' transformation, allowing users to match similar values when joining tables. These capabilities have now been extended, to support Fuzzy Matching capabilities within two other data transformations, **Fuzzy Group By** and **Cluster Values**.

Fuzzy Group By

In Power Query, you can group values in various rows into a single value by grouping the rows according to the values in one or more columns. Up until now, the only matching criteria for grouping values was an exact match.

That has now changed, as new Fuzzy Matching options have been added to the 'Group By' dialog, allowing users to match similar values when trying to perform a 'Group By' operation. In the example below, grouping rows to calculate total sales by person, and matching similar Name values.
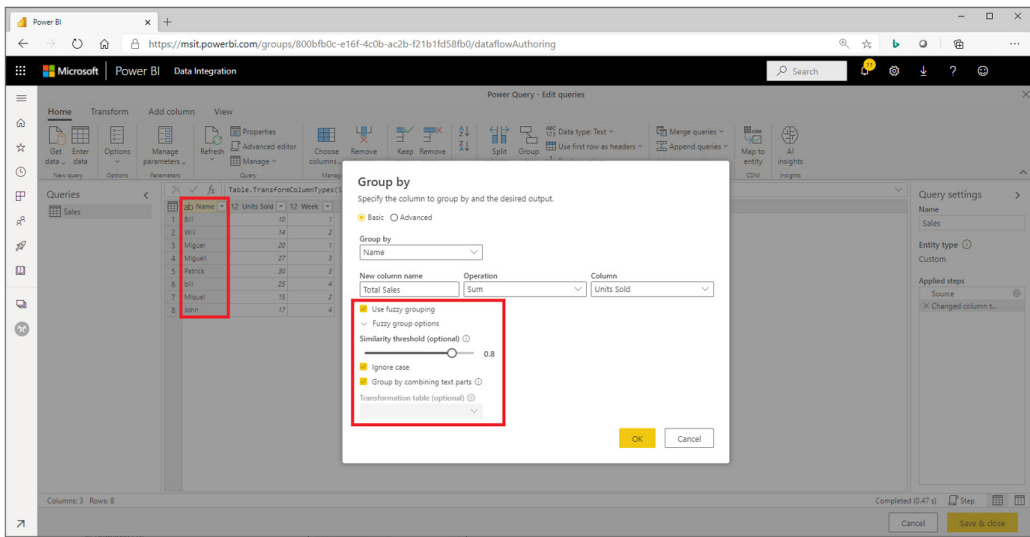
This results in the following summarised table:
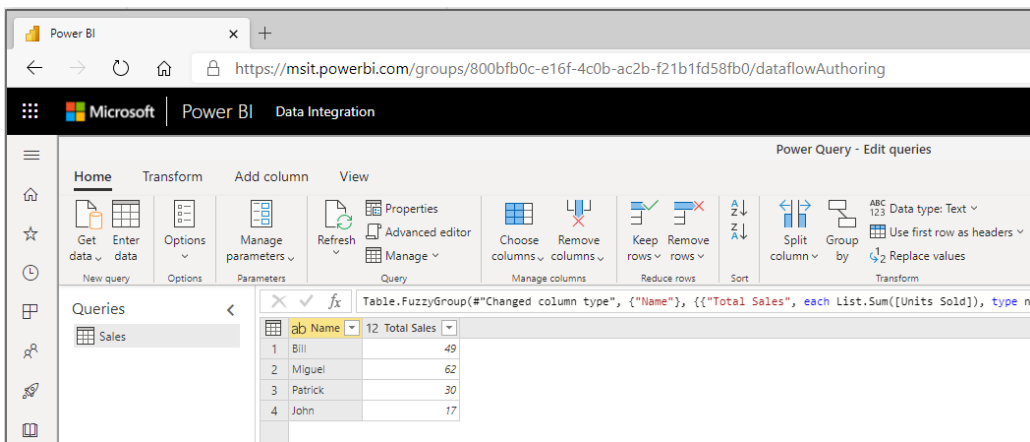
Cluster Values

In many cases when dealing with slightly similar values that need to be reconciled, users may not want to merge tables nor group rows within a single table, but rather simply have a new column in their tables with the canonical value that is common across multiple slightly different values – what is known as a "cluster" value.

The newly added 'Cluster values' transformation does exactly that. It can be found within the 'Add Column' tab in the Ribbon and provides Fuzzy Matching options to provide users with the most flexibility in clustering values, including the ability to obtain the similarity score between input and canonical values for each row of data.
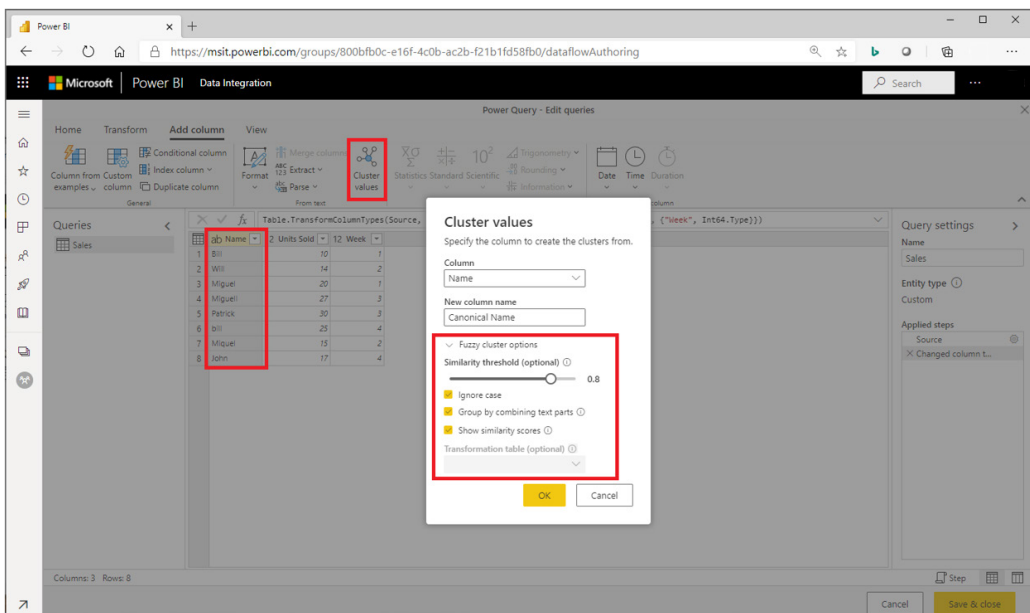
The output from this transformation is a new column with the clustered values and (optionally) another column with the similarity score between values.
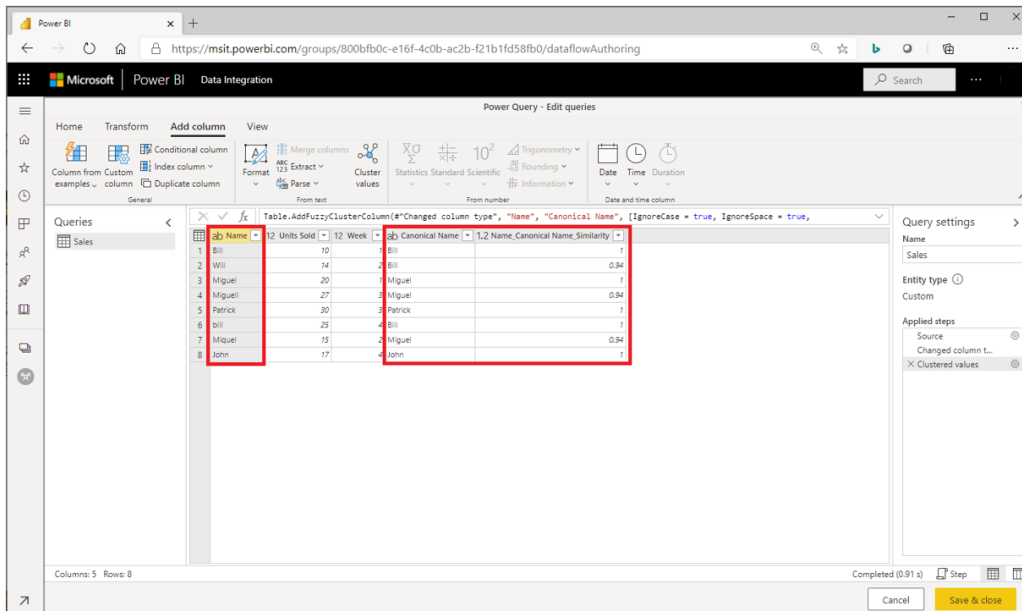
COPY / PASTE QUERIES BETWEEN PQ ONLINE AND PQ DESKTOP

With Power Query being available across several products, including Power BI (Desktop & Dataflows in PowerBI.com), Excel, Power Apps (Dataflows), Dynamics 365 Customer Insights, Azure Data Factory, Power Automate and more, it's very common for users to want to move their queries across products. While it is possible to copy-paste **M** code within the Advanced Editor, this can be complex when trying to copy multiple queries with dependencies.

In Power Query Desktop, it has been possible for some time to right-click (or **CTRL + C**) queries from the Queries pane, which would take care of

copying the selected query (or multiple queries) and all of their upstream dependencies needed in order to the selected queries to work, then paste it into another Power Query Desktop instance (whether in Power BI, Excel or SQL Server Data Tools).

Recently, the same capability was enabled within Power Query Online, make it easy to move queries between Power Query Desktop and Online, or between multiple Power Query Online instances.

COPY DATA FROM QUERY EDITOR PREVIEW

An even more basic scenario than copy-pasting queries for users is to copy-paste data results from the Power Query Online Editor – whether it is copying an entire table, a column, a cell value, *etc*. These options have all been recently added to Power Query Online; you simply right-click on the desired element to copy it to the clipboard.
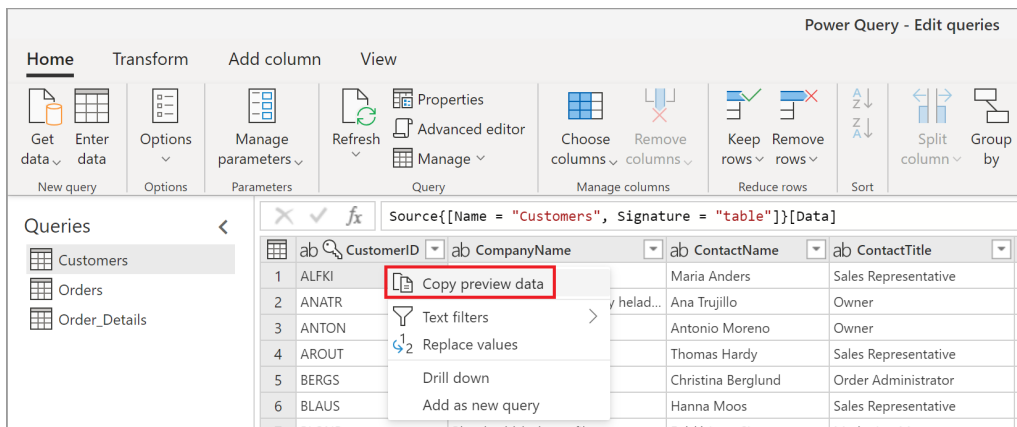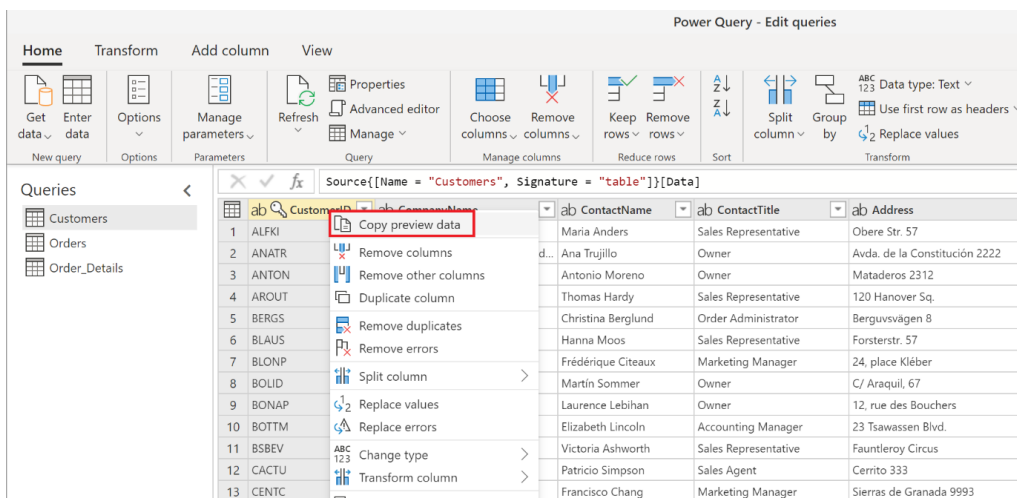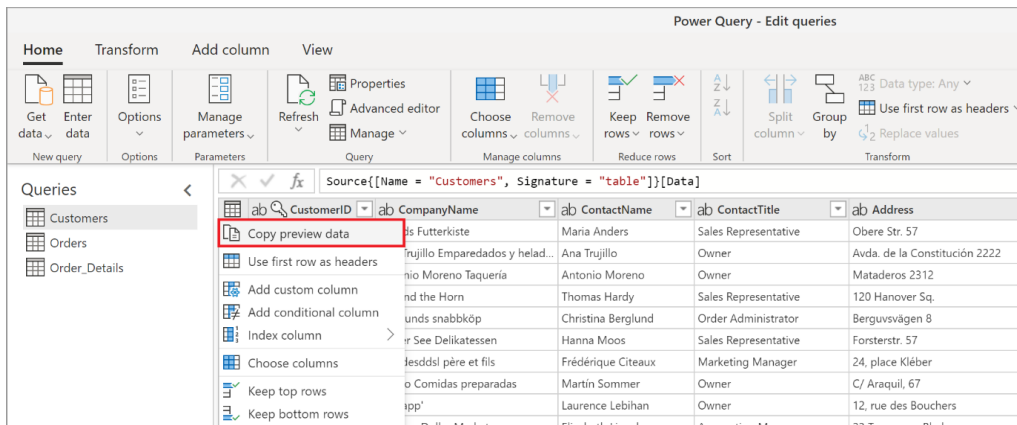
MULTI-SELECT SUPPORT IN QUERIES PANE

It is now possible to perform actions over multiple queries at once by multi-selecting them (**CTRL + Click or SHIFT + Click**) in the Queries pane.

Multi-select actions include the ability to copy, paste, delete or move queries to a query group.
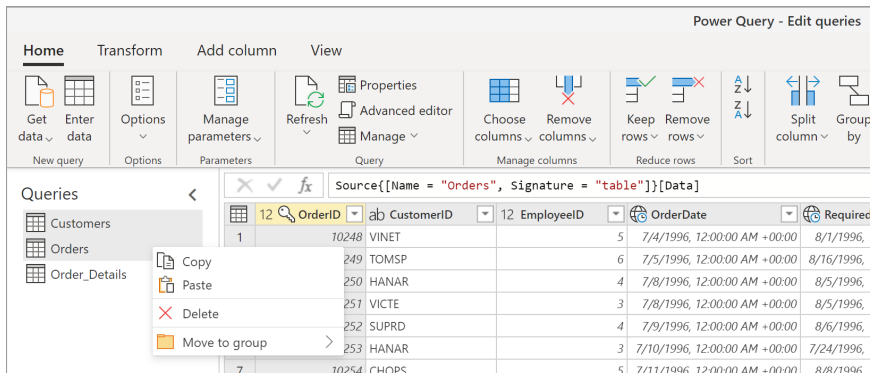
FORMULA BAR: QUERY SCRIPT MODE

A new mode has been introduced in the Formula bar, allowing users to switch from step-level script to the full query script. Users can toggle between the two modes from the View tab in the Ribbon, or the new shortcut in the Status bar.
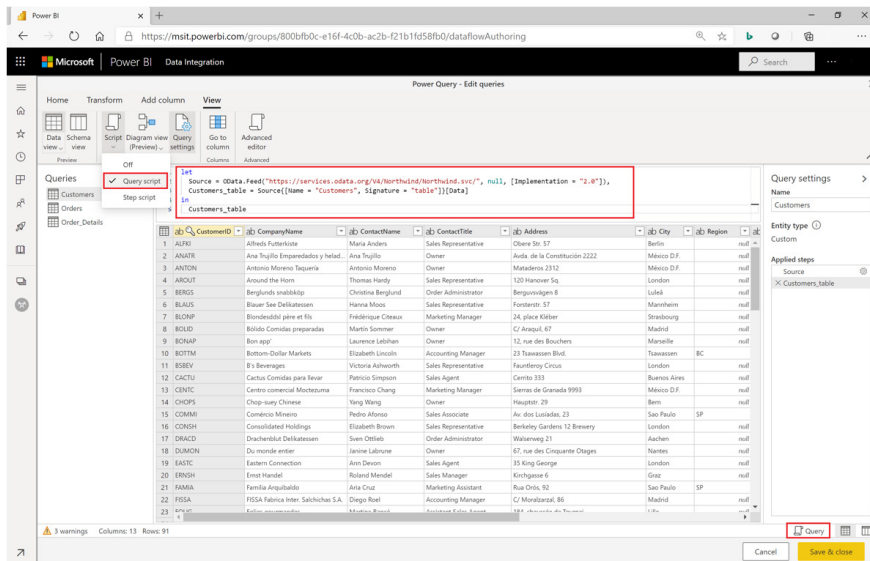
STATUS BAR AND EVALUATION PERFORMANCE COUNTERS

A new status bar has also been added to the Power Query Online Editor dialog, enabling users to:

- get a summary view of any validation warnings in their queries
- see column and row counts for the currently selected query
- when query evaluations are in progress, see performance counters and progress indicators to better understand where time is spent during a query evaluation
- when Data Profiling is enabled, allow users to switch between 'Top 1,000 rows' and 'Entire dataset' for their data profiles
- toggle between Step and Query script modes for the Formula bar
- switch between Data and Schema views.
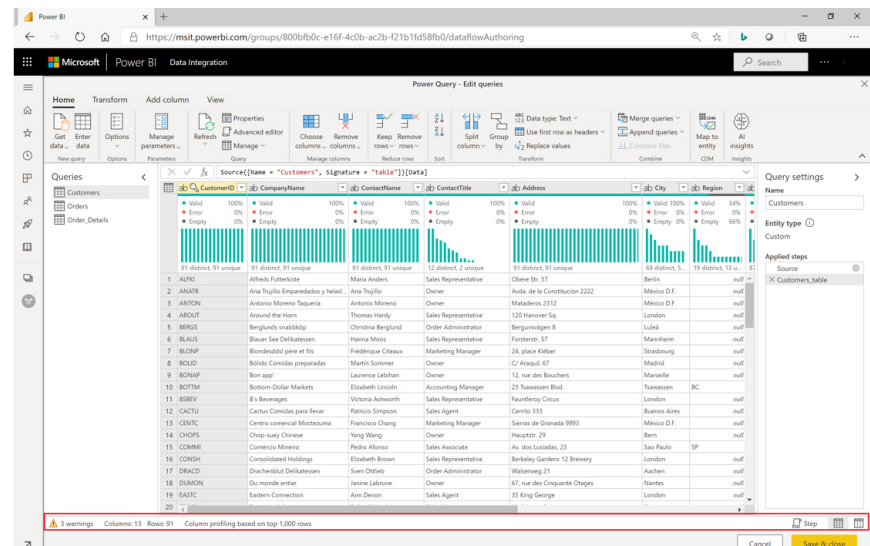
PARQUET FILES CONNECTOR

The new Parquet Files connector allows users to import data from Parquet files into Power Query Online. With this connector, you may point at specific files or use other connectors (such as Azure Data Lake Storage Gen2) to connect to a folder with multiple Parquet files and easily combine them together.
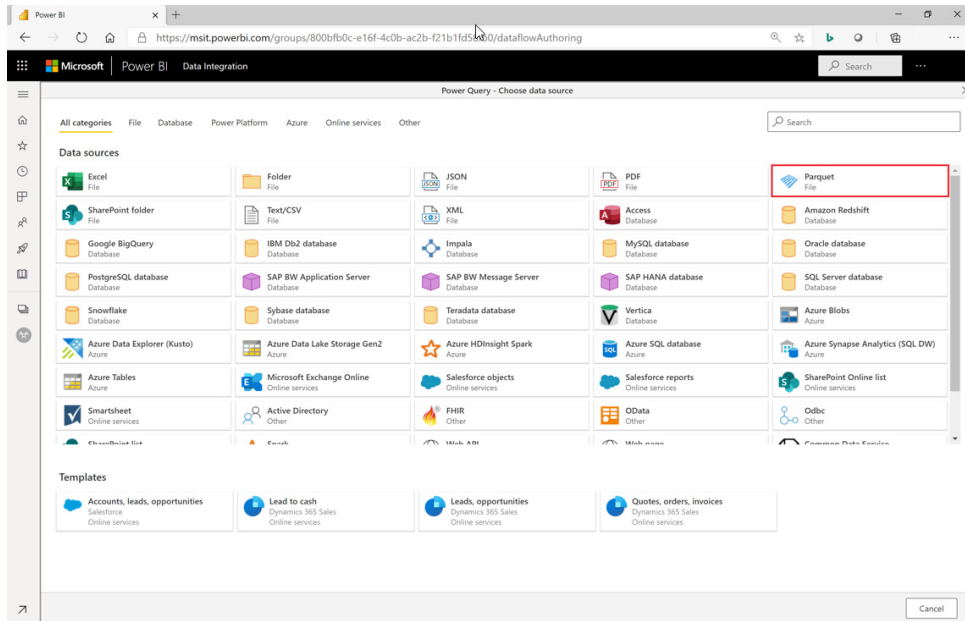
SAP HANA

Not so long ago, the SAP HANA connector was released in Power Query Online. This connector allows you to import data from SAP HANA Analytic and Calculation views from SAP HANA databases in the cloud and on-premises, via the On-premises data gateway, into Power Query.
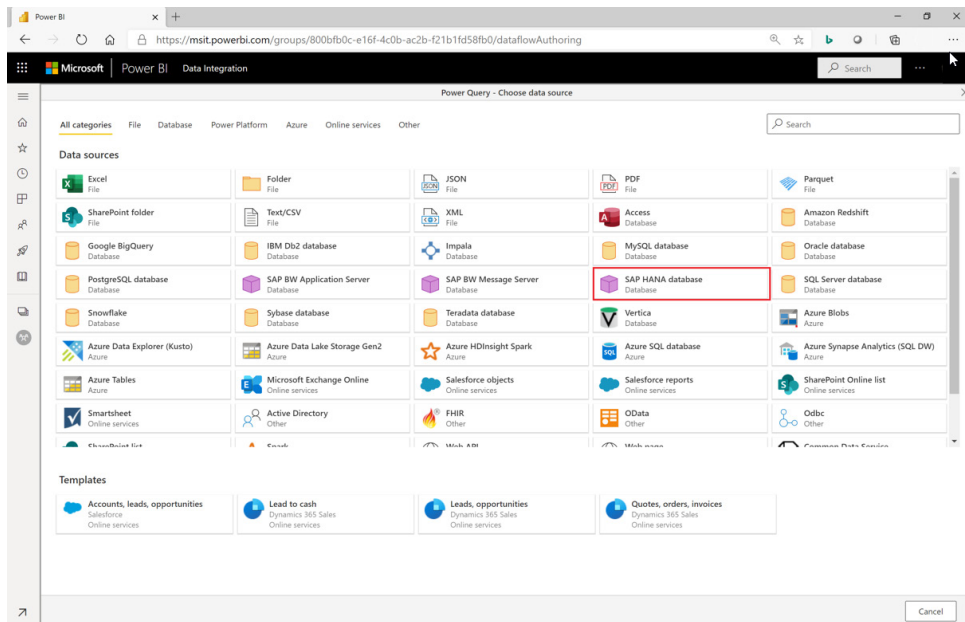
Note that Advanced Options for this connector (such as Native Database Queries, Connection Timeout options, *etc.*) are supported currently at the **M** engine level. Support for these options in the Get Data user experience (UX) will begin soon; in the interim, they may be configured via the Formula bar or Advanced Editor.

SAP BUSINESS WAREHOUSE

Just like with SAP HANA, the existing SAP Business Warehouse connectors for Application and Message Server have been recently enabled in Power Query Online.

SNOWFLAKE

Recently, the Snowflake connector was enabled in Power Query Online, allowing customers to import data from Snowflake Data Warehouse into Power Query Online.

IMPALA

The new Impala connector allows customers to import data from Impala clusters into Power Query Online, by either using a cloud-to-cloud connection or the On-premises data gateway for on-premises clusters.

FHIR

A new connector was recently added to Power Query Online that allows users to import data from FHIR. FHIR is a standard describing data formats and APIs for exchanging electronic health records. The FHIR connector has been available for a few months in Power BI Desktop and is now available in Power Query Online.
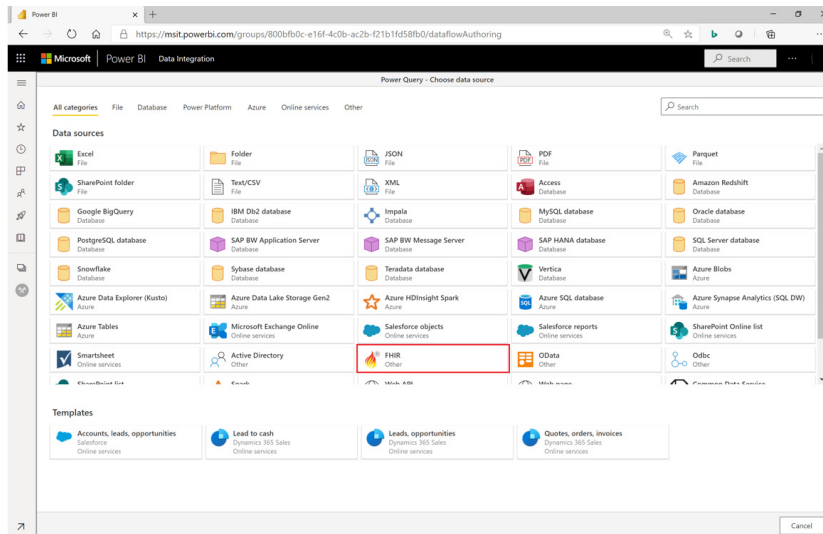
SQL SERVER – ADVANCED OPTIONS IN GET DATA UX

The SQL Server connector has also been improved to include Get Data UX support for some of the most frequently used Advanced Options provided by this connector, including the ability to specify a native SQL statement, to include relationship columns, navigating using full hierarchy (*e.g.* including database schemas) and support for SQL Server failover.

These new options may be found under the 'Advanced Options' section within the SQL Server connector dialog.
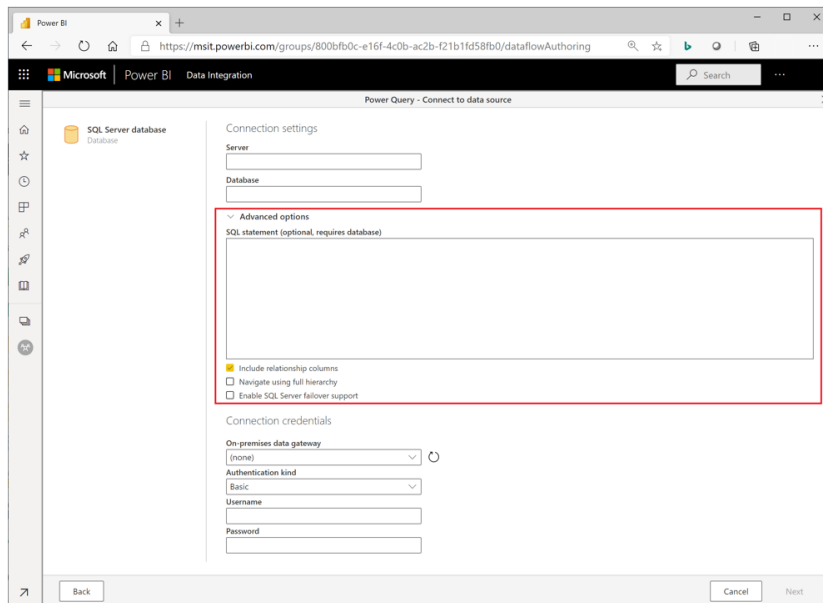
WORKSPACE-LEVEL GRANULARITY TO ATTACH STORAGE

Microsoft now allows workspace administrators to connect to an Azure subscription to bring their own ADLS Gen2 account. This will make it easier for departments to control and assign permissions as well as give flexibility to large organisations who may require multiple ADLS Gen2 accounts for different needs and purposes.

THE ENHANCED COMPUTE ENGINE IS NOW GENERALLY AVAILABLE

The enhanced compute engine is now Generally Available. The enhanced compute engine improves performance for multiple scenarios by loading dataflow entity data into a SQL-based cache. Using SQL clustered columnstore indices and other optimisations, Microsoft is targeting up to a 20x improvement in query processing. Computed entities and DirectQuery connections against the dataflow in Premium can then be fulfilled by reading from the cache instead of reading from storage and flat files as Dataflows in Power BI Pro do. The enhanced compute engine in

Power BI Dataflows enables Power BI Premium subscribers to:

- speed up refresh operations when computed entities or linked entities are involved
- enable DQ connectivity over dataflows leveraging the compute engine
- achieve improved performance in the transformation steps of dataflows when entities are cached within the compute engine.

ENHANCED DATAFLOWS API AND SAMPLES

The Dataflows API provides programmability and automation options for your dataflows. With this enhanced API, users will be able to interact with their dataflows to perform popular transactional activities including refresh, create, delete, import, export, and much more. To help you get started, we are also providing some samples for popular use cases such as:

- refresh dataflows
- automatically refresh datasets when a dataflow completes.

NEW POWER QUERY AND DATAFLOWS DOCUMENTATION

Microsoft has added over 50 new Power Query and Dataflows documentation articles, including getting started and quick how-to guides for common data transformations, connector reference articles and best practices for working with Power Query and Dataflows.

You can access them at https://docs.microsoft.com/en-us/power-query/ .
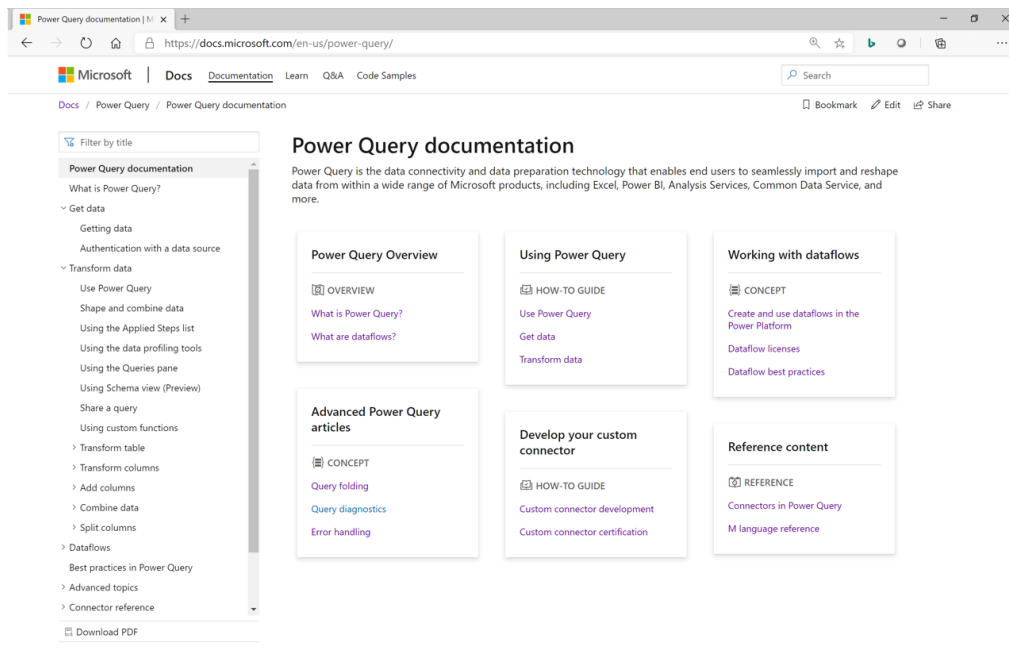
Microsoft Dataverse Connector

The new connector for Microsoft Dataverse in Power BI is now Generally Available. With this new connector, Power BI users have more options when connecting to Dataverse environments, including Dataverse for Teams.

This connector is using the Tabular Data Stream endpoint for the Dataverse environment. This endpoint enables better relationship discovery in the Power BI dataset model. The new connector supports DirectQuery providing real-time data and support for the Dataverse security model. In addition, complex data types, such as lookups, option sets and currency are flattened for easy consumption in the model.

To find out more, check out the preview documentation: View table data in Power BI Desktop - Power Apps | Microsoft Docs .

To make sure that you are using the new connector, choose the Dataverse connector in 'Get Data' in Power BI Desktop, under the 'Power Platform' category.

Azure Time Series Insights Update

Time Series Insights has added support for Azure B2B / Guest account support.

SurveyMonkey Update

SurveyMonkey has added support for customers in their EU datacenter, as well as small bug fixes.

Cognite Update

The Cognite connector is Generally Available. It is also adding support for AAD authentication, as well as performance improvements for time series aggregation.

Power BI Search in Microsoft Search in Bing and Office now Generally Available

Power BI Search in Microsoft Search in Bing and Office is now Generally Available. This will introduce the Power BI search content in Bing.com, Windows Search box and Microsoft Office sites (office.com, sharepoint.com), to expand the work search to the whole organisational resources across different products.

For those that don't know, Power BI Search in Microsoft Search in Bing and Microsoft Search in Office enables a business group to expand organisational search scope through a built-in powerful search experience with Power BI content, to intelligently help search user to find the most work relevant information more productively. Apparently, it will provide:

- **built-in experience:** seamless out-of-box search experience to find Power BI dashboard and report easily and quickly across your organisation, without switching back and forth between the search portal and the Power BI site
- **richer content:** modernised search experience to present Power BI data in the most useful way. The content should go beyond just hyperlinks to include more key information, such as type, owner, *etc*.
- **maximise access to information with data protection:** show the search result with relevant Power BI data that is authenticated to you based on your workplace identity
- **unified search experience:** cohesive and coherent search experience to incorporate richer Power BI search content in bing.com, office.com, sharepoint.com. The search experience should be consistent through all media.

Home List experience

There is now a list view on the Home page. This view combines previous widgets on Home including Recent, 'Shared with me', and 'My apps', to help simplify the experience. Hover over individual artifacts to directly favourite content that is important to you. The list view provides metadata to display an at-a-glance overview including when an artifact was last opened, the location of a report, endorsement levels, app descriptions and sensitivity labels.
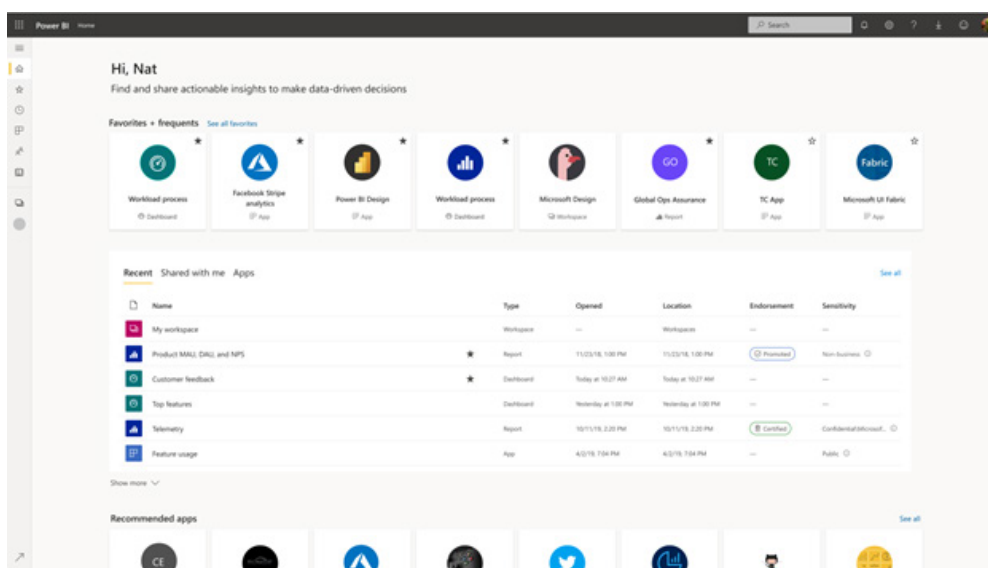
Custom publish message

This update has added a new option in the admin portal which allows administrators to provide a custom message that appears before a user publishes a report from Power BI Desktop.
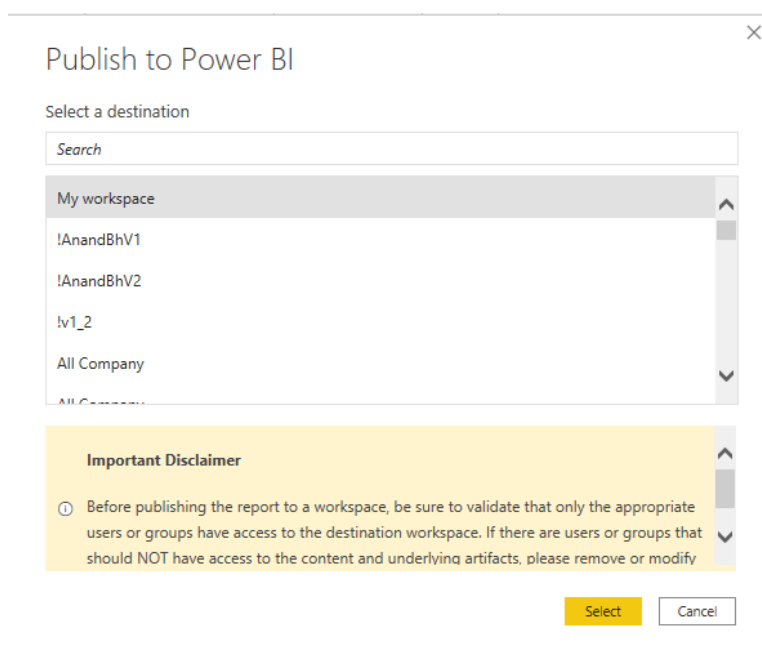
Administrators can find this new option in the Service by navigating to **Settings -> Admin portal -> Tenant settings -> Help and support settings** and selecting 'Show a custom message before publishing reports'.

◢ Show a custom message before publishing reports
Enabled for the entire organization

When people attempt to publish a report, they'll see a custom message before it gets published.

🟡⬤ Enabled

Custom message

Important Disclaimer
Before publishing the report to a workspace, be sure to validate that only the appropriate users or groups have access to the destination workspace. If there are users or groups that should NOT have access to the content and underlying artifacts, please remove or modify their access to the workspace or publish the report to a different workspace. [Learn more](https://docs.microsoft.com/en-us/power-bi/collaborate-share/service-create-the-new-workspaces#give-access-to-your-workspace)

Apply to:
◉ The entire organization
◯ Specific security groups

☐ Except specific security groups

Apply   Cancel

Once you have enabled the setting, you will need to provide a custom message. The custom message can be plain text or follow Markdown syntax.

Important Disclaimer
Before publishing the report to a workspace, be sure to validate that the appropriate users or group

It should be noted that the text area where the custom message is displayed does support scrolling if you want to provide a lengthier message up to 5,000 characters.

Publish to Power BI   ✕

Select a destination

Search

My workspace   ∧

!AnandBhV1

!AnandBhV2

!v1_2

All Company   ∨

Before publishing the report to a workspace, be sure to validate that only the appropriate   ∧
users or groups have access to the destination workspace. If there are users or groups that
ⓘ should NOT have access to the content and underlying artifacts, please remove or modify
their access to the workspace or publish the report to a different workspace. Learn more   ∨

Select   Cancel

Similar to other tenant settings, you can choose if the custom message applies to 'The entire organization', 'Specific security groups' or 'Except specific security groups':

Apply to:

⦿ The entire organization

◯ Specific security groups

☐ Except specific security groups

New export settings are available in the Power BI admin portal

New administrator settings have also been produced, which provide you with more granular control over export options in Power BI and extend export settings to control exporting from paginated reports.

These new tenant admin settings include:

- **Export to .csv:** controls exporting data from tiles, visualizations, or paginated report to a .csv file
- **Download report:** controls downloading .pbix files and paginated reports
- **Allow live connections:** controls Power BI service Live Connect, including Analyze in Excel
- **Export reports as MHTML documents:** controls exporting paginated reports as MHTML documents
- **Export reports as Word documents:** controls exporting paginated reports as Word documents
- **Export reports as XML documents:** controls exporting paginated reports as XML documents.

Power BI Premium per user public Preview now available

The public Preview of Power BI Premium per user has been enabled in all public tenants that requested priority access to Microsoft and has been rolled out to all tenants worldwide. Now, Power BI users have access to all the Power BI Premium capabilities, on a per user basis, for the entire public Preview period for *free*.

Quickly create reports in the Service (coming soon)

We are not quite sure why Microsoft has mentioned this one, as it's not quite cooked yet – but it's coming soon, apparently. Soon, there will be a new way to quickly create reports in the Service. Rather than downloading Power BI Desktop and importing data, you will be able to paste data straight into Power BI on the web and have visuals automatically generated for you. Sounds good!

Dark mode support in the Power BI Android app

Starting from this release, if you find it easier to use the dark theme when you use your device, you can enjoy that theme with the Power BI Android app as well, on both your phone and tablet (iOS support for dark mode was release a while back).
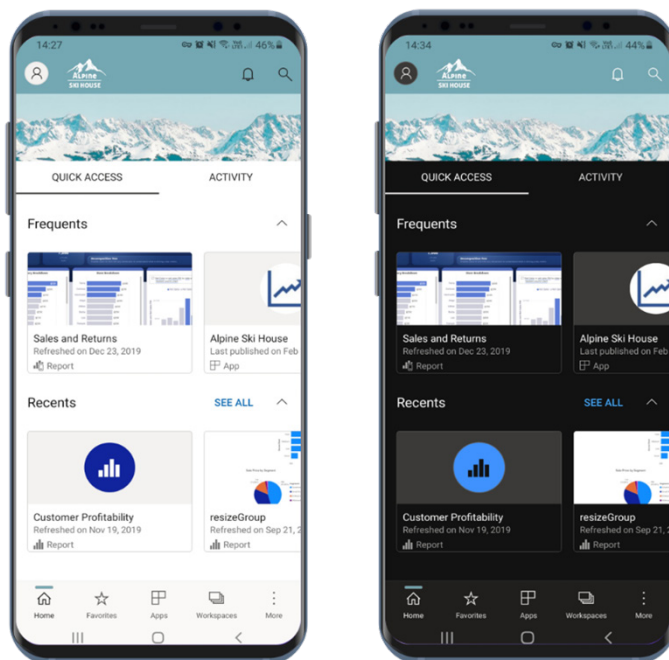
If you have already configured your device to operate in dark mode (available from Android 10), you do not need to do anything. The Power BI app automatically inherits the configuration from the device settings. Just get the latest app version from the store, and you will have dark mode enabled.

If you want to use a theme in your Power BI mobile app that is different from the one you have set for your device, go to the app's settings page, tap on Appearance, and choose your preference: Dark, Light or 'System default'.

When the app is in dark mode, all screens and dialogs are presented in a dark theme. Power BI content, however, such as reports and dashboards, does not change. It stays with the colours and themes published by the person who created them.

Anomaly detection is now supported in all mobile apps (iOS, Android and Windows)

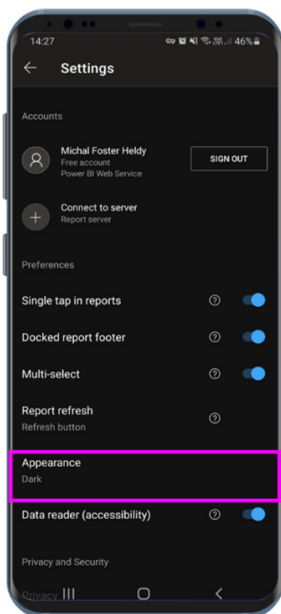The recently released Anomaly detection (Preview) feature now works in the Power BI mobile apps as well. If the report creator has set up anomaly detection for a report visual, you will be able to view, in the mobile apps, unexpectedly high peaks or low dips in your data caused by data outliers (*i.e.* anomalies). In addition to being able to view spikes and dips in your data, you can also open the insights pane to get explanations. When

you select an anomaly, Power BI runs an analysis across fields in your data model to figure out possible explanations. It gives you a natural language explanation of the anomaly, as well as factors associated with the anomaly, sorted according to explanatory strength. You can open the Insights pane from the data point itself, or from the visual's More options (…) menu.

New look for Embedded scenarios

All the improvements of the Power BI 'new look', for instance, navigation updates, will be available for Power BI embedded analytics scenarios.

By default, the report page navigation will be across the bottom as tabs. Getting the new page navigation on the left as a pane is possible

programmatically (or by showing the report action bar). To show the report page navigation on the left as a pane, you can use the 'panes' object and choose the position of the page navigation.

```
var embedConfig = {
    ...
    settings: {
        panes: {
            pageNavigation: {
                visible: true,
                position: models.PageNavigationPosition.Left,
            }
        }
    }
};
```
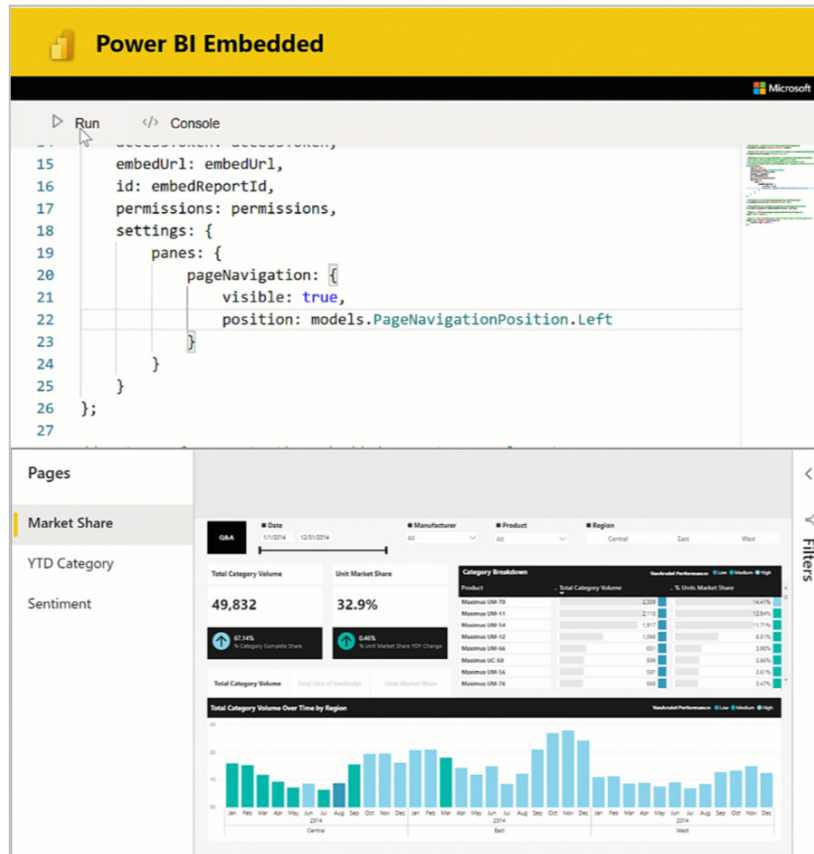

An additional change that is coming to Power BI embedded analytics with the `new look` update is the new pane design for edit mode Visualizations and Fields panes. You will now get the same panes design as it appears on Power BI Desktop and Service.

New capabilities in embedding for your organisation

REPORT CONSUMER ACTION BAR

As part of the Power BI 'new look' update, the Power BI action bar has been made simpler and been better organised, so it is easier to find actions. When embedding for your organisation, users will now be able to use the Power BI report action bar.
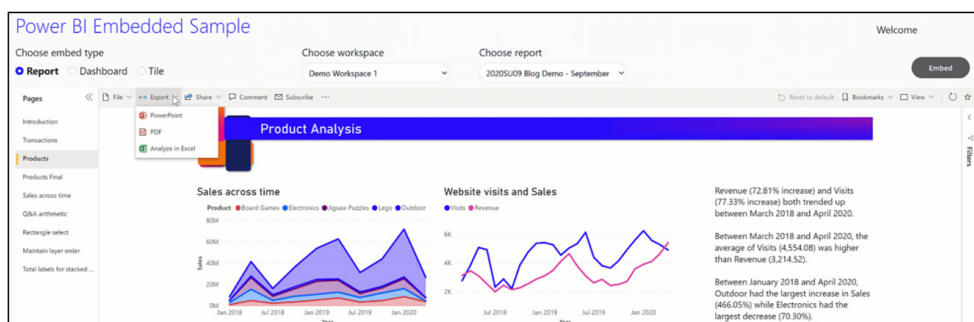
To show the action bar for your report consumers, you will need to add a setting on your embed configuration. The new setting is called bars (similar to the 'panes' object introduced a few months ago):

```
var embedConfig = {
    ...
    settings: {
        bars: {
            actionBar: {
                visible: true
            }
        }
    }
};
```

By showing the action bar you will get the vertical list of pages, which is the same experience as in Power BI Service. The page navigation can be collapsed through the action bar, giving users more room to view and interact with the report.

Controlling where the report page navigation sits (on the left as a pane or across the bottom as tabs) is only available through the report settings and not supported programmatically if the action bar is shown.

You will need to allow user state read and write permission for your application on Azure AD to get full functionality of the action bar, which includes:

- allow users to make the report a "favourite"
- use of Personal bookmarks
- use of Persistent filters.

PERSONAL BOOKMARKS

Report users may create their own set of bookmarks for each report, by capturing various states of a report page (including filters, slicers and state of visuals), give them friendly names and later retur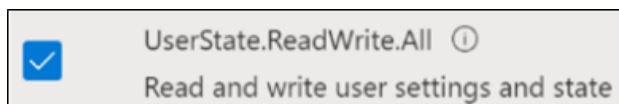n to each state with just one click. In addition, it is also possible to make any personal bookmark the default view, so your end-users can land on their preferred view of the report every time they open it.

Now, users may use the same personal bookmarks they are using on Power BI Service when consuming embedded analytics (only supported when embedding for your organisation). It should be noted that when embedding Power BI for your organisation, personal bookmarks can be enabled in two ways.

1. The first is showing the report action bar, by showing the report action bar you will allow your end-users to open and close the bookmarks pane as part of the action bar bookmarks button
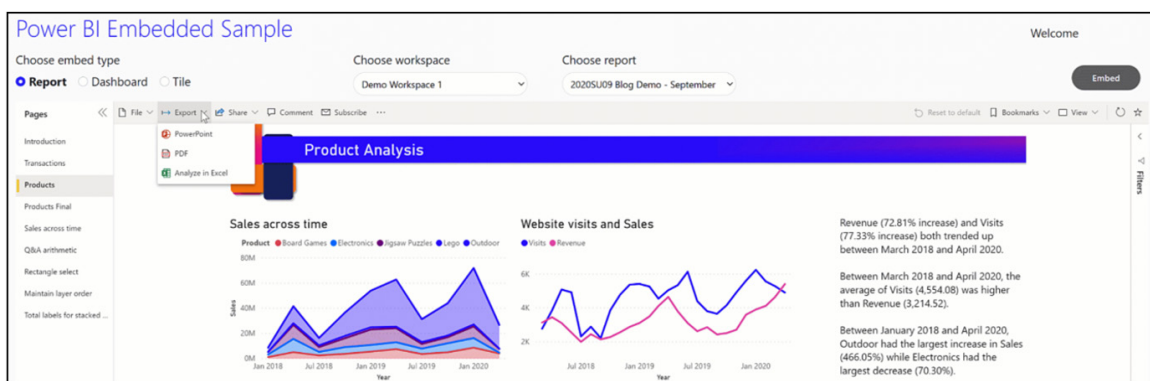
2. Another option is to show and hide the bookmarks pane programmatically, by using the panes object on the report settings. You may also update the report settings in run time by using the Update Settings API.
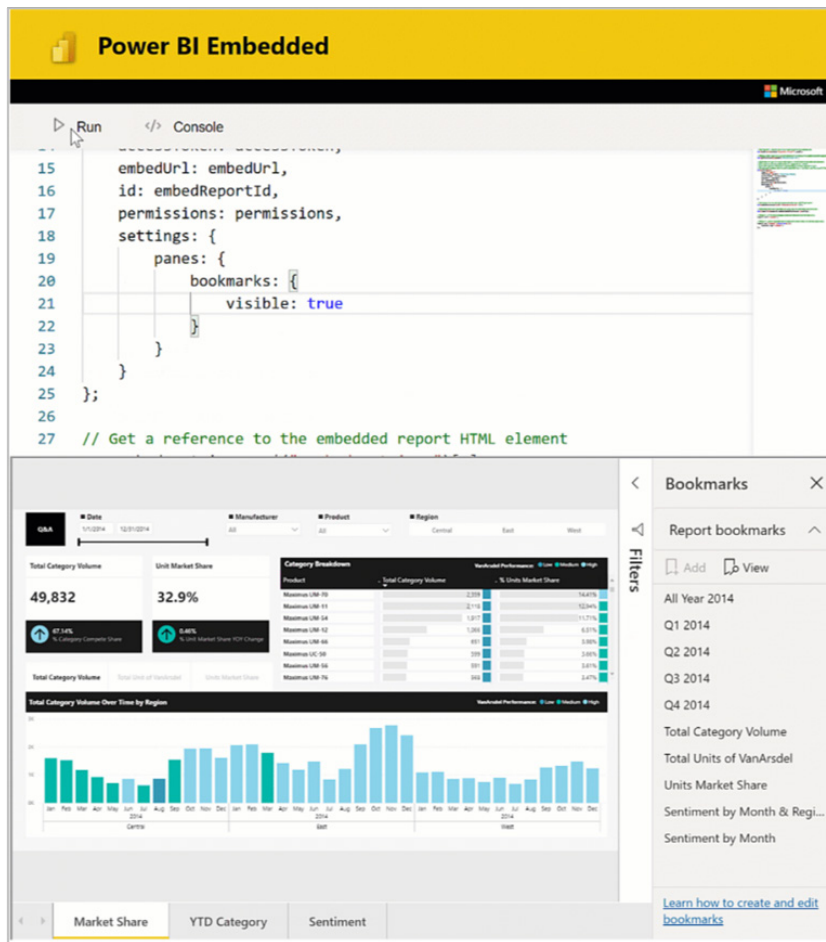
It should be noted that the personal bookmarks feature requires the new Azure AD application permissions and load configuration setting in order to work correctly.

PERSISTENT FILTERS

Persistent filters allow users to retain the filters, slicers and other data view changes that they make. Users no longer need to waste their time slicing and dicing their report and repeating the same steps each time they return to the embedded report. With this feature, users will be able to pick up right where they left off last time and quickly get to their insights.

The same state will be shared both for consuming the report in embedded analytics and in Power BI service. With the new action bar in embedded reports, the persistent filters 'Reset to default' button will be available for users, without implementing their own customised button(s).

Personalize visuals experience now fully supported on embedded scenarios

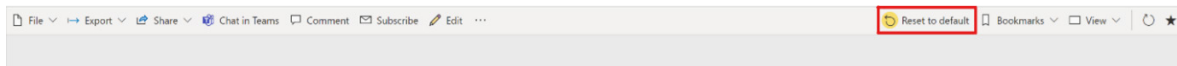The 'Personalize visuals' feature empowers you to explore and, er, personalise visuals all within the consumption view of a report. When you turn on 'Personalize visual' for a report, the option to customise a visual will also be available when consuming embedded analytics.

After your you have made tweaks to the visuals in the report, you may then save your modified view as a personal bookmark (only supported when embedding for your organisation). If you do not have personal bookmarks available for your report (or when embedding for others), you can also save the modified view(s) by using the Bookmarks APIs.

To capture a bookmark state with your modified visuals, you should capture the report state with a new capture bookmark options object. By default, your modified visuals will not be saved on the captured bookmark. To capture a bookmark state with the 'Personalized visuals':

> **let capturedBookmark = report.bookmarksManager.capture({ personalizeVisuals: true });**

You can then save the bookmark states of any user as part of your web application code and create a personalised bookmarks experience for you and other users.

The Bookmarks APIs support both embed for your customers and embed for your organisation scenarios.

New Q&A embed experience

The new Q&A embed experience is now aligned with the new Q&A visual.

When embedding Q&A to your web application, you will now get an input box for you to type your questions and a few suggestions to get started with. Clicking any of the suggestions will automatically populate the input box with that question and show you the result.

The new Q&A embed experience supports all the new Q&A features you have for the report Q&A visual.

Power BI APIs & Life-Cycle Management

EXPORT REPORT TO FILE API UPDATES

In March 2020, Microsoft introduced the Export report to PDF, PPTX and PNG files using Power BI REST API (Preview). The API included Bookmarks capabilities to export the current state of a report, after applying filters to it. Now, Microsoft has added the option to export an existing report bookmark, using the name property, a unique (case sensitive) identifier which you can get using the bookmarks JavaScript API and they have also added the option to pass report level filters through the API. The ability to export a single visual is apparently coming soon too.

TAKE OVER API FOR PAGINATED REPORT DATA SOURCE

The new 'Reports – Take Over in Group' API will allow you to transfer the ownership of paginated reports data sources to the authorized user (the user that called the API). For instance, to update the details of a data source, you must be the owner of the data source. The take over API for paginated reports will help take the ownership and update the data source.

The new API will be the equivalent of the existing API, 'Datasets – Take over in group', which allows you to transfer ownership of a dataset for Power BI reports.

Coming soon

IMPROVED ANALYTICS WITH NEXT-GENERATION POWER BI EMBEDDED

Last month, the Preview Availability of Improved Analytics with Next-Generation Power BI Premium was announced. This will come to Power BI Embedded as well. When available, the new platform will improve chargeback support for independent software vendors (ISVs) and will introduce lower entry points for premium features like paginated reports and others. More anon.

New visuals

The new visuals provided in this update are:

- AdaptiveCards by Paradigm BI
- France Map Drilldown by Data Khi
- Dumbbell Bar Chart by Nova Silva BV
- Dumbbell Column Chart by Nova Silva BV
- Strip Plot by Nova Silva BV
- Add Intelligent Narratives for BI by Arria NLG
- Overlapping Bar Chart by Acorn Hill.

A couple are detailed below.

### Strip Plot by Nova Silva

We were a little disappointed when we found out this wasn't the name of Canadian burlesque bar…

Many charts require you to summarise or categorise data before it is displayed. This can hide important details and may be misleading. The Strip Plot shows all your data observations in one go without hiding important details. It shows each data point on a single continuous scale.
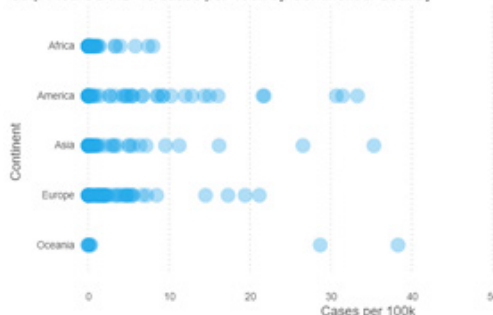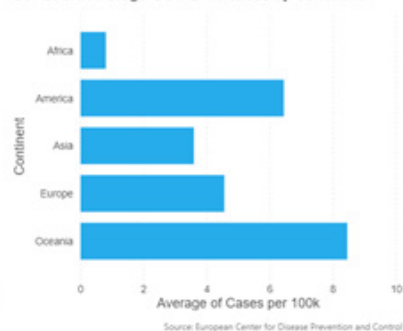
The example above illustrates this by showing the number of reported COVID-19 cases per continent (albeit on September 1st, 2020). The bar chart shows the average per continent, where the Strip Plot shows the cases per individual country. In the Strip Plot, it becomes obvious the relative high number in Oceania are caused by just two countries (outliers), where the bar chart only shows a very high average. It is these kinds of details that become visible in the Strip Plot.

Furthermore, the Strip Plot supports all standard Power BI functionality like drilling, selection and highlighting, context menu and full ToolTip support. All this functionality is available through the standard Power BI interface, so there is no need to learn any new interface.

This may be downloaded from the AppSource.

Intelligent Narratives by Arria NLG
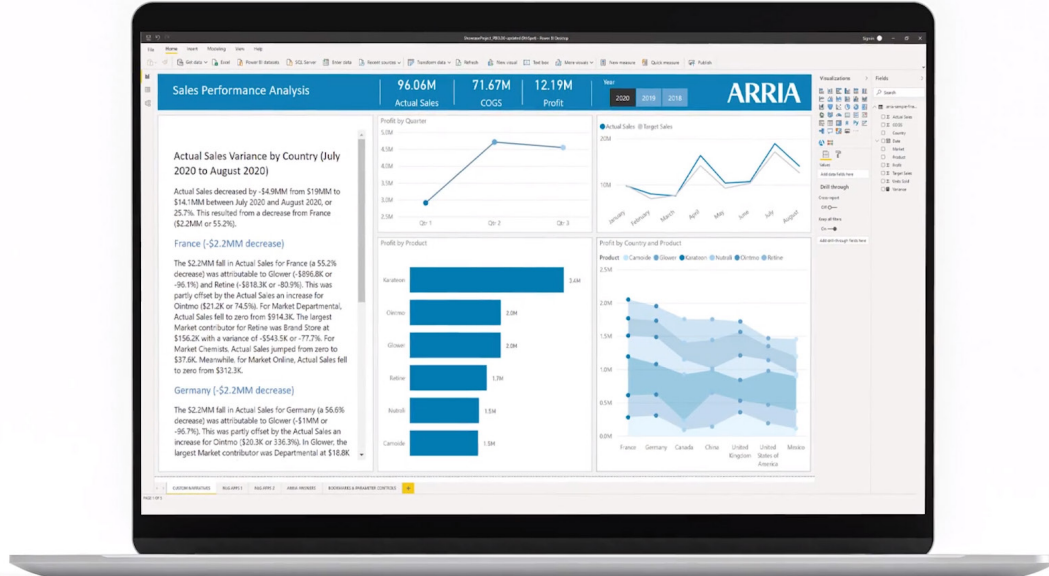
This visualisation allows you to quickly identify, understand, communicate, and action key insights with user-configurable, out-of-the-box narratives. Arria's narrative capabilities support your dashboard's visuals (and describe the underlying data) with short-form summaries or long-form reports.

This custom visual gives you access to advanced natural language generation, in the form of configurable, no-code narratives. Arria also provides natural language query capabilities so you can ask questions about your data and get instant, precise responses.
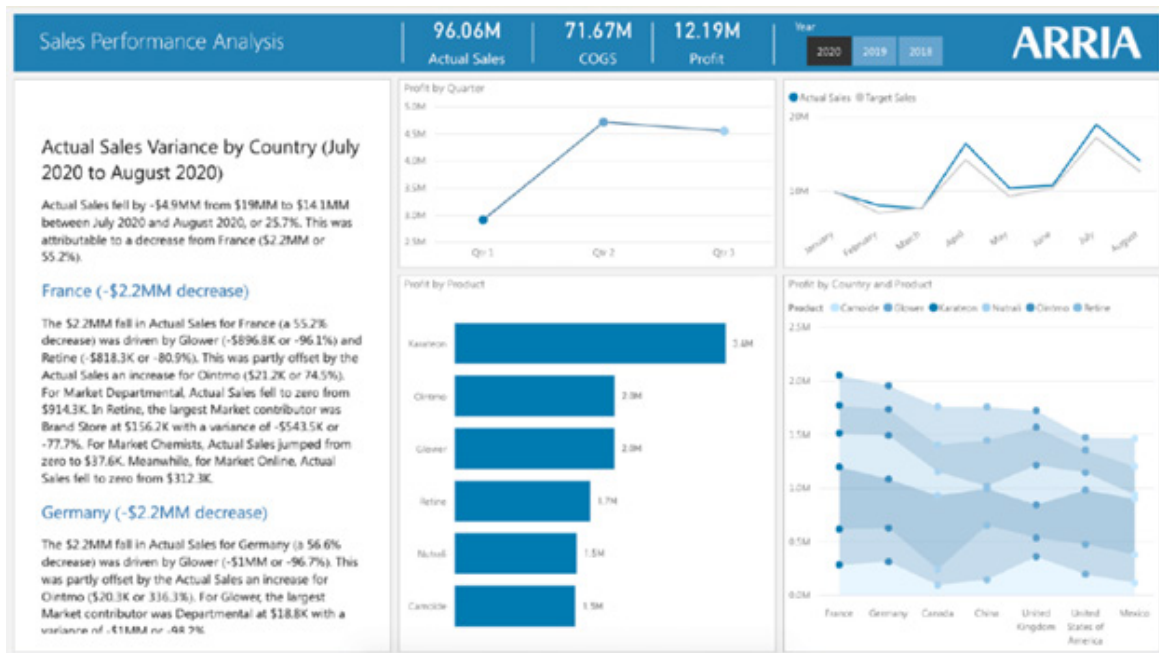
From sales performance to expense variance, you no longer have to sift through mountains of data to get the answers to your organisation's most important questions. Report generation should take significantly less time.

To create your reports, choose from multiple applications:
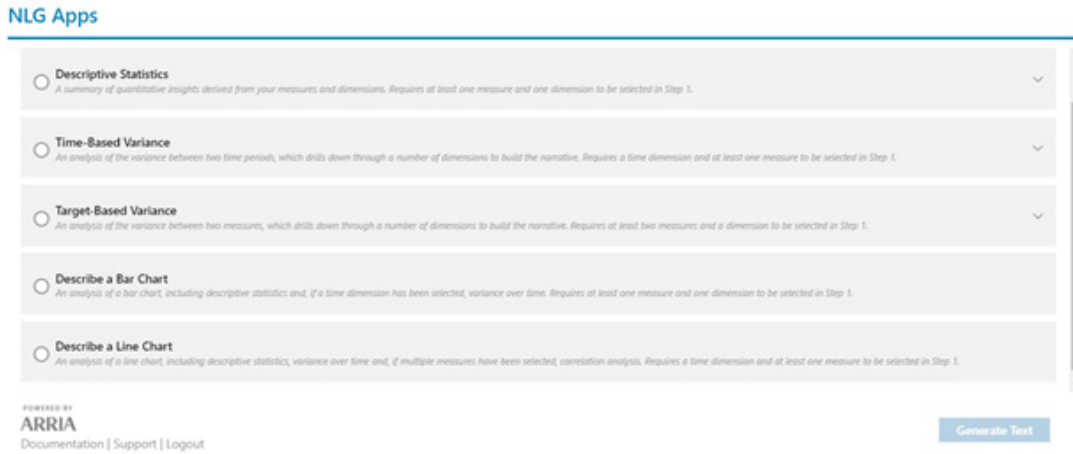
Narratives are generated instantly, based upon your data selections and your choice of analysis type.
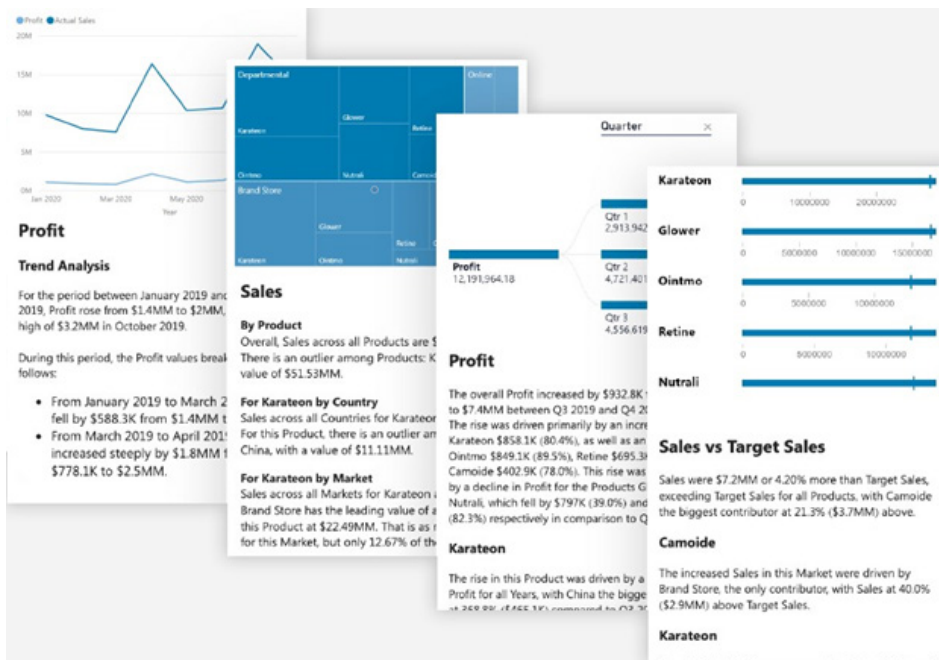
You may narrate your visuals with natural language insights for speed to data understanding. Drill down into all your dashboard's underlying data to tap into insights that you might otherwise miss.

With this visualisation, you may instantly create natural language narratives right inside your dashboard. You choose the analysis type you need, and you configure the narrative according to your business requirements.
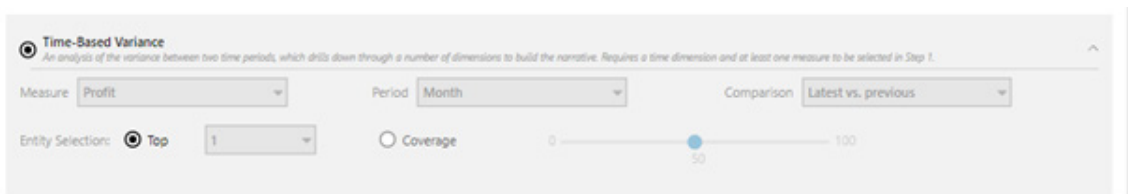
Using NLQ (natural language queries), you can query your data, on demand. Within the integrated chat interface, ask your data questions and get answers.

Have a conversation with your data.
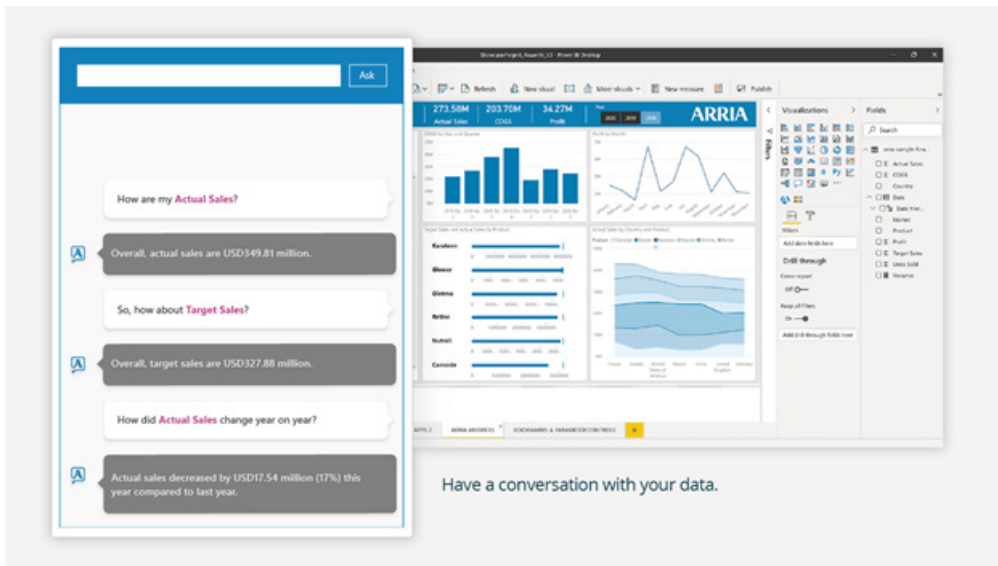
This may be downloaded from the AppSource.

Test Your Analytics Maturity

Test Your Analytics Maturity app created by Avanade helps you to evaluate your organisation's analytics maturity. Once you install the Power BI app, you will see a Power BI report that consists of 10 simple questions to gauge your analytics maturity on multiple core dimensions.

You may share the tool with your colleagues and learn whether your analytics maturity level is at a Slumber, Awakening, Challenge, Accomplishment or Triumph. One interesting self-assessment tool uses built-in Power BI visualisations and synchronised slicers to deliver a survey-like experience. In addition to helping you assess maturity, Avanade provides you with a tool to help you showcase the flexibility and possibilities of Power BI for your organisation.
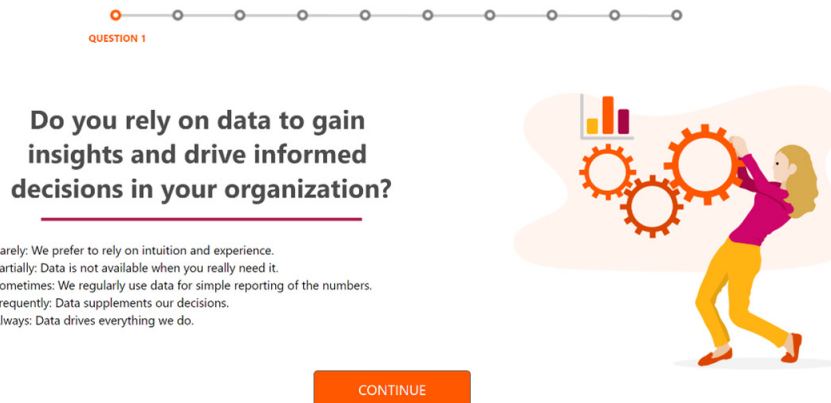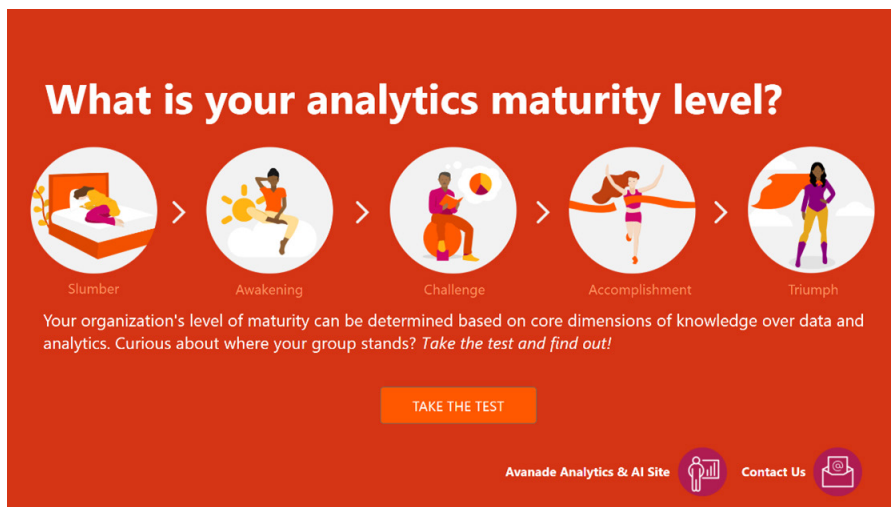
This may be downloaded from the AppSource.

Apps on AppSource

Microsoft AppSource allows you to select useful applications for your organisation's needs and get solutions that can enhance the Microsoft products you use. While it is easy to find apps on the official AppSource portal, there is an alternative way to do it – on a Power BI report. You can now do that now using a new Power BI App from DataChant, called the 'Apps on AppSource – Exploration Tool'.

From the main view of the application, you can search and filter for apps by products, publishers or app name. You can see products and publishers. In the table view, you can highlight a specific app to read its description or click on the app image or title to navigate to the app on AppSource. You can also click the Video or Help hyperlinks to browse to the relevant app resources. The app includes a Word Cloud view to allow you to search for apps by common key phrases and drill through to the Publisher view to specific publishers and review their various apps on the market.
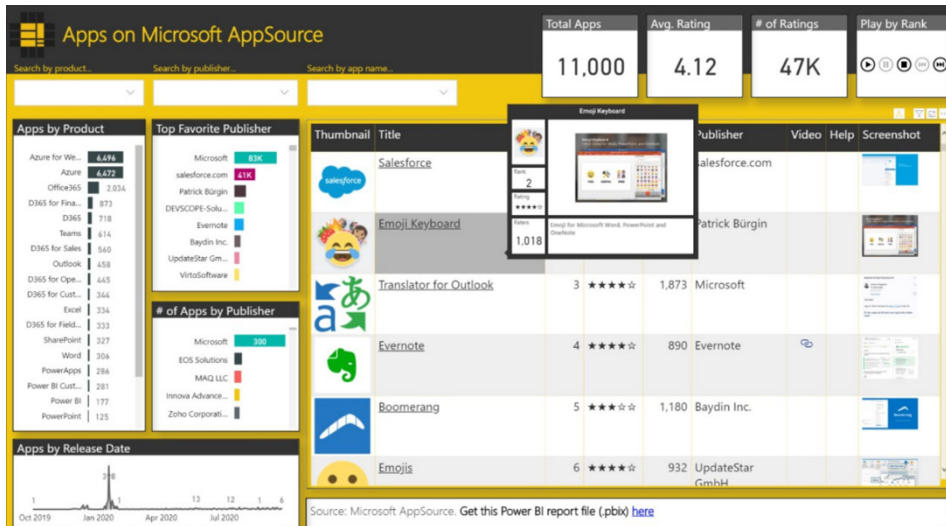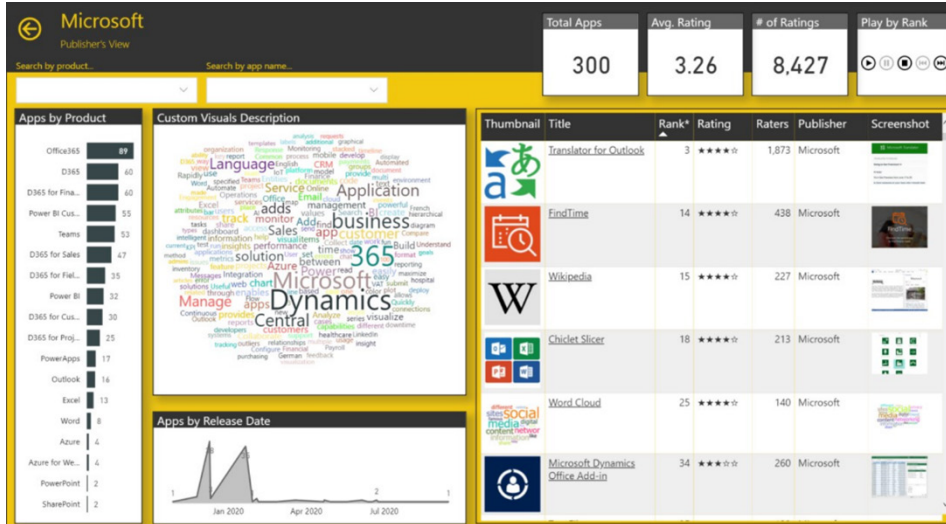
Power BI Gold suite

The Power BI Gold collection of apps are a set of ready-made reports that help you implement Power BI for a Microsoft Dynamics 365 Business Central system, designed and developed by Fenwick Software.

The included datasets plug directly into Dynamics 365 Business Central, allowing you to easily extract data and build custom reports based on your data. The curated datasets across the areas of sales, finance, purchasing and inventory modules provide a steady reporting foundation.

With Power BI Gold you can build reports by any dimension from Business Central. Measures are ready to go and the data is already modelled for analysis. Each report comes with a pre-built report template with thought-out visuals and formatting configurable to your organisation's logo and colour theme.

Each Power BI Gold app has a pre-built data connector app required to install in Dynamics 365 Business Central system to allow for the integration of data to Power BI.

New Admin APIs and Service Principal authentication to make for better tenant metadata scanning

Power BI enables organisations to adopt a data-driven culture where every person may obtain insights. With the self-service data generated in Power BI, you may witness the following challenges:

- how to allow self-service but still govern data efficiently
- how to help users discover the right data to use
- how to reduce data duplication.

This release intends to make it easier for you to get the information you need from Power BI to help you to address and overcome these challenges.

SERVICE PRINCIPAL AUTHENTICATION FOR READ-ONLY SCANNER ADMIN APIS

To better support the security constraints of some organisations, Microsoft has added service principal support for the scanner Admin APIs. Service principal is an authentication method that can be used to let an Azure AD application access Power BI APIs. With this authentication method, you no longer have to maintain a service account with an admin role. Rather, to allow your app to use the Admin APIs, you just have to give your approval once as part of the tenant settings configuration.

ASYNCHRONOUS UNIFIED SCANNING APIS

In the past, to get a full scan of Power BI assets, data source metadata and lineage, you had to call multiple APIs. Now unified Async APIs have been released that can get you all the required metadata and lineage information in an efficient, reliable way.

Given that most tenants have a massive amount of data, to avoid failures in returning the metadata and to improve scanning time, Microsoft has implemented the APIs in an asynchronous way. The APIs were designed with full tenant scan in mind, and their efficiency on the server side was improved dramatically. The time it now takes for a full scan of large tenants can be just minutes or hours, instead of days or weeks as in the past, and the number of failures has gone down significantly.

INCREMENTAL SCAN

Users often need to have a scheduled scan that gets the required information from Power BI that provides an up-to-date picture of what is going on in the Power BI tenant. Power BI knows how to distinguish which of the customer's workspaces do not change frequently, most of the time staying the same without any updates. In these "static workspaces", the data might get refreshed, but the associated metadata stays the same. With this understanding, Microsoft has designed support for an incremental scan, giving customers the flexibility to scan only those workspaces that have changed since the last time they were scanned. Using the incremental scan can reduce scanning time significantly and save resources, both for the customer and for the Power BI Service.

ENDORSEMENT (CERTIFIED AND PROMOTED) LABELS

To better support the discovery of high-quality data, the information the API returns for dataflows, datasets and reports includes information about endorsement, if any. This makes it easy to get a clear overall picture about endorsed content in your organisation.

SENSITIVITY LABELS

If you use sensitivity labels in Power BI to protect your data, you might find it useful to extract and use this information in your customised scanning solution. The new APIs return the sensitivity label ID for each labelled artifact. You can use it to create your own report to see how well your data is protected.

Power BI Visuals Platform adds support for conditional formatting

Conditional formatting lets a report creator specify how colours are displayed in a report, according to a numerical value. With the new 3.5 API release, developers will be able to add the conditional formatting functionality to your Power BI visual.

As always, it's recommended you update your visuals to the latest API release to fully appreciate the new functionality and improvements.

More next month we're sure!

The A to Z of Excel Functions: FIND

The **FIND** function locates a text "sub-string" inside a longer text string, and returns the starting position of it within the parent string (*i.e.* where the first character is in the longer text string). This function is not available in all languages.

The FIND function employs the following syntax to operate:

FIND(find_text, within_text, [start_number])

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

- **find_text:** this is required and represents the text you wish to find
- **within_text:** this is also required. This represents the longer (parent) string that contains the text you seek
- **start_number:** this is optional. This specifies the character at which to start the search. The first character in **within_text** is character number 1. If you omit **start_number**, then it is assumed to be 1.

It should be noted that:

- **FIND** is intended for use with languages that use the single-byte character set (SBCS)
- **FIND** always counts each character, whether single-byte or double-byte, as 1, no matter what the default language setting is
- **FIND** is case sensitive and doesn't allow wildcard characters. If you don't want to do a case sensitive search or use wildcard characters, you can use SEARCH instead
- if **find_text** is "" (empty text), **FIND** matches the first character in the search string (that is, the character numbered **start_number** or 1)
- **find_text** cannot contain any wildcard characters
- if **find_text** does not appear in **within_text**, **FIND** returns the *#VALUE!* error value
- if **start_number** is not greater than zero (0), **FIND** returns the *#VALUE!* error value
- if **start_number** is greater than the length of **within_text,** **FIND** returns the *#VALUE!* error value
- use **start_number** to skip a specified number of characters. As an example, suppose you are working with the text string "SumProduct". To find the number of the first "u" in the descriptive part of the text string, set **start_number** equal to 4 so that the first part of the text is not searched. **FIND** begins with character 4, finds **find_text** at the next character, and returns the number 8. **FIND** always returns the number of characters from the start of **within_text**, counting the characters you skip if **start_number** is greater than 1.

Please see our example below:

▲	A	B	C
1	**Data**		
2	SumProduct		
3			
4			
5	**Formula**	**Description**	**Result**
6	=FIND("s",A2)	Cannot find "s" as **FIND** is case sensitive.	**#VALUE!**
7	=FIND("S",A2)	Position of first "S" in cell **A2**.	1
8	=FIND("u",A2,4)	Position of the first "u" in cell A2, starting at the fourth character.	8

The A to Z of Excel Functions: FINDB

Brother of Cardi B, the **FINDB** function locates a text "sub-string" inside a longer text string, and returns the starting position of it within the parent string (*i.e.* where the first character is in the longer text string). This function is not available in all languages.

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

FINDB(find_text, within_text, [start_number])

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

- **find_text:** this is required and represents the text you wish to find
- **within_text**: this is also required. This represents the longer (parent) string that contains the text you seek
- **start_number:** this is optional. This specifies the character at which to start the search. The first character in **within_text** is character number 1. If you omit **start_number**, then it is assumed to be 1.

It should be noted that:

- this function is not available in all languages
- **FINDB** is intended for use with languages that use the double-byte character set (DBCS)
- **FINDB** always counts each double-byte character as 2 when you have enabled the editing of a language that supports DBCS and then set it as the default language. Otherwise, **FINDB** counts each character as 1
- The languages that support DBCS include Chinese (Simplified), Chinese (Traditional), Japanese and Korean
- **FINDB** is case sensitive and doesn't allow wildcard characters. If you don't want to do a case sensitive search or use wildcard characters, you can use **SEARCHB** instead
- if **find_text** is "" (empty text), **FINDB** matches the first character in the search string (that is, the character numbered **start_number** or 1)
- **find_text** cannot contain any wildcard characters
- if **find_text** does not appear in within_text, **FINDB** returns the *#VALUE!* error value
- if **start_number** is not greater than zero (0), **FINDB** returns the *#VALUE!* error value
- if **start_number** is greater than the length of within_text, **FINDB** returns the *#VALUE!* error value
- use **start_number** to skip a specified number of characters. Using **FIND** as an example, suppose you are working with the text string " SumProduct". To find the number of the first "u" in the descriptive part of the text string, set **start_number** equal to 4 so that the first part of the text is not searched. **FIND** begins with character 4, finds **find_text** at the next character, and returns the number 8. **FIND** always returns the number of characters from the start of **within_text**,
- counting the characters you skip if **start_number** is greater than 1.

In the following example, **FINDB** returns 3 because each character is counted by its bytes; the first character has 2 bytes, so the second character begins at byte 3.

<div align="center">

FINDB("京", "東京都") = 3.

</div>

More Excel Functions next month…

Beat the Boredom Suggested Solution

Earlier in the newsletter, we asked you to fill in the blanks in column **A**:

	A	B	C
1	**Investment**	**Cash Flow**	**Value ($)**
2	Energy Company	Cash receipts	110
3		Cash paid	120
4		Capex	130
5		Interest paid	140
6		Interest received	150
7	IT Startup	Cash receipts	160
8		Cash paid	170
9		Capex	180
10		Interest paid	190
11		Interest received	200
12	Organic Farming	Cash receipts	210
13		Cash paid	220
14		Capex	230
15		Interest paid	240
16		Interest received	250
17	Bio-tech Company	Cash receipts	260
18		Cash paid	270
19		Capex	280
20		Interest paid	290
21		Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23		Cash paid	320
24		Capex	330
25		Interest paid	340
26		Interest received	350

so that your finished table would look like this:

	A	B	C
1	**Investment**	**Cash Flow**	**Value ($)**
2	Energy Company	Cash receipts	110
3	Energy Company	Cash paid	120
4	Energy Company	Capex	130
5	Energy Company	Interest paid	140
6	Energy Company	Interest received	150
7	IT Startup	Cash receipts	160
8	IT Startup	Cash paid	170
9	IT Startup	Capex	180
10	IT Startup	Interest paid	190
11	IT Startup	Interest received	200
12	Organic Farming	Cash receipts	210
13	Organic Farming	Cash paid	220
14	Organic Farming	Capex	230
15	Organic Farming	Interest paid	240
16	Organic Farming	Interest received	250
17	Bio-tech Company	Cash receipts	260
18	Bio-tech Company	Cash paid	270
19	Bio-tech Company	Capex	280
20	Bio-tech Company	Interest paid	290
21	Bio-tech Company	Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23	Pharmaceutical Company	Cash paid	320
24	Pharmaceutical Company	Capex	330
25	Pharmaceutical Company	Interest paid	340
26	Pharmaceutical Company	Interest received	350

You were reminded this was an Excel, not a Power Query, challenge.

A Suggested Solution

Here's the trick: first, select the whole column where you need to fill:

	A	B	C
1	**Investment**	**Cash Flow**	**Value ($)**
2	Energy Company	Cash receipts	110
3		Cash paid	120
4		Capex	130
5		Interest paid	140
6		Interest received	150
7	IT Startup	Cash receipts	160
8		Cash paid	170
9		Capex	180
10		Interest paid	190
11		Interest received	200
12	Organic Farming	Cash receipts	210
13		Cash paid	220
14		Capex	230
15		Interest paid	240
16		Interest received	250
17	Bio-tech Company	Cash receipts	260
18		Cash paid	270
19		Capex	280
20		Interest paid	290
21		Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23		Cash paid	320
24		Capex	330
25		Interest paid	340
26		Interest received	350

Then, press the **F5** function key (**CTRL + G**), whereby a 'Go To' dialog will pop up. Click the 'Special' button, *viz.*
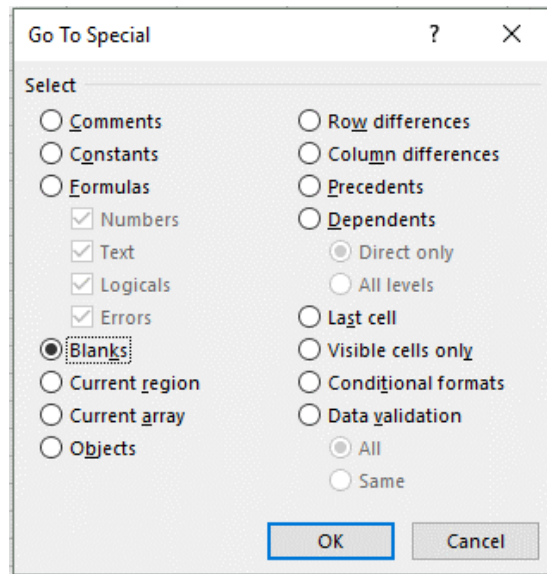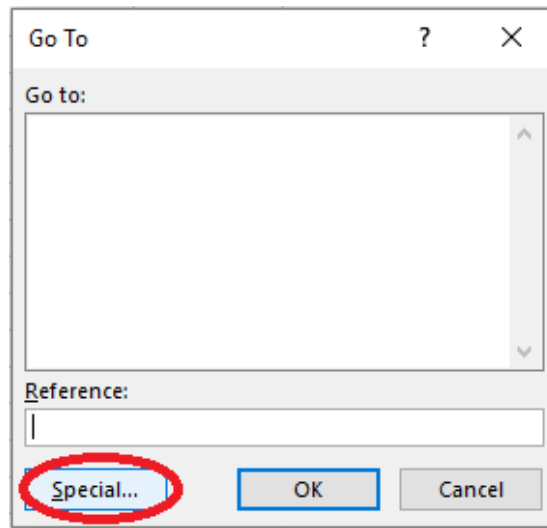
Excel will select blank cells in the chosen column. You will need to point the first blank cell to be equal to its precedent cell, then, press **CTRL + ENTER**.

	A	B	C
1	**Investment**	**Cash Flow**	**Value ($)**
2	Energy Company	Cash receipts	110
3	=A2	Cash paid	120
4		Capex	130
5		Interest paid	140
6		Interest received	150
7	IT Startup	Cash receipts	160
8		Cash paid	170
9		Capex	180
10		Interest paid	190
11		Interest received	200
12	Organic Farming	Cash receipts	210
13		Cash paid	220
14		Capex	230
15		Interest paid	240
16		Interest received	250
17	Bio-tech Company	Cash receipts	260
18		Cash paid	270
19		Capex	280
20		Interest paid	290
21		Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23		Cash paid	320
24		Capex	330
25		Interest paid	340
26		Interest received	350

And magic! The whole column will be filled instantly!

	A	B	C
1	**Investment**	**Cash Flow**	**Value ($)**
2	Energy Company	Cash receipts	110
3	Energy Company	Cash paid	120
4	Energy Company	Capex	130
5	Energy Company	Interest paid	140
6	Energy Company	Interest received	150
7	IT Startup	Cash receipts	160
8	IT Startup	Cash paid	170
9	IT Startup	Capex	180
10	IT Startup	Interest paid	190
11	IT Startup	Interest received	200
12	Organic Farming	Cash receipts	210
13	Organic Farming	Cash paid	220
14	Organic Farming	Capex	230
15	Organic Farming	Interest paid	240
16	Organic Farming	Interest received	250
17	Bio-tech Company	Cash receipts	260
18	Bio-tech Company	Cash paid	270
19	Bio-tech Company	Capex	280
20	Bio-tech Company	Interest paid	290
21	Bio-tech Company	Interest received	300
22	Pharmaceutical Company	Cash receipts	310
23	Pharmaceutical Company	Cash paid	320
24	Pharmaceutical Company	Capex	330
25	Pharmaceutical Company	Interest paid	340
26	Pharmaceutical Company	Interest received	350

Until next time.

Upcoming SumProduct Training Courses - COVID-19 update

Due to the COVID-19 pandemic that is currently spreading around the globe, we are suspending our in-person courses until further notice. However, to accommodate the new working-from-home dynamic, we are switching our public and in-house courses to an online delivery stream, presented via Microsoft Teams, with a live presenter running through the same course material, downloadable workbooks to complete the hands-on exercises during the training session, and a recording of the sessions for your use within 1 month for you to refer back to in the event of technical difficulties. To assist with the pacing and flow of the course, we will also have a moderator who will help answer questions during the course.

If you're still not sure how this will work, please contact us at training@sumproduct.com and we'll be happy to walk you through the process.

Location	Course	Date	Date	Duration	Duration
Online (Australia)	Power Pivot, Power Query and Power BI	4 - 6 Jan 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	11 Jan 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	12 - 13 Jan 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	15 - 17 Feb 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	22 Feb 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	23 - 24 Feb 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	7 - 9 Apr 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	14 Apr 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	15 - 16 Apr 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	10 - 12 May 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	17 May 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	18 - 19 May 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	15 - 17 Jun 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	22 Jun 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	23 - 24 Jun 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	19 - 21 Jul 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	26 Jul 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day

Location	Course	Date	Date	Duration	Duration
Online (Australia)	Financial Modelling	27 - 28 Jul 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	23 - 25 Aug 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	30 Aug 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	31 Aug - 1 Sep 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	29 Sep - 1 Oct 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	6 Oct 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	7 - 8 Oct 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	3 - 5 Nov 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	10 Nov 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	11 - 12 Nov 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	8 - 10 Dec 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	15 Dec 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	1 Day
Online (Australia)	Financial Modelling	16 - 17 Dec 2021	09:00-17:00 AEDT	(-1 day) 22:00-07:00 GMT	2 Days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This year, we thought we'd revisit each function key in depth (there are 12 – one for each month of the year!) Given it's January, let's look at **F1** insights (and no Lewis Hamilton in sight) *[groan – Ed.]:*

Keystroke	What it does
F1	Help
ALT + F1	Insert chart as an object
CTRL + F1	Show / hide Ribbon
SHIFT + F1	What Is… (Help)
ALT + SHIFT + F1	Insert new sheet
CTRL + ALT + F1	New macro sheet
CTRL + SHIFT + F1	Show / hide Ribbon and Quick Access Toolbar together

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 www.sumproduct.com/training.