

Sum Product

NEWSLETTER #80 - July 2019

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We're halfway through 2019

and there's no slowing down! Power BI still has 20 trillion updates a month, the market emphasises the importance of data visualisation and business intelligence, SumProduct begins the Excel Summit South conference tour of Australia, Microsoft has issued a whole load of freebies, Mac Excel is becoming more useful and our newsletter still attempts to reach the 100-page mark.

My old English teacher would turn in his grave at the size of that last sentence – if he were dead!

This month, we consider depreciation using both **OFFSET** and **DDB** (not at the same time!) and continue our regular series on VBA, Power Pivot and keyboard shortcuts.

Hope to see some of you at the Excel Summit South events soon.

Until next month.

Liam Bastick, Managing Director, SumProduct



Excel Summit South: Final Call

EXCEL SUMMIT SOUTH 2019

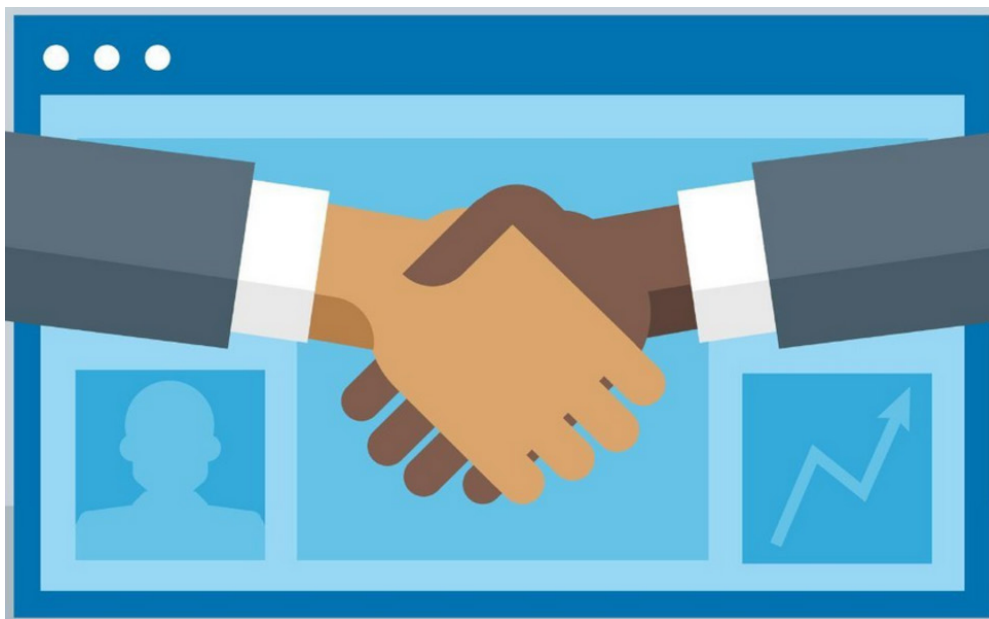
It starts the end of this month – have you got your ticket yet? We'd love to see you there. Our Microsoft and MVP presenters from Australia, Bulgaria, Slovenia, the UK and the USA (hopefully, somebody can speak English!) are all getting ready to come and talk about all things 3D Maps, Auditing Spreadsheets, Charts, Dashboards, Data Analysis, Data Types, Dynamic Arrays, Excel Tricks & Tips, Financial Modelling, Forecasting, Office 365, PivotTables, Power BI, Power Pivot, Power Query, Presenting Your Data in PowerPivot, Simulations Analysis, Slicers, Spilled Formulae, Testing, Timelines and VBA.

Bring a laptop, an inquisitive mind and your sense of humour. Be prepared to learn heaps over two days. We are travelling around Australia as follows:

- **Brisbane:** Monday 29 and Tuesday 30 July
- **Sydney:** Thursday 1 and Friday 2 August
- **Melbourne:** Monday 5 and Tuesday 6 August
- **Perth:** Thursday 8 and Friday 9 August.

Check out the website at www.excelsummitsouth.com for all the details, prices and registration. Early Bird pricing is nearly over. Don't miss out – and remember, the additional 10% off using the code **NEWSLETTER 10**. Hopefully, we will see you there!

Salesforce Buys Tableau



Data visualisation and Business Intelligence continue to make in-roads in the worldwide business communities. Announced mid-month (but still newsworthy), in its largest deal to date, Salesforce.com Inc. has agreed to buy Tableau Software Inc., in an all-stock deal valued at US\$15.3 billion. It's clearly a major bid to build the acquirer's analytics offering. It is understood that by reaching through combined new markets the intention is to build an annual revenue of US\$26 - \$28 billion by fiscal year 2023.

Tableau's HQ will stay in Seattle and will continue to be led by present Chief Executive Officer Adam Selipsky, who has been responsible for

the transition of Tableau's software tools to cloud-based subscriptions, similar to other "well-known" products out there...

Highly respected for its chart applications and analytics dashboards, Tableau has been broadening its product line to include data cleansing and Machine Learning (ML) tools, enabling it to compete in the wider data-warehousing market and take the battle to Power BI, amongst other competitors.

We watch the space with interest.

Free Stuff from Microsoft Business Applications Summit 2019

The 2019 Microsoft Business Applications Summit may be over. It covered so much more than Excel, with both Microsoft staff and Most Valuable Professionals (MVPs) presenting on all things Dynamics 365, Power BI, Excel, PowerApps, Microsoft Flow, and mixed reality.

If you didn't go – we didn't – don't worry. Microsoft has released a whole load of freebie videos and PowerPoint slides that summarise much of the cool stuff. Immerse yourself here:

- [Microsoft Excel: Whirlwind Tour 2019 \(deck\)](#)
- [Microsoft Excel: Getting Started with Dynamic Arrays in Excel \(deck\)](#)
- [Microsoft Excel: Best practices for spreadsheet modeling, data shaping, and data analysis \(deck\)](#)
- [Microsoft Excel and Visio: Unlock the power of data-driven diagramming \(deck\)](#)
- [Microsoft Excel: Collaboration in Excel \(deck\)](#)
- [Microsoft Excel: Boost your productivity with Excel on the web \(deck\)](#)
- [Design and create business workflows automatically using Microsoft Excel, Flow, and Visio \(deck\)](#)
- [Microsoft Excel: How I leveraged Excel, Microsoft Flow, Power Query, and Power BI to optimize busine... \(deck\)](#)
- [Microsoft Dynamics 365: Excel life hacks for Dynamics 365 Business Central \(deck\)](#)

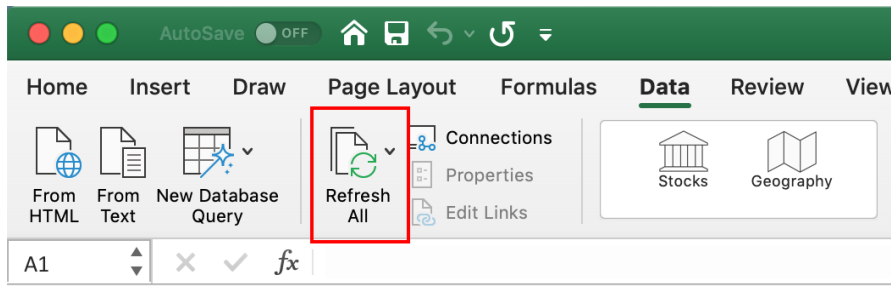
Power Query in Excel for Mac

It's not there yet – but it's starting! Too late to announce in last month's newsletter, the end of May saw Excel for Mac taking its first steps into Power Query Land (who said this was Never Never Land?).

Up until now, Power Query has not been supported in Excel for Mac, but the tide is turning. Starting with anyone with Office Insiders Fast in Excel

for Mac version 16.26 (19052200) or later, the journey starts now.

As of this release, end users may refresh Power Query queries on a Mac – albeit for CSV, JSON, Text, XLSX and XML files only. It may only be baby steps – but it's a significant start.



To see how it might work for you, refresh your workbook queries as you would do normally (either using **Data -> Refresh All** or VBA). The refresh will now work for the file types stipulated above. You might need to update the file path so that it works. In this instance, click **Data -> Connections -> select the connection that failed to refresh -> Change File Path** to update.

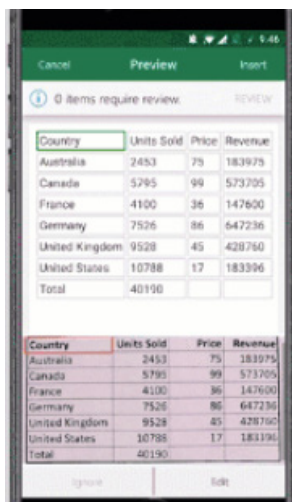
Alternatively, you could use a PC (bang goes our Apple freebies).

Insert Data from Picture Generally Available on the iPhone Excel Application

Insert Data from Picture is now Generally Available to iPhone users, including support for no less than 21 languages for both the Android version of the app (available since March) and the new iPhone one.

This tabular recognition feature for Excel combines advanced Optical Character Recognition (OCR) technology and machine learning models

to transform paper-based information into digital data. Insert Data from Picture brings printed, tabular data directly into Excel, where you can perform various kinds of analysis that are time-consuming or even impossible with pen and paper.



Simply open the Excel app on your phone, snap a picture of your paper-based data table, crop and review the image, and you're done—no technical skills required. The data table is automatically embedded and ready for analysis in Excel.

Going from analogue to digital gives you time for more important tasks and is more secure. In addition, once a printed copy is converted, digital records are easier to organise and search—eliminating paper waste and reducing physical storage space.

Here are just a few examples of how users can benefit from Insert Data from Picture:

- Consolidate dozens, hundreds, or even thousands of rows of paper-based data in a flash—all without a single pencil mark
- Create illustrative charts and graphs to summarise information that was extremely difficult to communicate before
- Use Ideas in Excel to surface new trends and dependencies you might have missed when your data only existed on paper
- Easily archive data documents for future reference and compliance purposes.

To enable seamless data extraction from an image, Insert Data from Picture reuses many of the same OCR and Layout technologies previously released for Word (e.g. the PDF Reflow feature), Office Lens, and Seeing AI.

The image is analysed to detect the main building blocks of the document, like text and graphical elements (e.g. table borders). For this, Microsoft enhanced their OCR engine to handle images with scattered text, which is often the case in tabular data and leveraged various image processing techniques to detect graphical elements.

Once the image is decomposed into main building blocks, Insert Data from Picture starts inferring the layout of the table. The most important part is detecting the grid of the table, which is done by generating grid candidates from horizontal and vertical lines (for bordered tables) and empty spaces between text (for borderless tables). After all the candidates are generated, the feature uses a combination of various heuristics and machine learning models to filter false positives and produce the final grid that will be reconstructed in the output. Producing that final grid relies on the analysis of each cell to build out other structures like paragraphs, font properties, and lists.

For those who have used OCR-based features before, you know it doesn't always get everything right. Insert Data from Picture takes special care to highlight potential errors, so you can focus on individual entries rather than on the whole thing. The good news is that this is an AI-powered feature designed for continuous improvement, meaning that data accuracy will increase over time. To achieve this, Microsoft leveraged the collection of machine learning models where each model detects a specific case of misrepresented content (e.g. missed or added characters).

You can download Excel for your phone and start using these apps today:

- Excel app for iPhone
- Excel app for Android

Ideas for Modelling Depreciation

Given this month's A to Z of Excel Functions function (**DDB**), we thought it might be good to hold an appreciation of depreciation. There's another good – and more common – function that can help with depreciation: **OFFSET**.

Just to recap, the **OFFSET** function employs the following syntax:

OFFSET(reference,rows,columns,[height],[width])

The arguments in square brackets (**height** and **width**) can be omitted from the formula – but they will prove to be useful here.

OFFSET(reference,rows,columns) will select a reference rows **rows** down (**-rows** would be **rows** rows up) and **columns** rows to the right (**-columns** would be **columns** rows to the left) of the **reference**. For example, consider the following grid:

	A	B	C	D	E	F
1	1	2	3	4	5	6
2	7	8	9	10	11	12
3	13	14	15	16	17	18
4	19	20	21	22	23	24
5	25	26	27	28	29	30
6	31	32	33	34	35	36

OFFSET(A1,2,3) would take us two rows down and three columns across to cell **D3**. Therefore, **OFFSET(A1,2,3) = 16**, viz.

	A	B	C	D	E	F
1	1	2	3	4	5	6
2	7	8	9	10	11	12
3	13	14	15	16	17	18
4	19	20	21	22	23	24
5	25	26	27	28	29	30
6	31	32	33	34	35	36

OFFSET(D4,-1,-2) would take us one row up and two rows to the left to cell **B3**. Therefore, **OFFSET(D4,-1,-2) = 14**, viz.

	A	B	C	D	E	F
1	1	2	3	4	5	6
2	7	8	9	10	11	12
3	13	14	15	16	17	18
4	19	20	21	22	23	24
5	25	26	27	28	29	30
6	31	32	33	34	35	36

For this second discussion, let's extend the formula to **OFFSET(D4,-1,-2,-2,3)**. It would again take us to cell **B3** but then we would select a range based on the **height** and **width** parameters. The **height** would be two rows going up the sheet, with row 3 as the base (*i.e.* rows 2 and 3), and the **width** would be three columns going from left to right, with column **B** as the base (*i.e.* columns **B**, **C** and **D**).

Hence, **OFFSET(D4,-1,-2,-2,3)** would select the range **B2:D3**, viz.

	A	B	C	D	E	F
1	1	2	3	4	5	6
2	7	8	9	10	11	12
3	13	14	15	16	17	18
4	19	20	21	22	23	24
5	25	26	27	28	29	30
6	31	32	33	34	35	36

Note that **OFFSET(D4,-1,-2,-2,3) = #VALUE!** since Excel cannot display a matrix in one cell (unless you have Dynamic Arrays!), but it does recognise it. However, if after typing in **OFFSET(D4,-1,-2,-2,3)** we press **CTRL + SHIFT + ENTER**, we turn the formula into an array formula: **{OFFSET(D4,-1,-2,-2,3)}** (do not type the braces in, they will appear automatically as part of the Excel syntax). This gives a value of 8, which is the value in the top left hand corner of the matrix, *but Excel is storing more than just that*. This can be seen as follows:

- **SUM(OFFSET(D4,-1,-2,-2,3)) = 72** (i.e. **SUM(B2:D3)**)
- **AVERAGE(OFFSET(D4,-1,-2,-2,3)) = 12** (i.e. **AVERAGE(B2:D3)**).

We'll use these ideas to build up the depreciation of capital expenditure.

Example

Let's imagine we've been charged with creating a depreciation schedule in an Excel spreadsheet with the following assumptions:

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														

All cells in yellow are assumptions that may be changed.

We wish to build a depreciation grid to calculate my total amortised cost as follows:

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														

The first challenge is to link the assumptions in cells **J21:O21** to the grey cells **H30:H35**, converting row assumptions into column data. Converting from rows to columns (or *vice versa*) is known as **transposing**. There are several ways you can do it, but only one way I truly recommend.

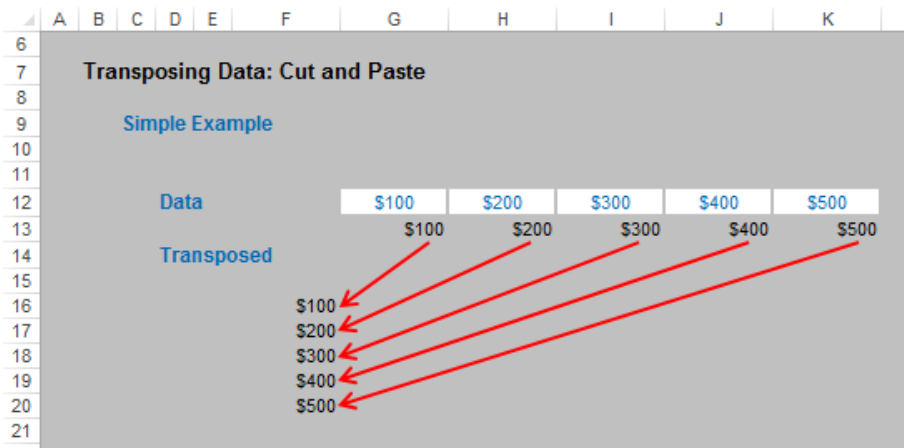
Method 1: Cut and Paste a Formula

For the purposes of simplification, I'm going to assume that we are looking to transpose data from going across a row to going down a column (the concepts are similar if columns are transposed into rows).

This method is very simple. First, create a formula that links to the data to be transposed, say, in the row beneath:

	A	B	C	D	E	F	G	H	I	J	K
6											
7											
8											
9											
10											
11											
12											
13											
14											

Second, once the formulae have all been created, cut and paste each formula individually into its appropriate position on the spreadsheet:

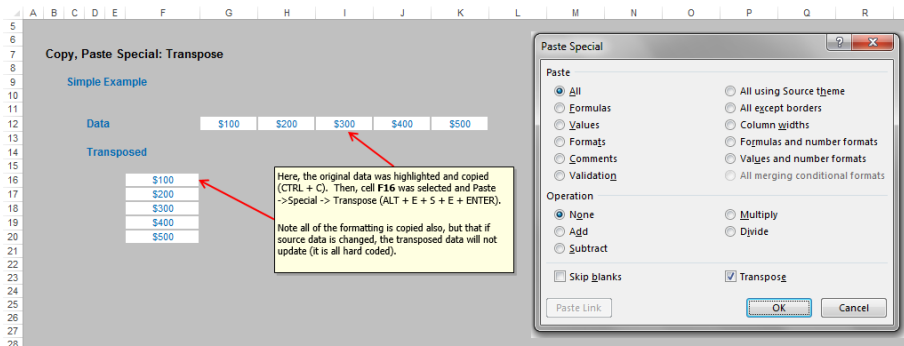


This is a very simple method, but certainly would be an ill-advised approach if you need to transpose 1,000 data points, for example.

However, simplicity is often a highly-underrated attribute in modelling. If you only have a few data items and you require the original inputs to remain (in our example, row 12, above), this method can often be deemed “simplest bestest”.

Method 2: Copy and Paste Special, Transpose

Another very simple approach is to copy and paste special as follows:

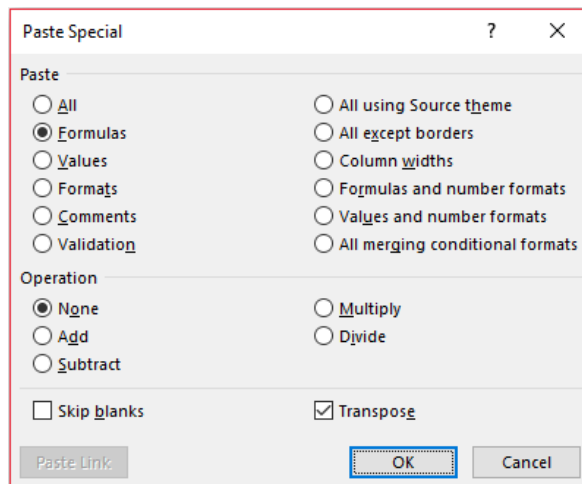


In this instance, simply highlight the data and copy the range in the usual way (e.g. **CTRL + C**). Next, simply select the first cell (i.e. the top left hand corner) of the intended range and Paste Special, Transpose (**ALT + E + S + E + ENTER**). As can be plainly seen from the illustration (above), the formatting as well as the content will be transposed.

the nature of the source data and how it is copied, updates in the original data will not flow through to the destination range.

This is an ideal approach for copying and transposing data from one source to another where links are not required. Aside from the inherited formatting, the main disadvantage here though is that depending upon

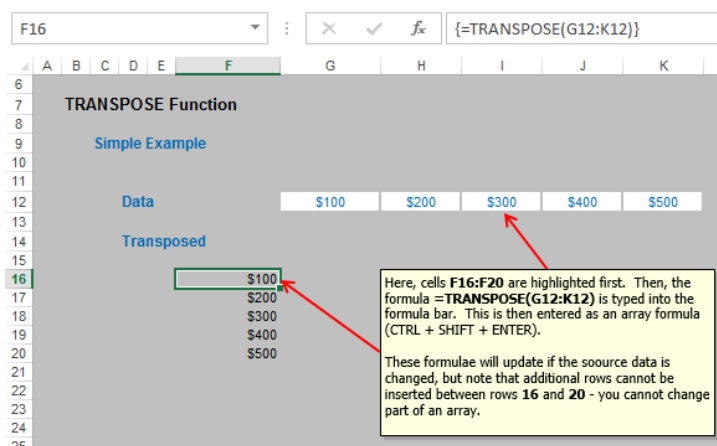
If the data needs to be linked to the source, then this approach is probably inappropriate. However, if inherited formatting is all that is putting you off, make the appropriate adjustments to the ‘Paste Special’ dialog box before pressing ‘OK’ / **ENTER**, e.g. set the dialog box as follows to copy only the formulae before transposing:



Method 3: Using the TRANSPOSE Function

On first glance, this looks like the 'best' method. Once you discover there is a **TRANSPOSE** function, you think life is simple and your problems (well, your modelling problems anyway!) are over. Unfortunately, this function is not without its limitations.

Consider the following example:



Here, the intention is to transpose the values in cells **G12:K12** into the range **F16:F20**. To do this, simply highlight cells **F16:F20** and then type in the following formula:

=TRANSPOSE(G12:K12)

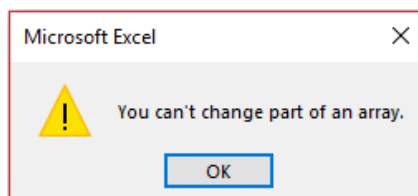
but rather than press **ENTER**, press **CTRL + SHIFT + ENTER** to enter the formula as an array formula.

This method is very simple, as long as you ensure that the destination range contains precisely the same number of cells in the column as there are cells in the source row. If you change the source data, the outputs will update accordingly too.

So, what's the problem?

Array formulae can consume memory exponentially, which in turn can soon prevent Excel from calculating correctly, especially if you are working on a Windows 32-bit operating system, which is the platform most businesses employ.

Further, if you wanted to insert additional rows between rows 16 and 20 (e.g. to extend the range), you will find that this is not possible:



Only Chuck Norris can change part of an array, and unfortunately, he's not available.

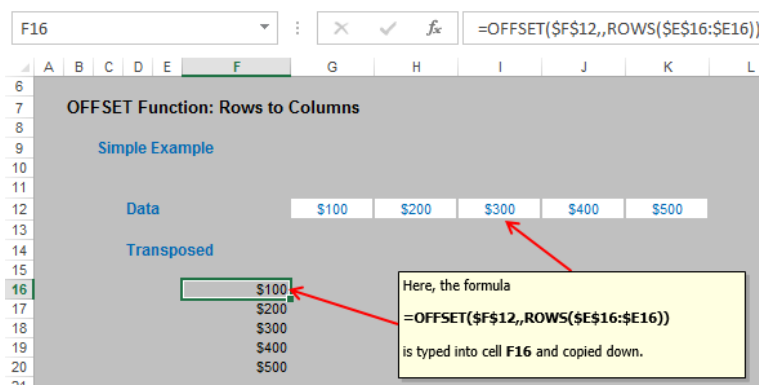
Interestingly, if you insert columns between **G** and **K** in the illustration above, this is possible, but the array formulae will not act like other Excel calculations: cell references in the **TRANSPOSE** formulae will not update (so the references will always link to what is in cells **G12:K12** in our

example). However, if you insert columns before column **G**, the formula will update. This can be confusing.

Therefore, **TRANSPOSE** is useful where you wish to protect the destination range's structure, but it can be seen as inflexible and inefficient, particularly with larger Excel files, slowing calculation times down unnecessarily.

Method 4: OFFSET Approach

Used with the **ROWS** function (which simply counts the number of rows in a specified range), transpositions may be performed quickly and effectively using **OFFSET**:



In this example, the following formula has been typed into cell **F16**:

=OFFSET(\$F\$12,,ROWS(\$E\$16:\$E16))

As the formula is copied down, the number increases in the **columns** argument of **OFFSET**, as the number of rows increases. This is a neat trick for transposing without using array formulae and can be seen as a good “general” solution, being quite flexible. The disadvantages here are twofold:

- Often modellers make mistakes in the absolute and semi-absolute references required to make this formula calculate correctly. This is easily overcome with practice; *and*
- The formula can look unnecessarily complex to the inexperienced or uninitiated. There are many end users (and modellers for that matter) unfamiliar with the **OFFSET** function in particular. It may be worthwhile to educate them accordingly.

Returning to the Example

It is this last method I have employed in our depreciation example:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Year 1	100	25	25	25	-	-	
Year 2	200	50	50	50	50	-	
Year 3	300	-	75	75	75	75	
Year 4	400	-	-	100	100	100	
Year 5	500	-	-	-	125	125	
Year 6	600	-	-	-	-	150	
Depreciation Charge		25	75	150	250	350	450

The formula in cell **H30** (highlighted) is

=OFFSET(BC_Capex,,SE30)

BC_Capex is cell **I21**. The prefix “**BC**” in this range name stands for “Base Cell” and is used to acknowledge the fact that **OFFSET** is non-auditable, as explained last time. This cell is styled speckled blue to emphasise that this cell must deliberately remain blank and not be deleted. I use this “Empty Cell” style regularly in modelling.

The reference **SE30** points to the label “Year 1” which is actually the number 1 formatted to look like text. This dispenses with the need to use the **ROWS** function explained earlier.

Now that I have successfully transposed the assumptions, I can calculate the depreciation grid:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Year 1	100	25	25	25	-	-	
Year 2	200	50	50	50	50	-	
Year 3	300	-	75	75	75	75	
Year 4	400	-	-	100	100	100	
Year 5	500	-	-	-	125	125	
Year 6	600	-	-	-	-	150	
Depreciation Charge		25	75	150	250	350	450

Assuming depreciation is to be calculated on a straight-line basis (i.e. the capital expenditure is apportioned equally across all periods it will provide economic benefit), the depreciation may be calculated across the grid using the formula in cell **J30**:

=IF(J\$28>=\$E30,MIN(\$H30-SUM(\$I30:I30),\$H30*Depn_Rate),)

The **IF** statement checks that depreciation does not commence before the capital expenditure has occurred. The **MIN** function takes a proportion of the capital expenditure but ensures that the cumulative total (“accumulated depreciation”) does not exceed the amount spent.

It is a simple method, recognised by many financial analysts and accountants. The main problem with this method concerns how many calculations are required in the grid. For example, if you built a 20-year monthly model, you would need 240 rows by 240 columns in the grid – a total of 57,600 calculations!

This is where **OFFSET** can come to the rescue...

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Depreciation Counter	1	2	3	4	4	4
Capital Expenditure	100	200	300	400	500	600
Annual Depreciation	25	50	75	100	125	150
Depreciation Charge	25	75	150	250	350	450

In this example, row 44 contains the formula `=MIN(J42,Economic_Life)` which restricts the period counter to not exceed the **Economic_Life** (here, four years). With row 48 calculating each period's representative depreciation, the total depreciation charge in row 50 becomes trivial. For example, the formula in cell **J50** is:

`=SUM(OFFSET(J$48,,,,-J44))`

This formula simply refers to the corresponding periodic charge in row 48 and then sums a range of cells of width the negative value given in row 44. This means that:

- In Period 1, depreciation is simply given by cell **J48**
- In Period 2, the depreciation is the sum of the first two charges in row 48 (namely, cells **J48:K48**)
- In Period 3, the depreciation is the sum of the first three charges in row 48 (namely, cells **J48:L48**)
- In Period 4, the depreciation is the sum of the first four charges in row 48 (namely, cells **J48:M48**)
- In Period 5, the depreciation is the sum of the last four charges in row 48 (namely, cells **K48:N48**). Note that the first period is now excluded (the width is -4) as the first period's capital expenditure is now fully depreciated.

A simple comparison of the two approaches to depreciation will determine that the two methods give the same result. The **OFFSET** approach may not be as transparent upon first glance, but it does reduce the number of formulae required.

We recommend if you are not familiar with **OFFSET** you should do the same. Play with the function for a while until you trust it and realise how useful it can be in your spreadsheets going forward.

When we model depreciation in reality, we usually model the first asset class both ways so that end users may see they give the same result. After that, we'll adopt the **OFFSET** approach exclusively as end users now "trust" this less familiar approach.

You can find an example file to play with on our website [here](#).

Visual Basics

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

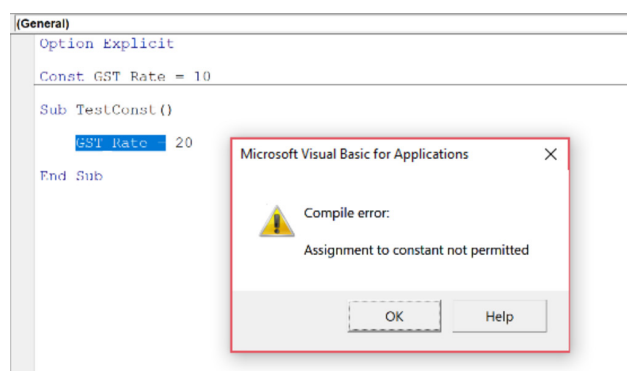
execution. By declaring constants, they can easy to access without hardcoding the information more than once and make code much more readable and facilitate error checking.

It is highly recommended any values that are passed into formulae, subroutines and / or functions are variables. However, what if the value of that variable does not change? There is a way to make it immutable by declaring it as a constant. This means that it cannot be changed during

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

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

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



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

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

```
(General)
Option Explicit

Const TheAnswerToEverything As Integer = 42
```

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

```
(General)
Option Explicit

Const RankOfHumans As Long = 3, RankOfDolphins As Integer = 2, RankOfMice As String = "One"
```

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

More next month.

Power Pivot Principles

We continue our series on the Excel COM add-in, Power Pivot. This month, we consider relationships (in Power Pivot) and how we may create them.

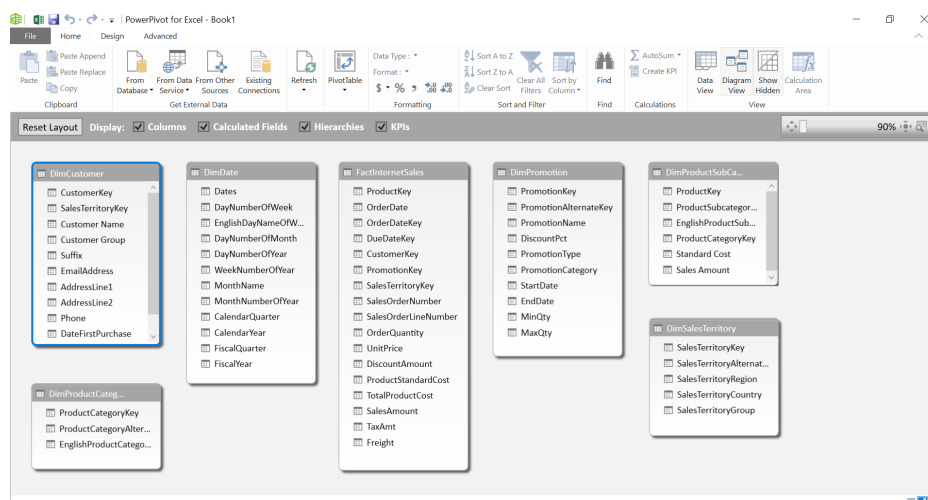
A relationship is a connection between two tables of data, based on one or more columns in each table. Why do we need relationships? As discussed previously, Power Pivot allows you to take multiple sources of data and combine the data tables together into one interrelated database known as a relational database. Once we have imported our

tables of data into Power Pivot, you may need to create a relationship between these tables of data. This will enable you to filter data in one table by columns of data from related tables, which will enable a broader analysis of the data. However, it should be noted for tables to connect they must contain columns with matching values.

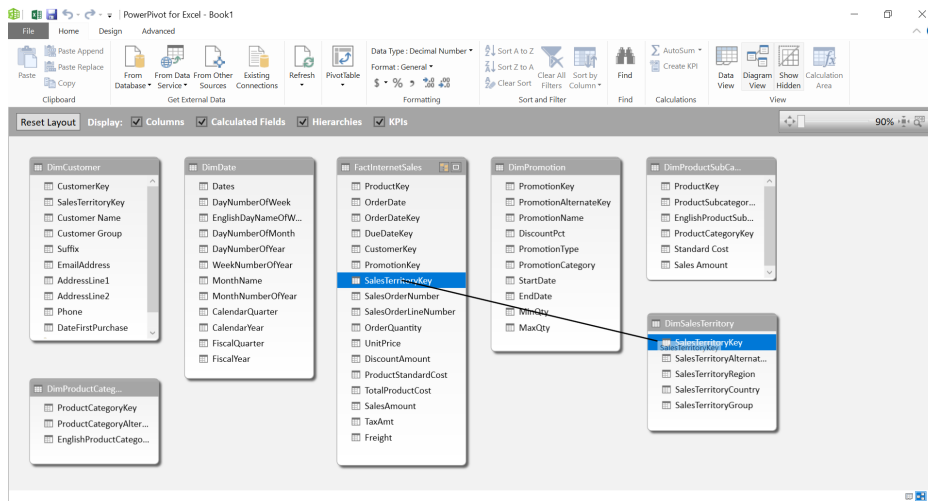
Let's run through how to create relationships with two examples.

Diagram View

The Diagram View provides a visual diagram layout of the data tables which enables us to easily identify relationships between our data. To see this, select the 'Diagram View' on the 'Home' tab of the Power Pivot window. This will bring up a list of all the tables that are incorporated in the model:

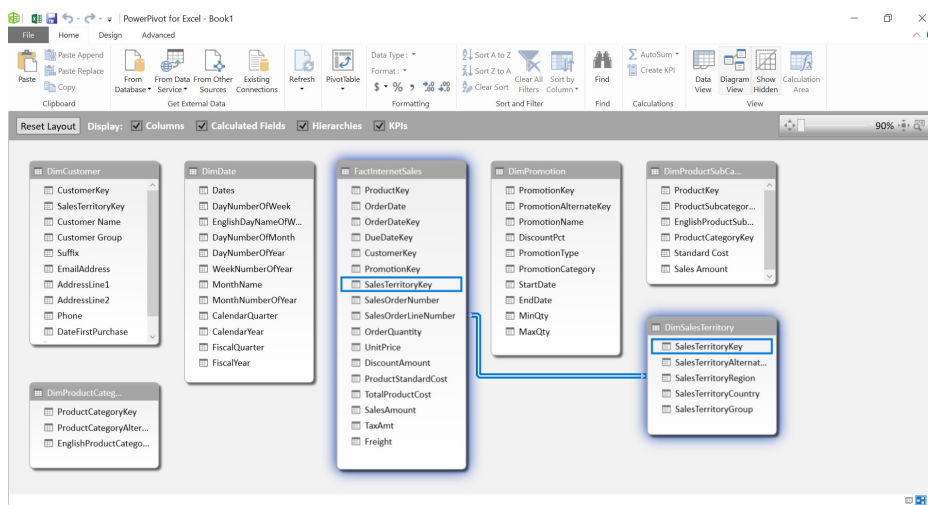


Here, we can see there is an obvious match: 'Sales Territory Key' is shown in both the 'FactInternetSales' table and the 'DimSalesTerritory' table so let's join these columns together.



Click on the 'Sales Territory Key' in the 'FactInternetSales' table and drag it down to the 'Sales Territory Key' in the 'DimSalesTerritory' table. That was easy (in other software, you have to specify both the direction and the type of linkage, not so here). This will now create a connection

between these two tables based on the columns of data that we have selected. Clicking on the line connecting the tables will highlight the columns of data creating the link.



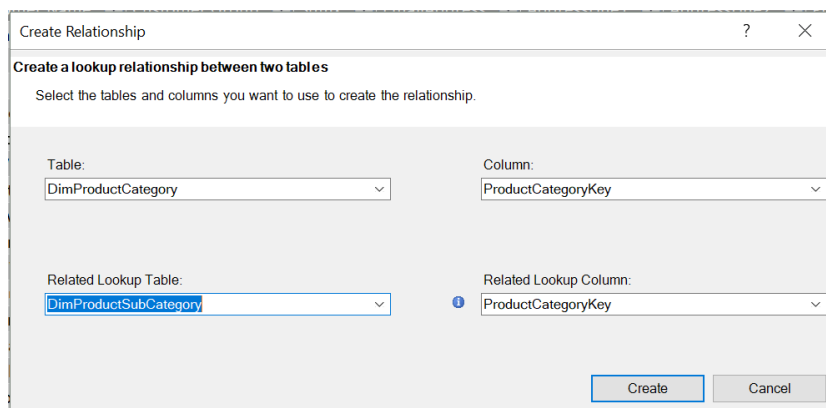
Links are allowed on a "one to one" and "many to one" basis presently in Power Pivot.

Design option

Another way to create relationships in Power Pivot is through the 'Design' option on the 'Relationships' group tab of the Power Pivot window:



Select 'Create Relationships'. The following dialog box will appear:



We want to connect the 'DimProductCategory' and the 'DimProductSubCategory' tables together using the common column 'ProductCategoryKey':

- Under the 'Table' drop-down box, select the table 'DimProductCategory'
- Under the 'Column' drop-down box, select the column 'ProductCategoryKey'
- Under the 'Related Lookup Table' drop-down box, select the table 'DimProductSubCategory'
- Under the 'Related Lookup Column' drop-down box, select the table 'ProductCategoryKey'
- Select 'Create' to link these tables together.

We can now go through the rest of the dataset and create relationships between the tables. Have fun practising!

We'll continue next month. Stay tuned for our next post on Power Pivot. In the meantime, please remember we have training in Power Pivot which you can find out more about at www.sumproduct.com/courses/power-pivot-power-query-and-power-bi.

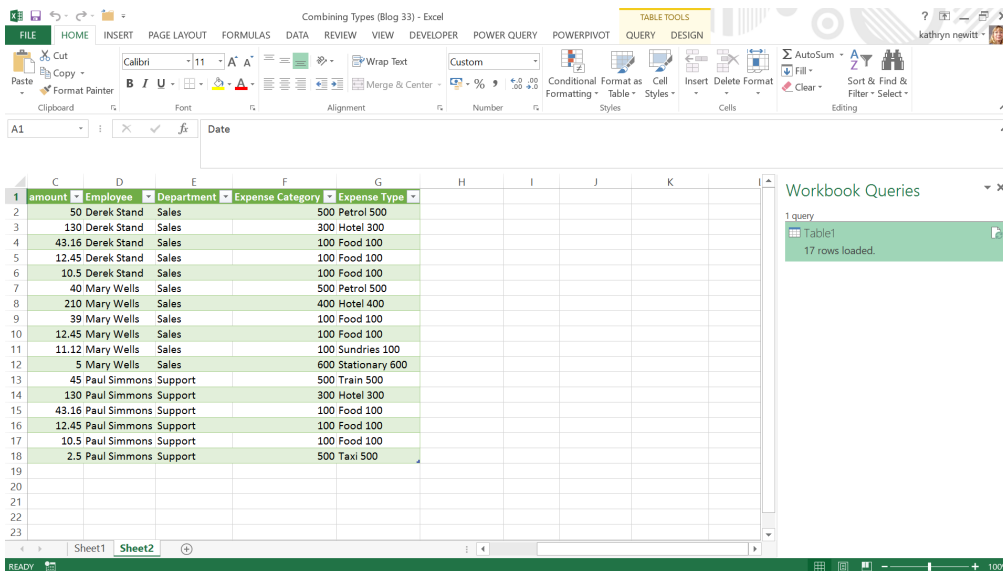
Power Query Pointers

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 the equivalent of Excel's LEN function.

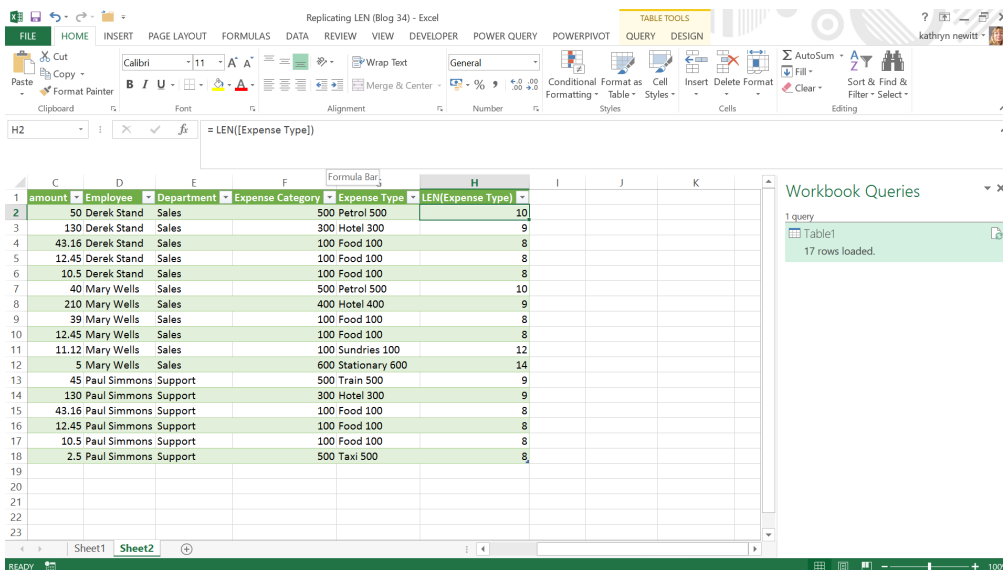
Previously, we have looked at how to replicate some commonly used Excel functions. Readers will recall that it does not always work in the same way as Excel. The M code behind Power Query uses different functions, which can be annoying when you are used to using familiar Excel functions. This month, we are going to look at another useful Excel function, namely LEN():

LEN(text) returns the number of characters in a text string.

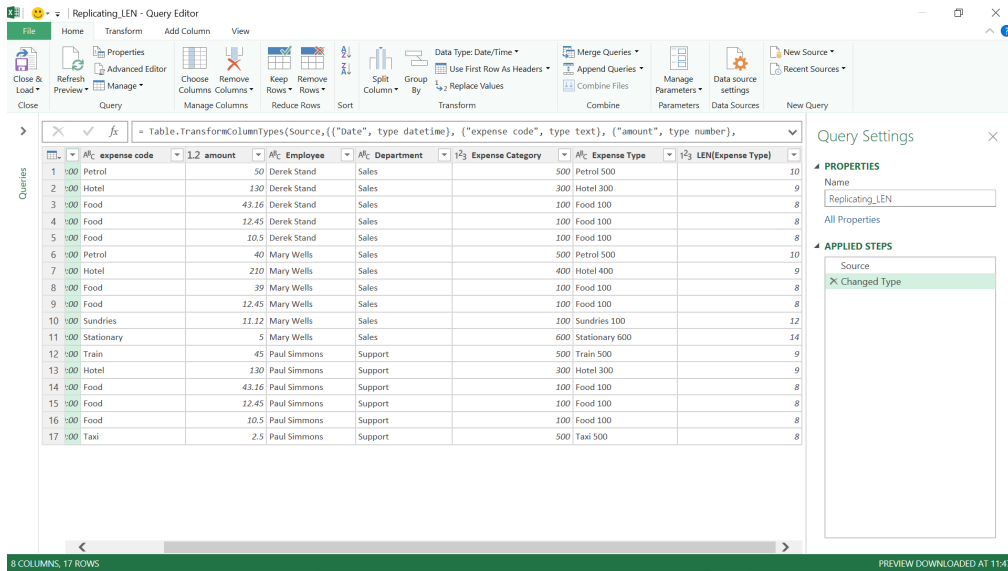
To demonstrate, let's have some example where we must determine how many characters there are in the Expense Type column below:



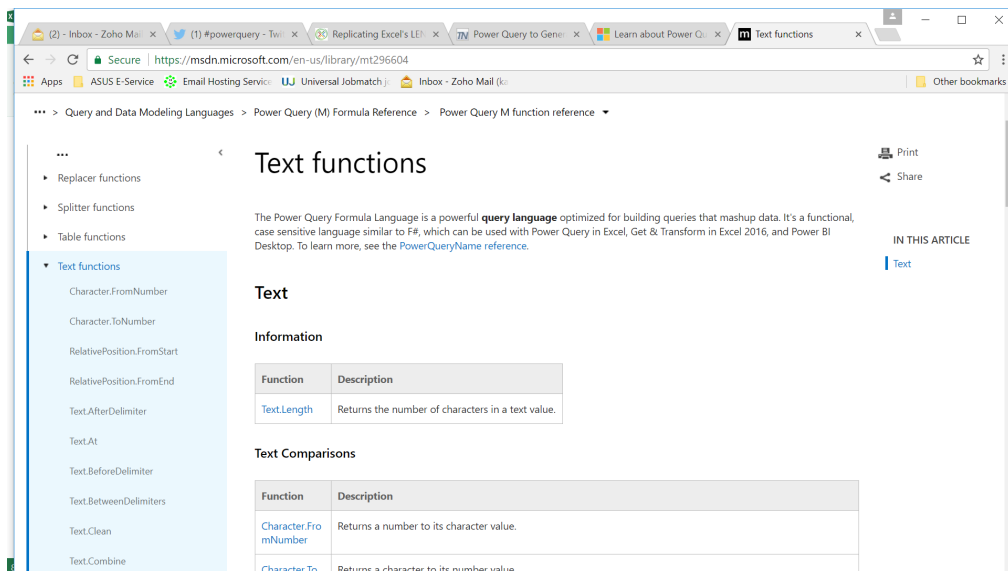
Let's use the Excel function first to show that the Power Query calculation will return the same value.



Now we have this calculated column, let's try this again in Power Query. In the 'POWER QUERY' tab, select the 'From Table/Range' option in the 'Excel' section and load the data into the Power Query Editor:



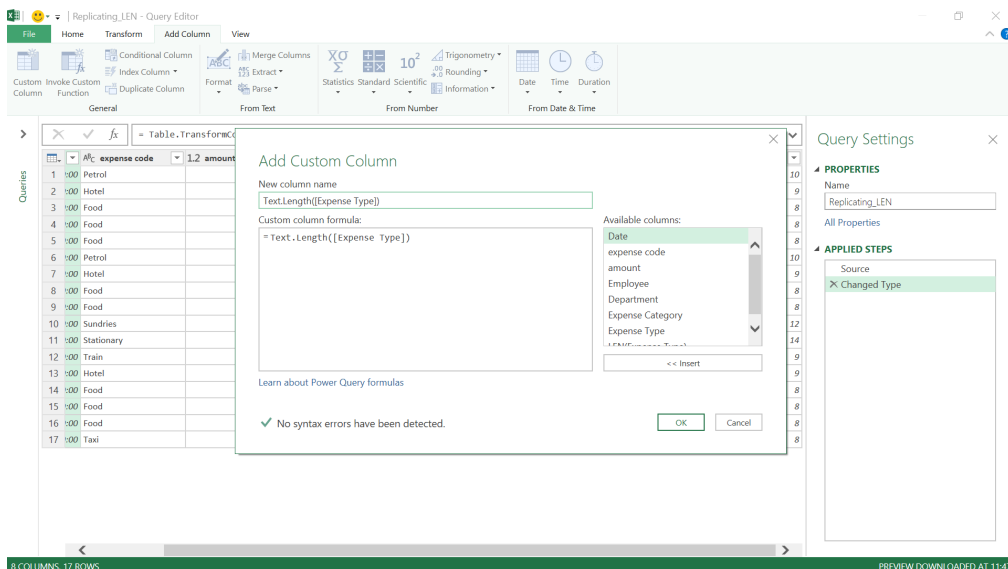
The next step is to find a text function that will do a similar job to LEN(). In the Power Query formula pages, we can find the following:



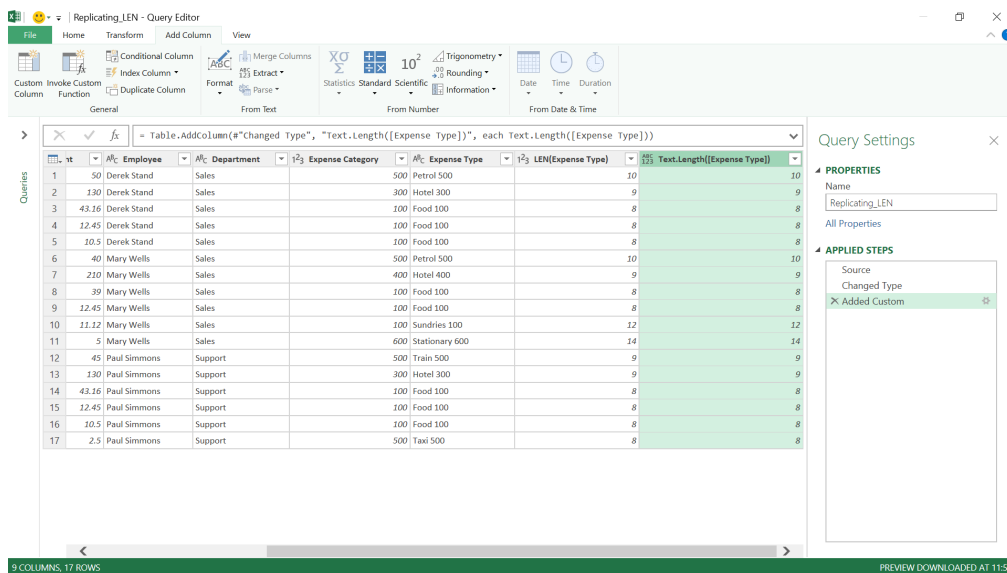
The very first function appears to do exactly what I want –

Text.Length: Returns the number of characters in a text value

In the 'Add Column' tab, choose to create a 'Custom Column':



Now when we click 'OK', we can compare the two columns:



The calculations match. This means that when we need to include a text length on a large data set, we can find it in Power Query which is quicker and more convenient if we plan to use it in further calculations in Power Query, or simply on large amounts of data.

More next month!

Latest Updates for Power BI Desktop

The update onslaught continues unabated. Microsoft continues to be highly active in adding new features and improvements to Power BI Desktop. The full list of updates for June are as follows:

Reporting

- Visual level filters for slicers
- Sorting for the 'Performance Analyzer' pane
- Conditional formatting updates for formatting options
 - o Visual background and title colours
 - o Card colours
 - o Gauge fill
- Visual header tooltips
- Table and matrix total label customisation

Analytics

- Key influencers visual updates (Preview)
 - o Key Influencers with Live Connect to Power BI datasets
 - o Key Influencers accessibility
 - o Support for Cloud RLS
- Manage aggregations dialog accessibility (Preview)

Modelling

- New DAX comparison operator: ==

Visualisation

- Personalised Visualization pane (Preview)

Data Connectivity

- Connect to shared and certified datasets (Preview)
- Common Data Service connector is now Generally Available
- Enhancements to the Cosmos DB connector

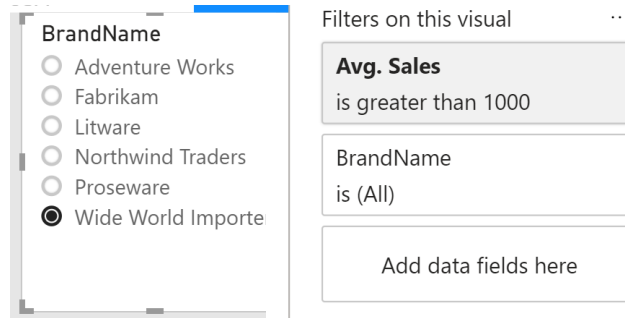
Other

- Updated pane design.

Let's go through each new feature in turn.

Visual level filters for slicers

This update allows you to finally add a visual level filter to slicers. It works just like any other visual level filter. It will just filter the slicer itself and no other visuals. This can be useful for filtering out blanks or if you want to use measure filters.

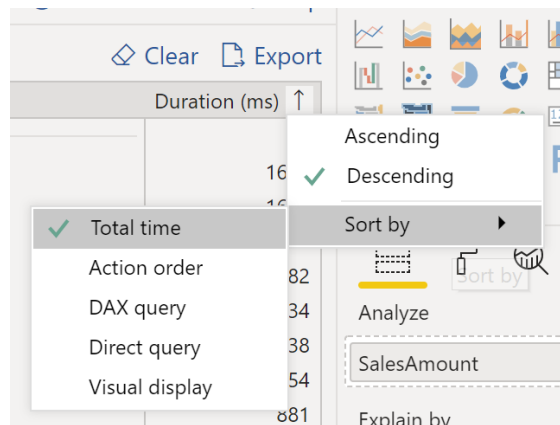


The filter that the slicer applies to other visuals doesn't change – it's still just the selection made of the value in the slicer. In the example above, Power BI doesn't also wrap the 'Avg. Sales > 1000' filter into the filter applied to other visuals.

Sorting for the 'Performance Analyzer' pane

There is a small update for the new 'Performance Analyzer' pane. You can now change the sort direct and pick to sort between:

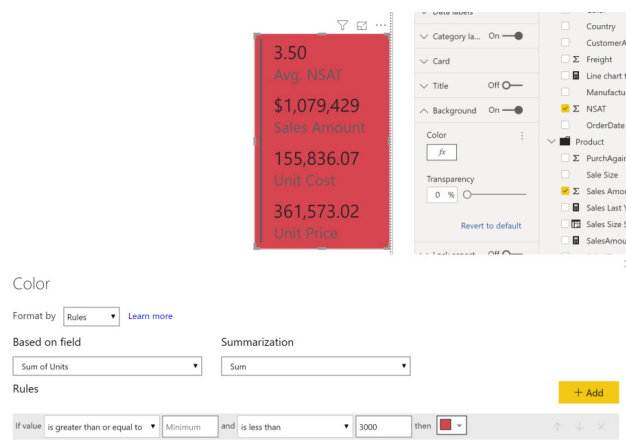
- Total time spent
- Order the actions occurred
- Time spent for the DAX query
- Time spent querying the source (for Direct Query)
- Time spent displaying the visual.



Conditional formatting updates for formatting options

VISUAL BACKGROUND AND TITLE COLOURS

Power BI Desktop is extending its conditional formatting option to formatting features this month. First, support has been added for conditionally formatting the visual's background and both the visual title's font colour and background colour.



CARD COLOURS

Secondly, for the card visual, you can now also conditionally format the data label and category label colours.

Brand Name

- Adventure Works
- Fabrikam
- Litware
- Northwind Traders
- Proseware
- Wide World Importers

12K
Units

Brand Name

- Adventure Works
- Fabrikam
- Litware
- Northwind Traders
- Proseware
- Wide World Importers

9,779
Units

GAUGE FILL

Lastly, you can conditionally format the fill color of the gauge. With all these updates, you now have greater flexibility when formatting your visuals. In addition, there are plans in the pipeline to add more expression-bound formatting options in the coming updates as well.

BrandName

- Adventure Works
- Fabrikam
- Litware
- Northwind Traders
- Proseware
- Wide World Importers

Units

8,214

1K 16

Search

∨ Gauge axis

∧ Data colors

Fill

Target

Revert to default

∨ Data labels On

∨ Target On

∨ Callout Value On

∨ Title On

Visual header tooltips

Microsoft has noticed that users frequently add helpful information for their end users to reports, such as hints on how to interact with the report or descriptions of the fields used in the visual. Setting that up does take a fair amount of work, so they have now added a way to add a ToolTip directly to the visual's header.


This option is switched off by default, but you can turn it on through the 'Visual header tooltip icon' toggle in the 'Visual header' card of the Formatting pane. This is the one toggle within the card that affects whether the icon shows in edit mode, as well as reading mode.

Visual header tooltip icon

Select to show the visual header tooltip icon

Visual header tooltip icon

Off

Once the toggle is on, you'll see a question mark icon in the visual's header, , and you'll see a new Formatting card in the pane called 'Visual header tooltip'. In this card, you can add the text to show in the ToolTip and the formatting of the ToolTip. Alternatively, you may pick a Report page ToolTip instead if you need more customisation.

^ Visual header tooltip

Report page

Tooltip text

Color

Text size

Font family

Background color

Transparency

[Revert to default](#)

Once you've added ToolTip text or selected a Report page ToolTip, you'll see it on hover over the question mark icon.

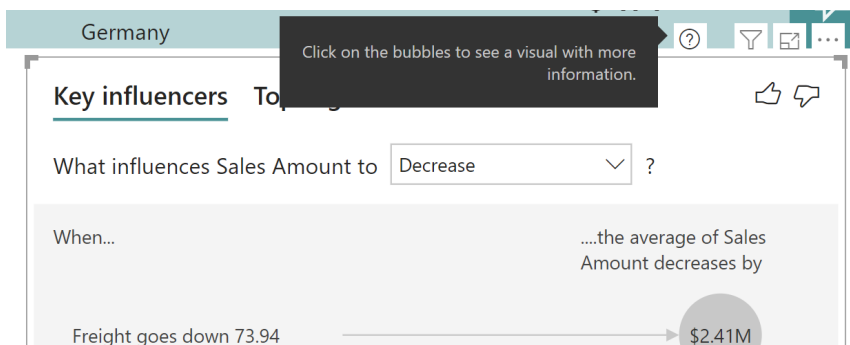


Table & matrix total label customisation

Many users have asked for the option to allow the total label for table and matrix to be customised. Microsoft has duly obliged. Now, you have the option to change the label under the Subtotals card for both columns and rows.

^ Subtotals

Row subtotals

Row subtotals label

Column subtotals

Column subtotals label

You can also customise the label for each subtotal field when stepped layout is off.



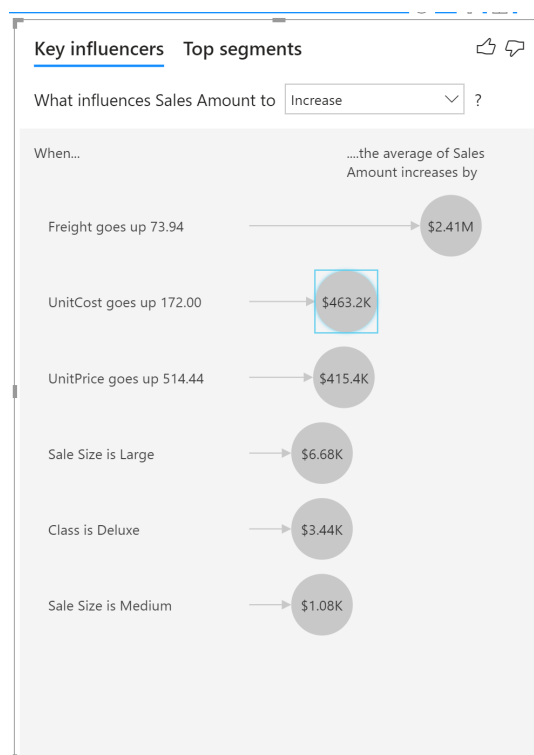
Key influencers visual updates (Preview)

KEY INFLUENCERS WITH LIVE CONNECT TO POWER BI DATASETS

There is now added support for the Key Influencers Preview visual when you are Live Connected to Power BI datasets in the Power BI Service. When using a report that Live Connected to a Power BI dataset, the visual should now be enabled and work just like it does for imported models.

KEY INFLUENCERS ACCESSIBILITY

There's also added support for the accessibility feature. You can now navigate the visual using just a keyboard, utilising a screen reader to read off the information from the visual, and turn on high contrast mode and see the visual updated appropriately.



Some specific keyboard shortcuts include:

- **CTRL + Right Arrow** to move focus inside the visual
- **ENTER / SPACE** to select whichever bubble is in focus
- When a bubble is selected, focus moves to the drill visual, and **ESC** will close it.

SUPPORT FOR CLOUD RLS

When viewing a report in different RLS roles, you can now use the key influencers visual and see the types of insights your consumers will get when viewing the report with the proper security applied.

Manage aggregations dialog accessibility (Preview)

The Manage Aggregations dialog, which is part of Microsoft's aggregations Preview, is now accessible. You can use a keyboard to navigate around the dialog along with a screen reader to read off information about what's in focus. High contrast modes are also supported.

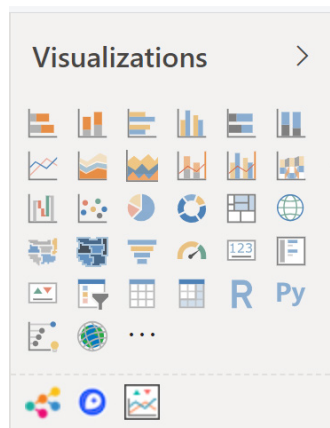
New DAX comparison operator: ==

There's a useful DAX update with the addition of a new comparison operator, ==. This operator is similar to the existing = operator, except that it performs strict comparison to BLANK values (rather than treat zeroes similarly). Think of it as an "if and only if is equal to" operator.

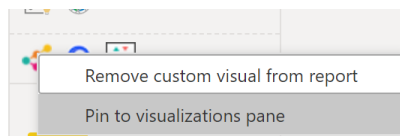
Personalised Visualization pane (Preview)

With this month's update, Microsoft has tweaked the Visualization section of the pane to allow for personalisation. With the personalised Visualization pane Preview turned on, you can now pin any marketplace visual to your pane and have it show up automatically for you every time you open any report.

Any marketplace visuals you add to your report now show up below a dashed line.:

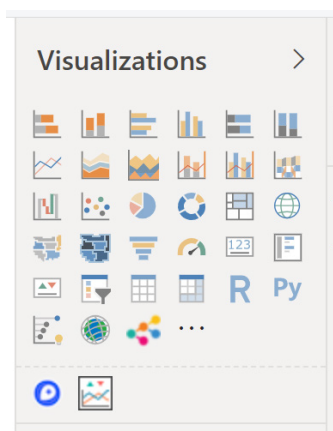


If you plan on using any of these visuals across multiple reports, you can right-click on the visual to pin it to the pane:



Once a visual has been pinned, it moves up to live with the other built-in visuals. This visual is now also tied to your signed in account, so any new reports you built will automatically have this visual included, assuming you

are signed in. This makes it very easy to standardise on a particular visual from the marketplace without needing to add it to every single report. That used to be very frustrating!

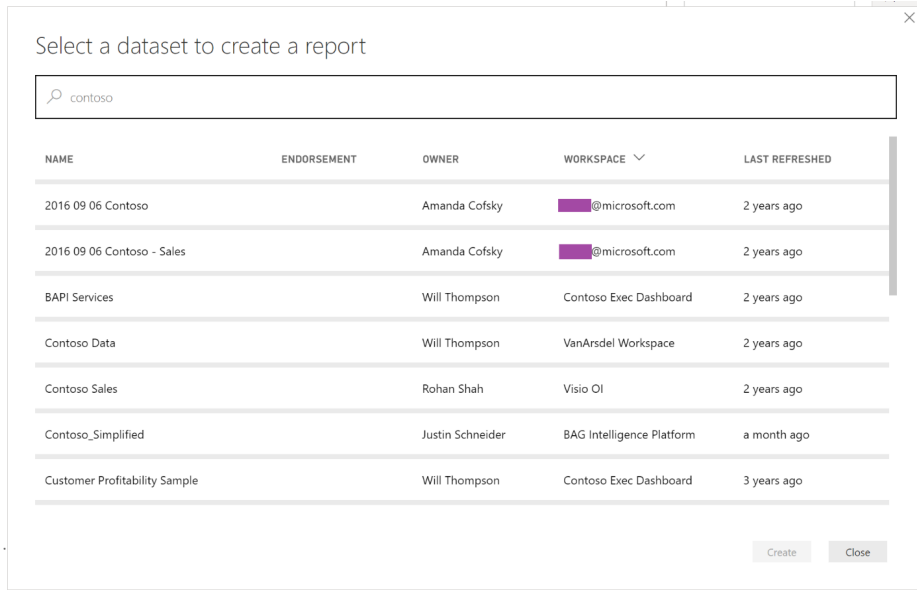


Connect to shared and certified datasets (Preview)

As you work to build a data culture where organisations leverage insights every day at all levels, a key part of that is ensuring availability of standard, authoritative datasets that represent a single source of truth. This allows users to make decisions on trusted data and provides visibility and control of governance. To enable this with Power BI, Microsoft is previewing shared and certified datasets.

With Shared Datasets in Power BI, you are allowing a single dataset to be used by multiple reports, even across workspaces. You can either build new reports based on datasets in different workspaces or you can copy existing reports across workspaces. With Certified Datasets, organisations now have a mechanism to distinguish the most valued and trusted datasets. Certified datasets show up prominently so users can easily find these authoritative data sources.

In Power BI Desktop specifically, you can connect to shared and certified datasets directly. Microsoft has provided the option with this update that when you connect to Power BI datasets you can now sort on name, endorsement, owner, workspace or last refresh time. You can also search in the dialog too.



Common Data Service connector is now Generally Available

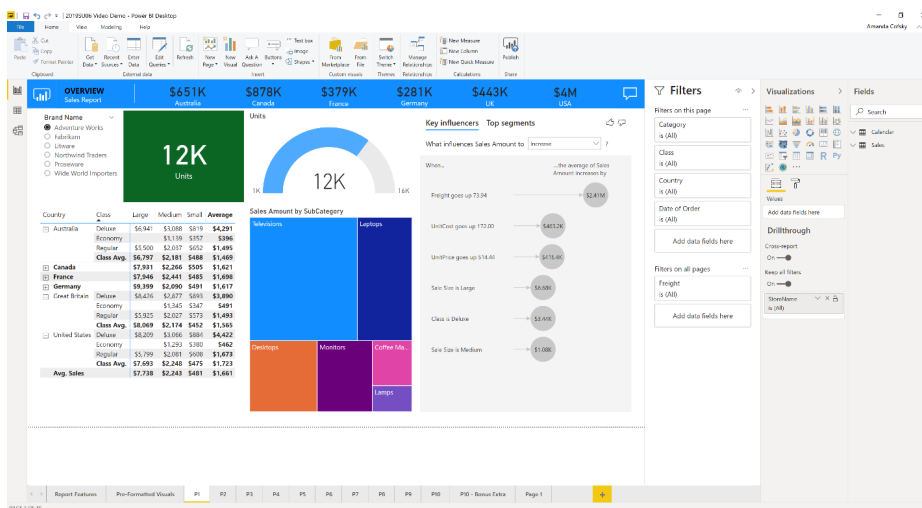
That's right – not much more to say.

Enhancements to the Cosmos DB connector

Ditto, kiddo.

Updated pane design

Microsoft has refreshed much of the pane interface. They have updated all of the panes, the footer, and view switcher to be a lighter color, updated spacing, and created new icons. Microsoft states that their new look is “much more modern and is the first step and refreshing the entire interface”. We'll wait and see.



That's it until the August newsletter.

Latest Power BI Report Server updates

This latest release has many reporting features, including conditional formatting for titles and other visual objects, the 'Performance Analyzer' pane and accessibility support for visuals. The new Modeling (*sic*) view is also featured in this release.

Here's the complete list:

Reporting

- Cross-highlight on a single point in line charts
- Word wrap on titles
- Update default visual interaction to cross-filter
- Rounded corners for visual borders
- Single select slicer
- Heat map support for Bing maps
- Cross-highlight by axis labels
- Default ToolTip formatting
- Static web URL support for buttons, shapes and images
- Page alignment options
- Selection pane improvements
- Formatting updates for maps
 - Adjust map points to a smaller size
 - Ability to add zoom buttons
- Accessible visual interaction
- Conditional formatting for visual titles
- Conditional formatting for web URL actions for buttons, shapes and images
- 'Performance Analyzer' pane
- Table and matrix keyboard navigation
- Line data label position control
- KPI visual Indicator text size control

Analytics

- Show dates as a hierarchy now Generally Available

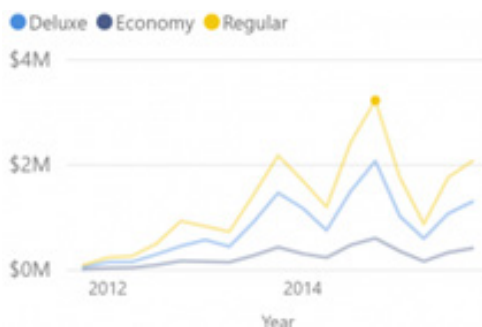
Modelling

- New Modeling view Generally Available
- New DAX functions
- Update to the ALLSELECTED DAX function
- Disable auto-date tables for new reports.

Let's go through them.

Cross-highlight on a single point in line charts

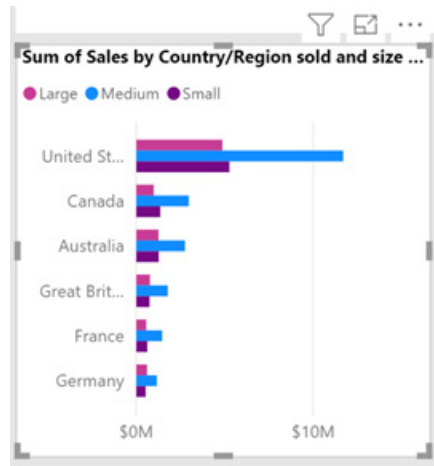
You can now cross-highlight on a single point in a line chart to filter not only on the category but also the individual date. When you click on the point, that individual point will show a marker indicating which point is the source of highlighting. If your visual is very dense, it will select the closest point to your click to use as the source.



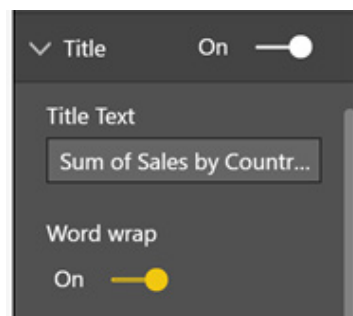
With this change, the line chart now behaves exactly the same as a stacked column chart in terms of interactivity. You can continue to use the legend when you filter just on the categorical value.

Word wrap on titles

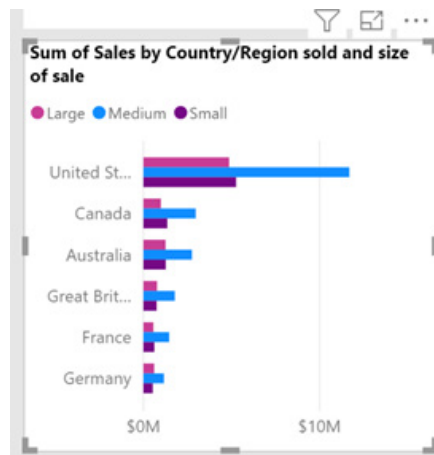
There's a new formatting option for visual titles this release: word wrap. For example, if you have titles that are currently being truncated,



you can now turn on the word wrap option in the Title card



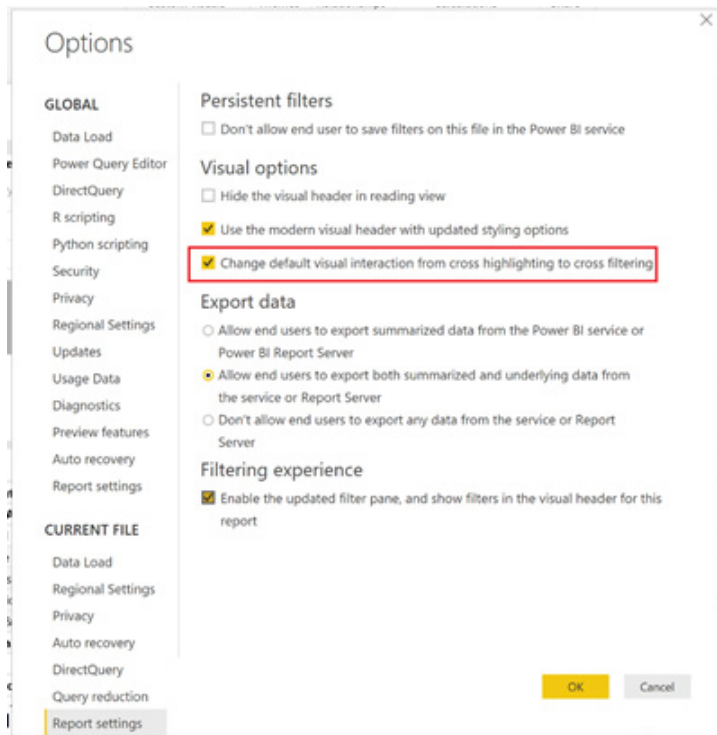
and your title will now show on two or more lines:



This doesn't change the labels on the y-axis: widen the chart to make text clearer in this instance.

Update default visual interaction to cross-filter

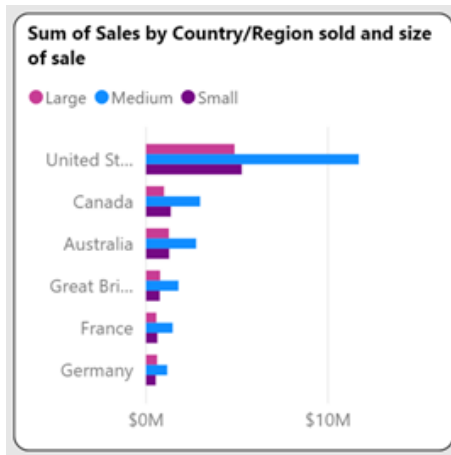
If you want to change all of your visuals to cross-filter each other quickly instead of cross-highlight, you no longer need to manually change all your visuals one by one using the 'Edit visual interactions' feature. Now, all you need to do is go to the Options dialog and check the new option under the current file report settings, namely 'Change default visual interaction from cross highlighting to cross-filtering':



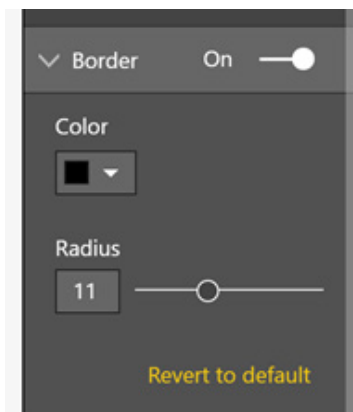
This will make the visual interaction cross-filter by default. You can still manually update visuals if you just require a few to be cross-highlighted instead. This will also not change any visual interactions you have already set manually.

Rounded corners for visual borders

This sounds ridiculous, but this is one of Liam’s favourites. Another new formatting option is the ability to round the corners of your borders. That’s right – little things please little minds!

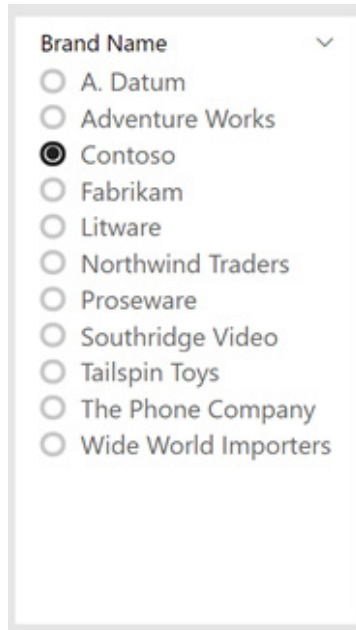


To use this option, go to the Border card in the Formatting pane, and adjust the radius from zero (0) to the desired roundedness (we appreciate this is not exactly obvious!).

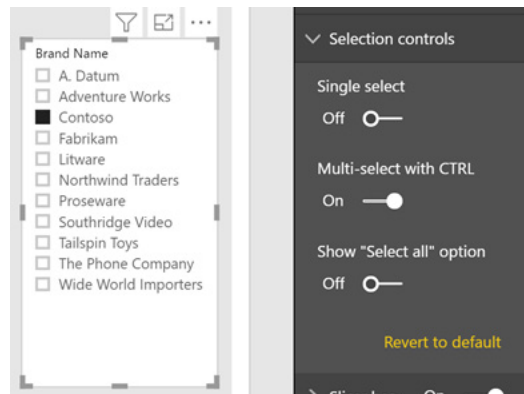


Single select slicer

The single select slicer option has been revamped to support radio buttons and allows one and only one filter selection. Additionally, for drop-down slicers, it closes the drop-down after selection, making the interaction much quicker for end users.

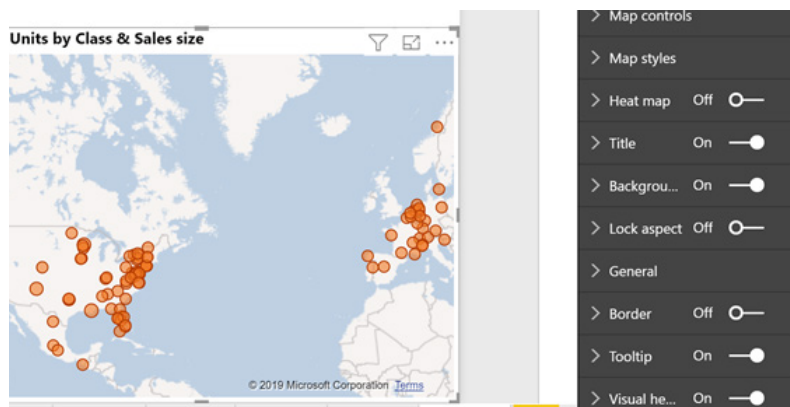


You can still use the previous behaviour, whereby clicking a selection replaces the filter but users may now **CTRL + Click** to multi-select, by turning on the 'Multi-select with CTRL' option instead.

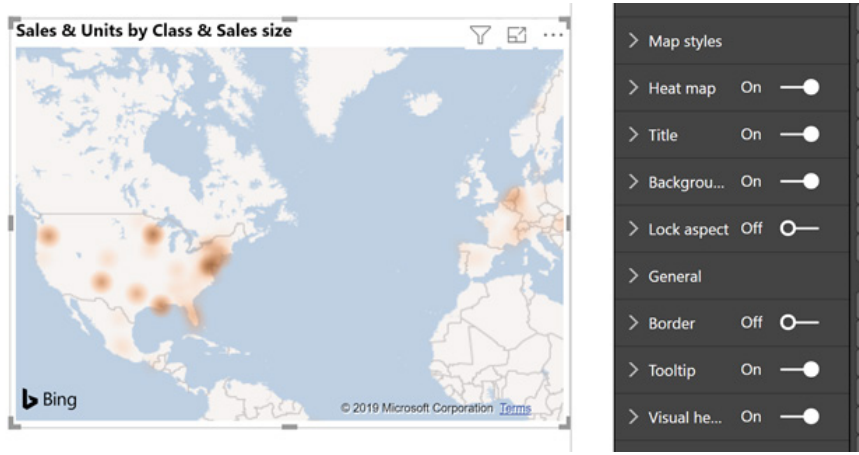


Heat map support for Bing maps

You can now enable a heat map formatting option for the circle Bing map visual. You'll see an option to convert all of the location dots on your map to a heat map layer through the Formatting pane.

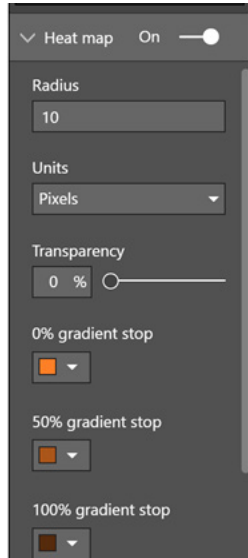


Once that option is turned on, the map will automatically replace all the dots with the heat map layer:



If you don't have anything in the 'Size field well' bucket, the gradient is based on location density (how many dots are in that area). If you also have a measure in the Size bucket, the results are weighted by the measure's value as well.

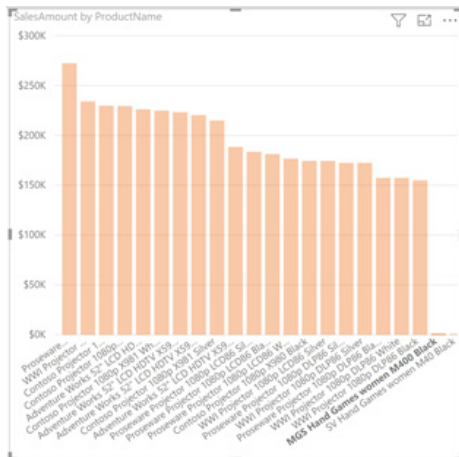
When you open the heat map formatting card, you'll also see a lot of formatting controls. You can set the radius and units for the radius to adjust the layer in addition to the colours used and their transparency.



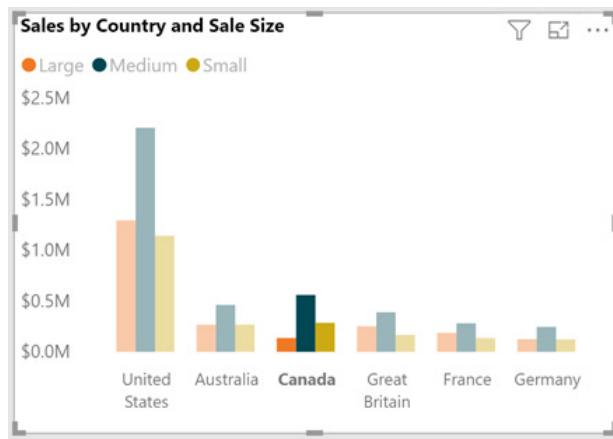
While using the heat map layer, you won't be able to select individual points or see any ToolTips.

Cross-highlight by axis labels

You can now use the axis category labels to cross-highlight, just like the data points in the visual. This is very useful when a category might be very small and hard to click.



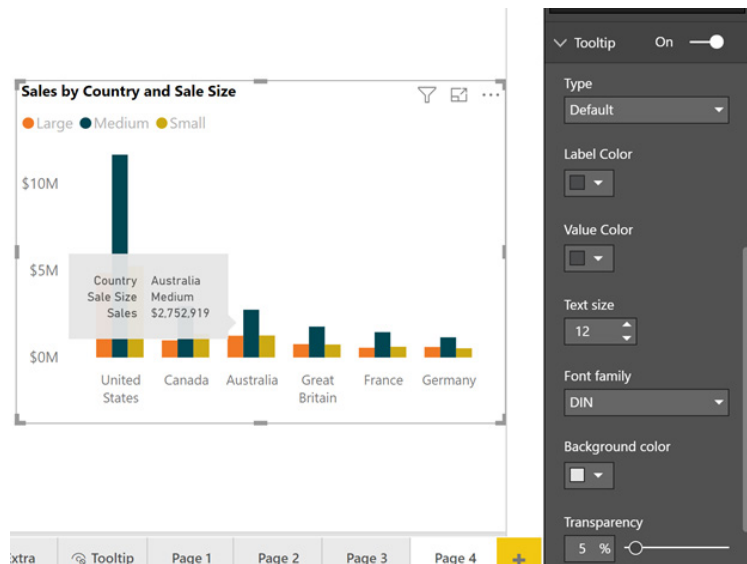
Another use is if a category is broken out by another series in the legend. This lets you select all values with just one click.



When you cross-highlight through the axis labels, the axis label is emboldened.

Default Tooltip formatting

You can now format the default Tooltip for each visual in your report. You can modify the Tooltip colours, fonts and transparency, which you can find in the Tooltip card of the Formatting pane.



To easily set these options across your whole report, you can control them as part of your theme. Here's an example of the JSON for the Tooltip section specifically:

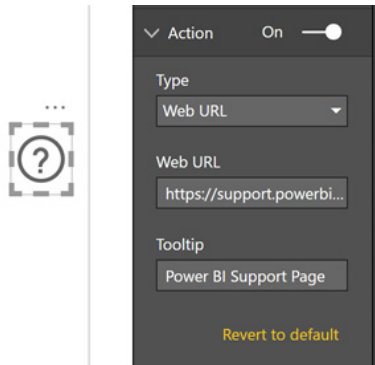
```

"visualStyles":{
  "":{
    "":{
      "visualTooltip": {
        "type": "Default",
        "fontFamily": "Arial",
        "fontSize": 11,
        "valueFontColor": {"solid": {"color": "#583780"}},
        "titleFontColor": {"solid": {"color": "#52898F"}},
        "transparency": 2,
        "background": {"solid": {"color": "#FFE1F0"}}
      }
    }
  }
}

```


Static web URL support for buttons, shapes and images

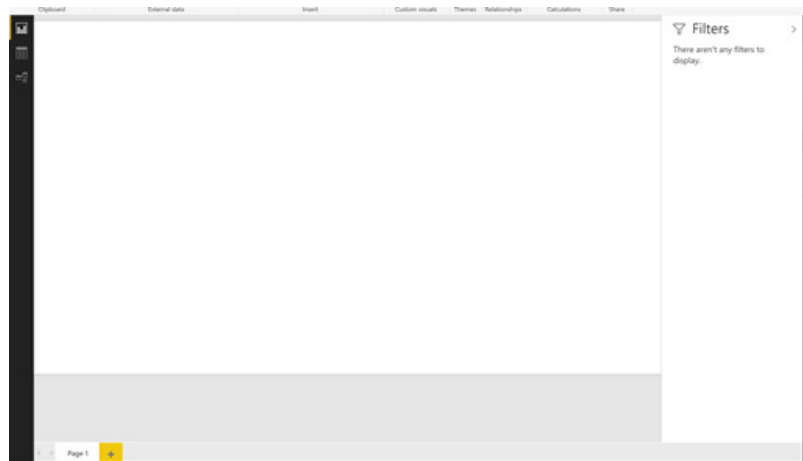
You can now link a specific website through an image, shape or button. You can do this by selecting the 'Web URL' option in the Type dropdown of the Action card of the Formatting pane.



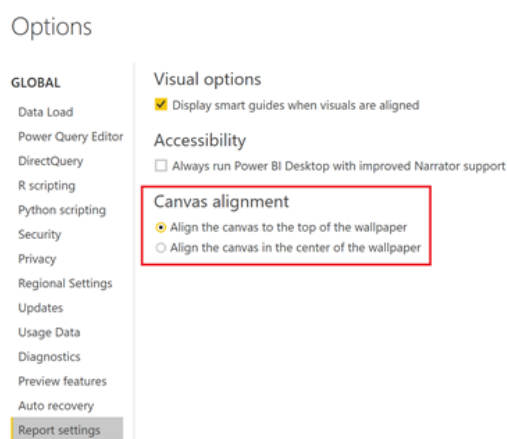
This will automatically take you to the URL when you click on the button (**CTRL + Click** in Edit mode). In the Power BI Service, a new tab will be opened for the site. This URL will need to be a valid URL starting with either <http://> or <https://>.

Page alignment options

You can now choose to align your report pages to the top the view instead of the centre through the 'Global Report' settings.



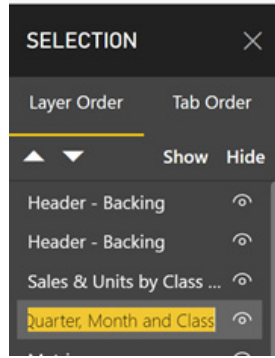
The 'Align the canvas to the top of the wallpaper' option is the default for new reports where users are using new filtering experiences.



Changing the setting will only apply to new reports going forward.

Selection pane improvements

You can now double click an object in the Selection pane to rename the title. If the title is switched off currently, you can still rename it through the Selection pane to make it easier to identify different objects in the list.

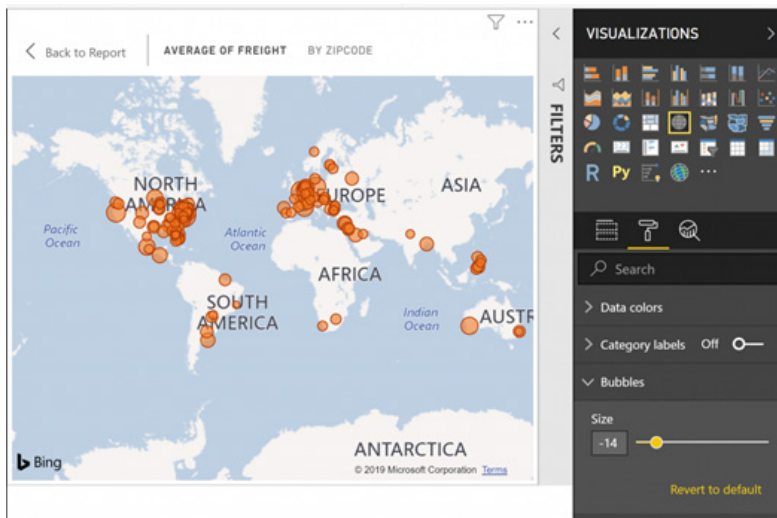


You can also use **SHIFT + Click**, along with **CTRL + Click**, to quickly and easily select many objects in the Selection pane at once, and adjust their visibility all together using the 'Show and Hide' options at the top of the pane.

Formatting updates for maps

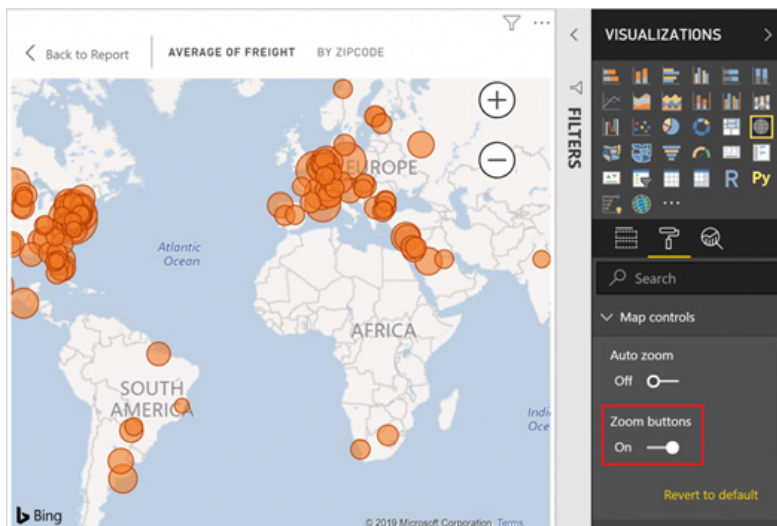
ADJUST MAP POINTS TO A SMALLER SIZE

If the default bubble size is too large for your tastes on the bubble Bing maps, you can now adjust the bubbles to a smaller size. Just slide the Size control under the Bubbles card to the left to reduce the size.



ABILITY TO ADD ZOOM BUTTONS

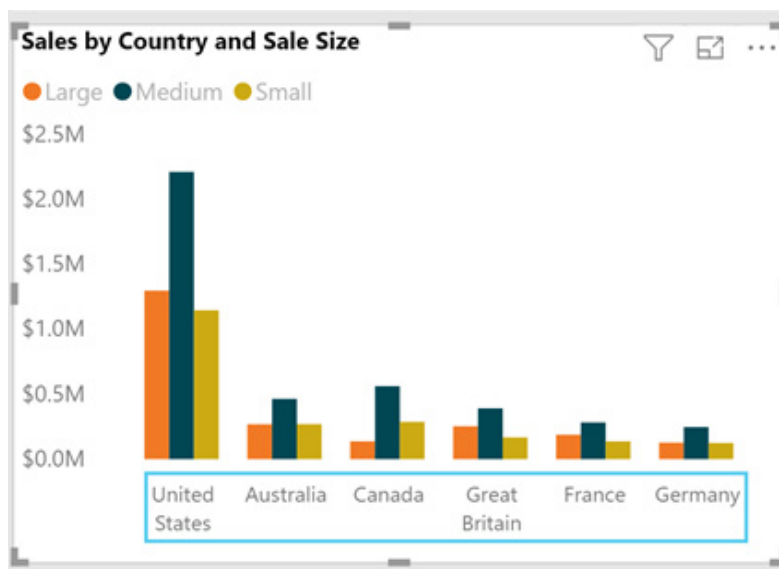
You now can add zoom buttons to your map. Zoom buttons can make it easier to zoom in and out of the map, especially if you don't have a mouse with a scroll wheel on it. You can turn them on through the 'Zoom buttons' toggle under the 'Map controls' card.



Accessible visual interaction

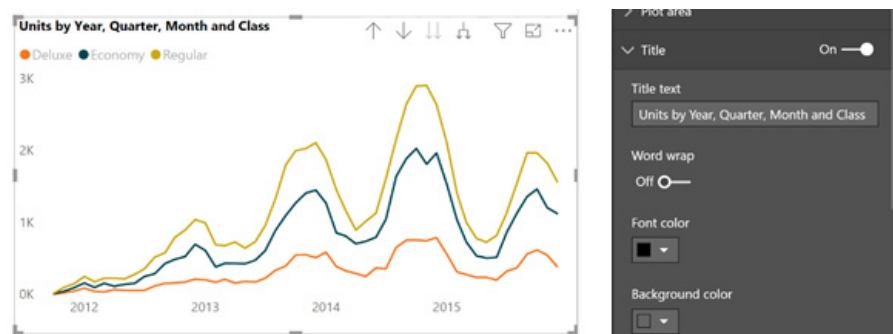
You can now access data points on many of the built-in visuals using keyboard navigation. When a visual is in focus, pressing **CTRL + Right Arrow** will move focus inside the visual. Focus will now cycle between the plot area, categorical axis, and legend (if it exists) using the **TAB** key. Press **ENTER** to select either the plot area or the legend and from there you can use:

- **TAB** or Arrow Keys to navigate between data points or legend items
- **ENTER** or **SPACE** to select and cross-highlight that data point
- **CTRL + ENTER** or **CTRL + SPACE** to cross-highlight multiple data points
- **CTRL + SHIFT + C** to clear all of the selection
- **SHIFT + F10** or the designated key on your keyboard to open the context menu to access options like Insights and Copy.



Conditional formatting for visual titles

Since the initial release of Power BI, end users have been able to customise the titles of their visuals, but they have always been static text (e.g. they will not change formulaically or via the use of conditional formatting).

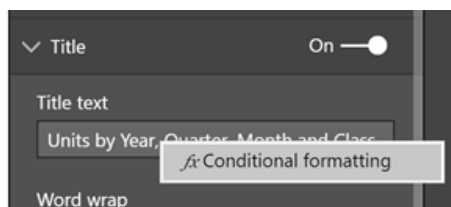


Since Power BI reports are interactive, it makes sense that you may want your titles to be dynamic and reflect the current state of the report. You can now use the conditional formatting dialog to change the text of your report based on a DAX expression in your model.

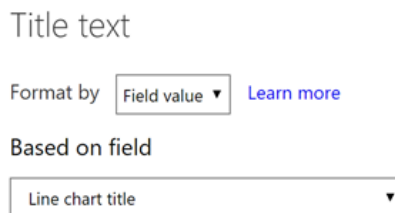
First, you'll need to create a field in your model to use for your title. For example, here's an expression that will change based on the filter context the visual receives for the product Brand name. One thing to note is that this field needs to be formatted as text:

```
1 Line chart title = "Units by Time and Class for " & SELECTEDVALUE(Sales[BrandName])
```

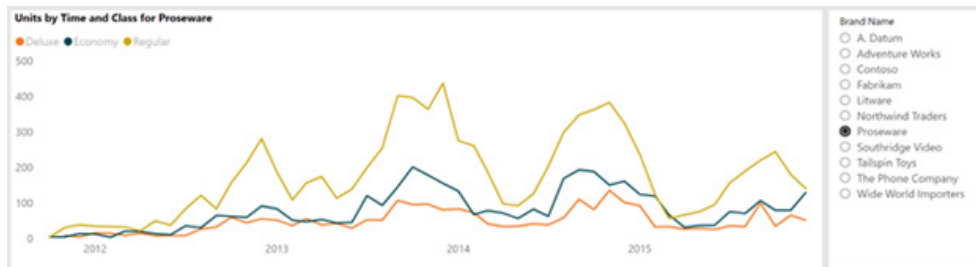
Then, launch the conditional formatting dialog by right-clicking the 'Title text' area in the Property pane card and picking 'Conditional formatting'.



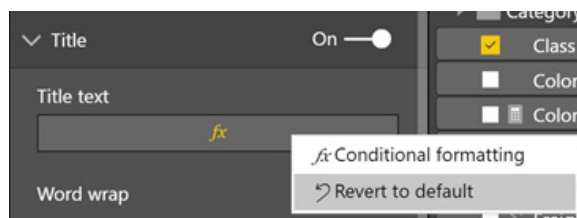
After that, in the dialog, select a text field from your model. This can be a column or a measure.



Now the visual's title will respond to changes in the report.

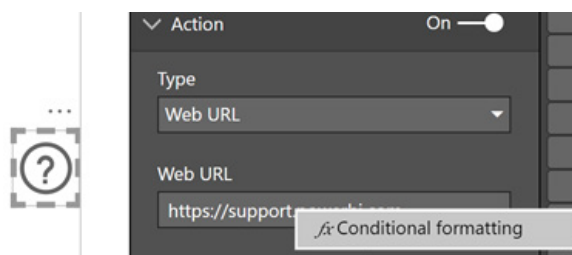


Once such a title is set, you can re-launch the dialog by clicking the **fx** button in the Property pane or revert to the default using the context menu.



Conditional formatting for web URL actions for buttons, shapes and images

You can also use the same expression-bound formatting to make the URLs of your buttons dynamic. It's set up in exactly the same way as titles. This can be very useful if you want users to navigate to other webpages with URL parameters based on their current selection.

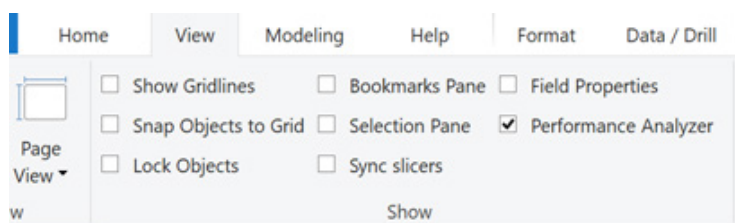


In future releases, Microsoft will be rolling these conditional formatting options out to more properties on more visuals and give end users more ways to set the expression. The goal is that you will be able to use rules, a measure or enter an expression directly in the dialog and use the result to format any property.

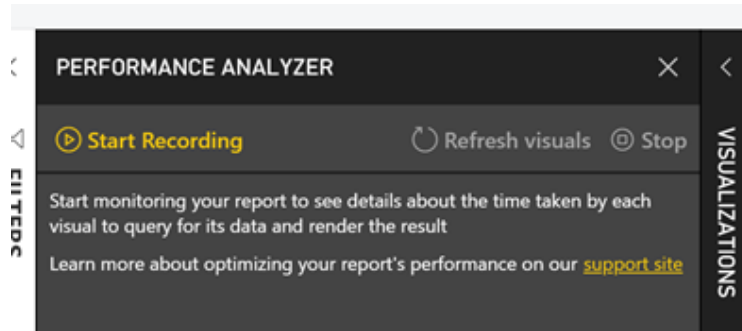
'Performance Analyzer' pane

When a report is running slowly, it can be difficult to know what you can do to optimise performance. To help with this, Microsoft has introduced a new 'Performance Analyzer' pane in Power BI Desktop. As an analyst, you can use this pane to see where the time is being spent.

You can open this pane through the View tab in the Ribbon.



When you first open the pane, you'll see an empty pane, and all you need to do is select 'Start Recording' to see what queries are being run.



Once you start recording, any action that runs a query, such as changing a page, refreshing the visuals, or cross-highlighting, will populate the pane with information. You'll see each visual logged in load order with its corresponding load duration.

The screenshot shows the 'PERFORMANCE ANALYZER' pane with a list of visual actions and their durations. The list is as follows:

Name	Duration (ms)
Changed a slicer	-
Slicer	320
Sales and %GT Sales by Year	253
Matrix	385
Card	287
Card	268
Cross-highlighted	-
Matrix	217
Slicer	173
Card	172
Card	172
Cross-highlighted	-
Matrix	310
Slicer	118
Card	197
Card	235
Changed a filter	-
Sales and %GT Sales by Year	725
Matrix	584
Slicer	537
Card	536
Card	535

You can expand a specific visual's log to see how the time was spent divided out in three different sections:

- **DAX query:** the length of time it took for Analysis Services to run the query
- **Visual display:** how long it took for the visual to draw on the screen (including anything like retrieving web images or geocoding)
- **Other:** covers time that the visual spent preparing queries, waiting for other visuals to complete, or doing some other background processing.

You'll also see data for how long your DirectQuery source took to return a result if you're in that mode.

The screenshot shows a detailed breakdown of time spent for a specific visual. The data is as follows:

Average of NSAT and Average of PurchAgain by Ye...	408
DAX Query	16
Visual display	33
Other	358
Copy query	

```

Untitled - Notepad
File Edit Format View Help
// DAX Query
DEFINE
VAR __DS0FilterTable =
    TREATAS({"2015"}, 'Calendar'[Year])

VAR __DS0FilterTable2 =
    TREATAS({"France"}, 'Sales'[Country])

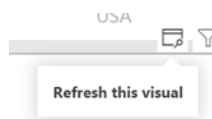
EVALUATE
TOPN(
    1001,
    SUMMARIZECOLUMNS(
        'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[Year],
        'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[Month],
        'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[MonthNo],
        __DS0FilterTable,
        __DS0FilterTable2,
        "AverageNSAT", CALCULATE(AVERAGE('Sales'[NSAT])),
        "AveragePurchAgain", CALCULATE(AVERAGE('Sales'[PurchAgain]))
    ),
    'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[Year],
    1,
    'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[MonthNo],
    1,
    'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[Month],
    1
)
ORDER BY
    'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[Year],
    'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[MonthNo],
    'LocalDateTable_8369bfaf-356a-4b8d-a282-dd2c1868a321'[Month]

```

You can also export all the query information to a JSON file to analyse in other tools.



If you want to dig into one slow loading visual specifically, while the Performance Analyzer is running, there will be an icon in the visual header that will let you refresh just that specific visual to see the statistics in the pane.



The Performance Analyzer is currently available in Power BI Desktop only and doesn't show all the time spent for the R or Python visuals.

Table and matrix keyboard navigation

Microsoft has added support for interacting with most visuals for keyboard and screen readers, and that support is extended to the table and matrix visual. Now when your focus is on a table or matrix, you can use the **CTRL + Right Arrow Key** to move focus inside to the first cell of the visual.

Country	Large	Medium	Small	Total
Germany	\$606,950	\$1,161,806	\$529,912	\$2,298,669
France	\$563,569	\$1,460,691	\$618,535	\$2,642,795
Great Britain	\$769,253	\$1,779,645	\$748,295	\$3,297,193
Australia	\$1,255,233	\$2,752,919	\$1,267,752	\$5,275,904
Canada	\$989,171	\$2,968,673	\$1,355,203	\$5,313,048
United States	\$4,863,456	\$11,689,596	\$5,260,313	\$21,813,365
Total	\$9,047,632	\$21,813,330	\$9,780,011	\$40,640,973

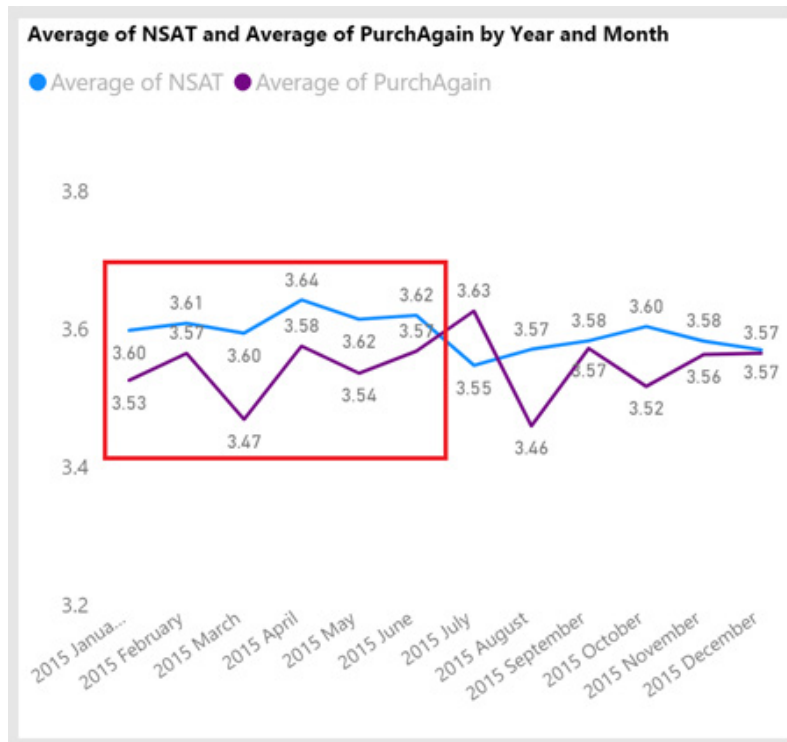
While your focus is on a cell, the screen reader will read off the relevant information, and you can use the follow keyboard shortcuts to navigate:

- **Arrow Keys:** move your focus up/down/left/right on cell
- **SPACE or ENTER:** select cell
- **SHIFT + Right Arrow Key:** expand an expandable header
- **SHIFT + Left Arrow Key:** collapse an expandable header
- **CONTEXT Key or SHIFT + F10:** open context menu.

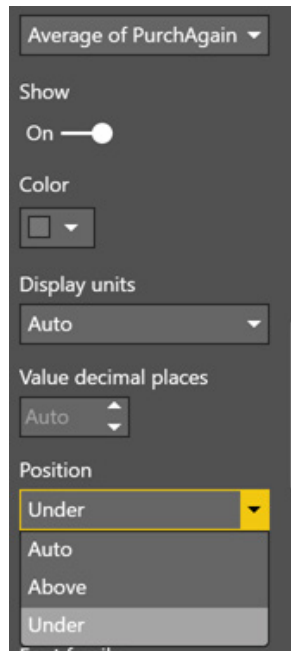
Line data label position control

When you have a line or combination chart with multiple lines overlapping with each other, it can sometimes be hard to tell which data label corresponds to which line. To help with this, Microsoft has added a new position control for data labels so you can set the labels to specifically show above or below its corresponding line.

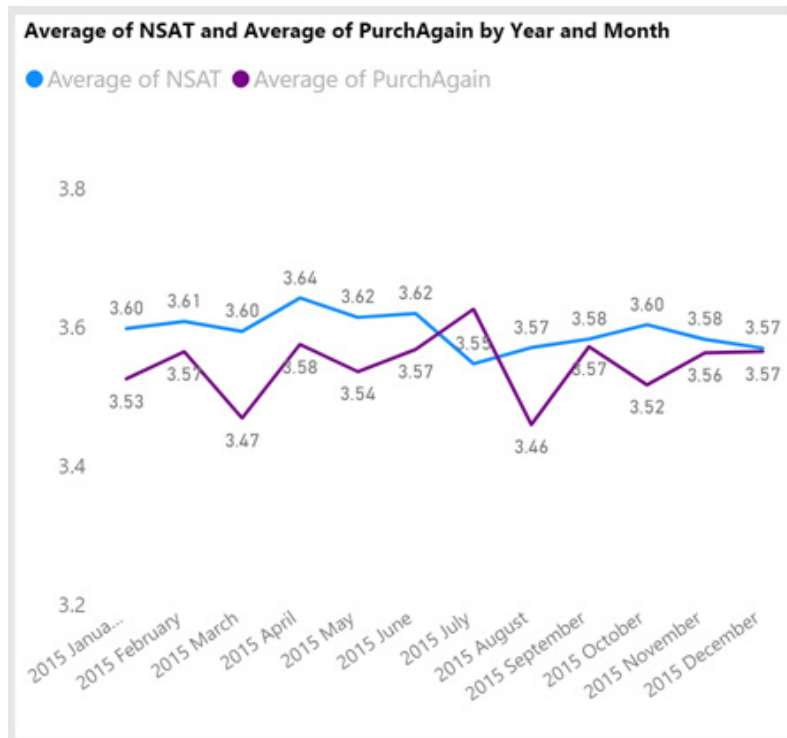
Take for example, the below line chart showing the average net satisfaction and likelihood to purchase again. Many of the data labels for the first several months are showing near each other with the automatic layout.



To help differentiate between the two, you can now customise the position so the labels for the PurchAgain line show below it and the labels for the NSAT show above it.

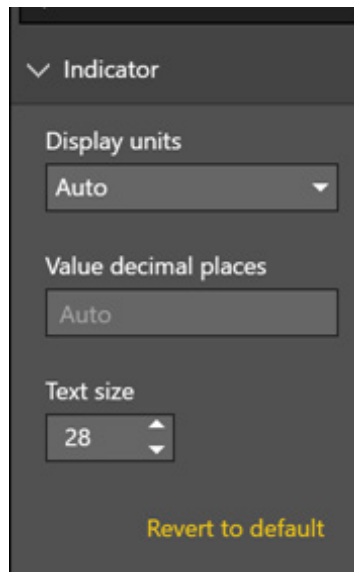


Once you do that, it's a lot clearer which label goes with which line.



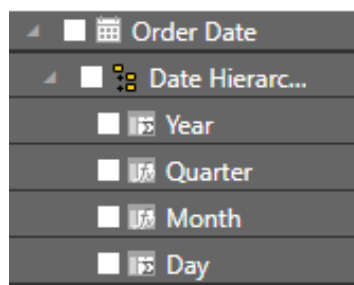
KPI visual Indicator text size control

As a small formatting improvement this release, this update sees the KPI visual to support changing the text size of the Indicator. It's been a big pain point for some people, so it is good to see this issue rectified.



Show dates as a hierarchy now Generally Available

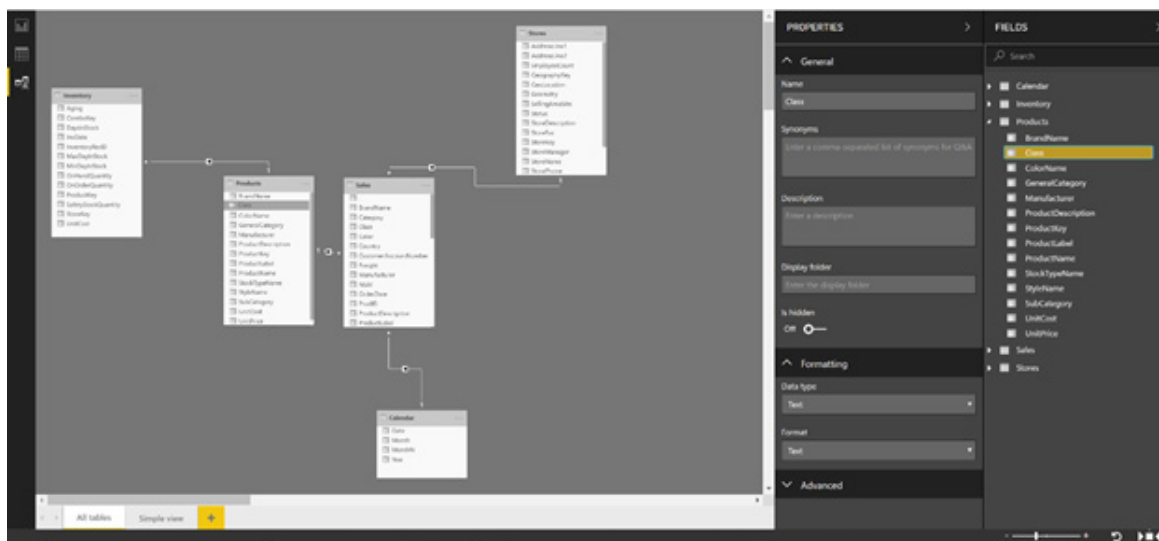
For each date column, Power BI now shows each hierarchy level in the Field list. The entire hierarchy, or a specific selection from the hierarchy, can be used in visuals.



New Modeling view Generally Available

The new Modeling view is now Generally Available. Some of the highlights of this new view include:

- Bulk editing of columns, measures, and tables
- Setting display folders on columns, measures, and hierarchies
- Dragging and dropping into display folders
- Multiple diagram layouts.



New DAX functions

This update sees another new DAX function, **ALLCROSSFILTERED**. This function may be used to remove filters on a table from other tables across direct or indirect many-to-many relationships.

You can now use either **CONTAINSSTRING** or **CONTAINSSTRINGEXACT** to get a Boolean value returned letting you know if a text field contains a specific string. **CONTAINSSTRINGEXACT** is case sensitive. Another new function is **DISTINCTCOUNTNOBLANK** to return a SQL like distinct count where blank values aren't counted.

This update has also extended the **LOOKUPVALUE** function to now take an optional last parameter to avoid raising an error. Lastly, Microsoft has also extended the **ALL** function so that using the **ALL** function without arguments will clear all filters in the Filter context.

Intellisense support is also supported for all these functions except the **ALL** updates and the new **DISTINCTCOUNTNOBLANK**, both of which will come in a later release (Microsoft states that this will be "April" but we think they are confused about that!). Watch this space.

Update to the ALLSELECTED DAX function

Further to the above, the **ALLSELECTED** DAX function has been extended to support multiple arguments, just like the **ALL** function.

Disable auto-date tables for new reports.

If you don't want to use Power BI's auto-generated date tables, and instead, for all your reports want to use your own date tables, you can now turn off the feature in the Options dialog under **Global -> Data Load -> Time intelligence**. Checking this box means that for any new files, Power BI will not automatically create any hidden date tables.

More anon.

Power BI Service and Mobile Latest Update

As we start the second half of 2019, the Power BI team continue to keep this newsletter at maximum length as they add more and more features and updates to Power BI Service and Mobile. Here's the latest instalment of additions:

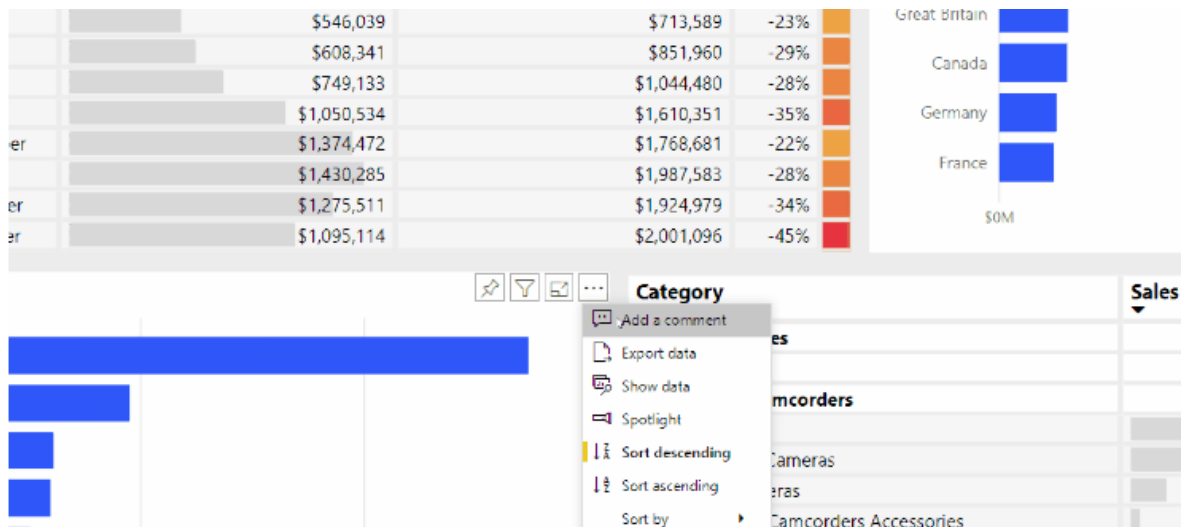
- Report commenting
- Custom navigation for Power BI Apps
- Governing Power BI visuals within organisations
- Enhanced e-mail attachment support for paginated reports
- May update for on-premises data gateway
- Updates to the Power BI mobile apps
- Roadmap updates.

Let's go through them.

Report commenting

Commenting has now been added to Power BI reports. With report commenting, you can directly add comments to report pages or specific visuals without switching context. Power BI will also automatically capture your report view, so others reading the comment can view the

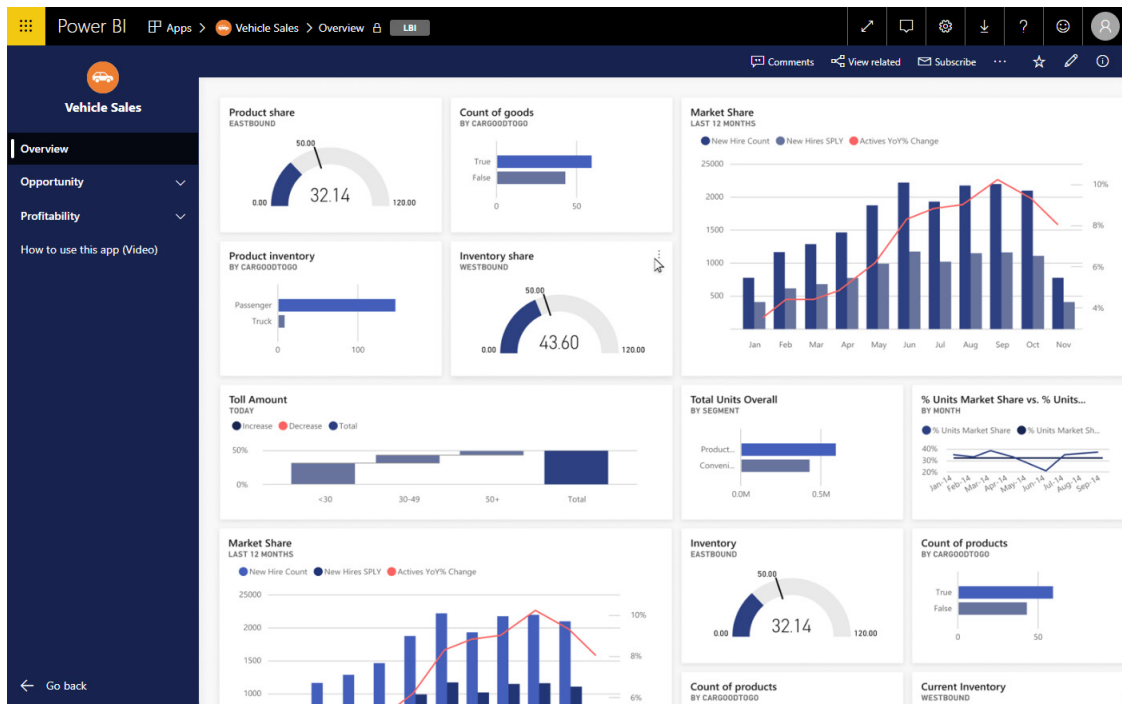
report exactly as you did when writing the comment. In addition, you can also **@mention** other individuals within your organisation to grab their attention. The **@mentioned** users will receive an email and a push notification on their Power BI mobile application.



Custom navigation for Power BI Apps

Reporting teams now have the ability to customise navigation for end users, so they can find content quickly and understand the relationships between different reports and dashboards. In addition, this update has

also added the ability for app owners to configure the app name, set a theme colour, choose a new icon, and even adding a support URL to a new or existing app.



Governing Power BI visuals within organisations

This update provides in-depth guidance on how administrators may govern custom visuals within their organisation. This is essential if you are an administrator in Power BI.

Enhanced e-mail attachment support for paginated reports

The e-mail subscriptions feature has been enhanced for paginated reports in Power BI. In addition to PDF, you can now choose the following new attachment types: PPTX, XLSX, DOCX, CSV or XML to be part of your subscription(s). Further, Microsoft has also raised the attachment file size limit to 25 MB for paginated reports for large data exports.

The screenshot shows the 'SUBSCRIBE' configuration window. At the top, there is a field for email addresses with 'Chris Finlan' and an 'X' icon, and a placeholder 'Enter email addresses'. Below this is a 'Subject' field with the text 'Subject'. Underneath is a text area for an optional message with the placeholder 'Include an optional message...'. The 'Format' section features a dropdown menu currently set to 'PDF'. The dropdown list is open, showing options: 'PDF' (highlighted in blue), 'XML Comma Separated Values (.csv)', 'Microsoft Excel (.xlsx)', 'Microsoft Word (.docx)', and 'Microsoft PowerPoint (.pptx)'.

May update for on-premises data gateway

An updated version of Power BI On-premises data gateway has been released. The latest version (3000.5.185) includes a preview of Gateway Performance Monitoring, Amazon Redshift Refresh and an updated mashup engine. To try it out, simply install the new gateway. You can find it [here](#)

Updates to the Power BI mobile apps

There are also a couple of updates for the mobile apps in various platforms:

- **Key Influencers visual:** support has been added for the key influencers visual on mobile so you can perform analysis of key drivers over your data with just a few taps
- **Maximise the view with full screen mode (Android and iOS):** a new button has been added to let you control when to focus on your data by removing report headers and footers and giving you maximum space for viewing your reports.

Roadmap updates

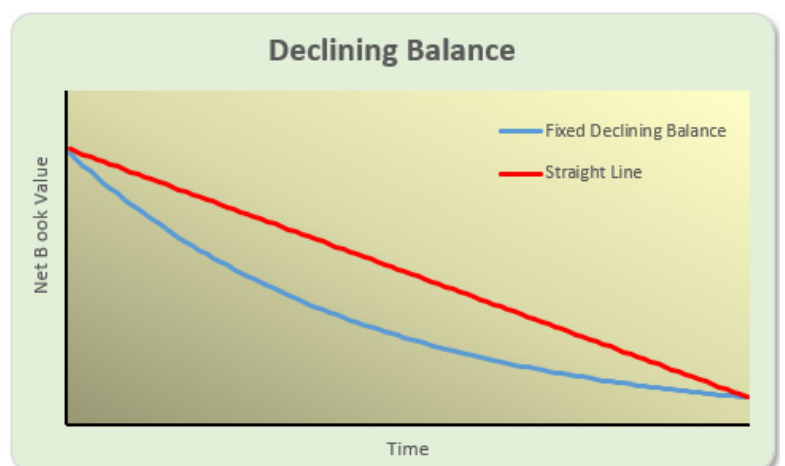
Microsoft is becoming more transparent advising users what's coming in the next three to six months. The latest teasers have been divulged. Expect to see the following before the end of the year:

- Report performance metrics
- Managed distributions
- New refresh scenarios
- Insights: key influencers.

More soon we expect!

The A to Z of Excel Functions: DDB

Depreciation is a method of allocating costs over the useful economic life of an asset (e.g. a building, a car, a computer). This function returns the depreciation of an asset for a specified period using what is known as the fixed-declining balance method (explained to the right).



Declining balance is a form of accelerated depreciation that will depreciate more aggressively than the straight-line method (where the same charge is applied in each period of equal length). This method is appropriate when an asset has higher functionality in the early years of use and becomes obsolete quickly. This method ensures that more depreciation is accounted for in the first few years, as a constant rate is

applied to the remaining non-depreciated balance. Fixed assets such as computer equipment are a good example since they are typically only used for a couple of years and then replaced.

This function returns the depreciation of an asset for a specified period using the double-declining balance method or some other method you specify.

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

DDB(cost, salvage, life, period, [factor])

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

- **cost**: this is required and represents the initial cost of the asset
- **salvage**: this is also required. This is the value at the end of the depreciation (sometimes called the salvage value of the asset). This value can be zero
- **life**: this is required. This is the number of periods over which the asset is being depreciated (sometimes called the useful life of the asset)
- **period**: another variable required. This is the **period** for which you want to calculate the depreciation. The period must use the same units as **life**
- **factor**: this argument is optional. This is the rate at which the balance declines. If **factor** is omitted, it is assumed to be two (2) (the double-declining balance method)
- **Important**: All five arguments must be positive numbers.

It should be further noted that:

- the double-declining balance method computes depreciation at an accelerated rate. Depreciation is highest in the first period and decreases in successive periods. **DDB** uses the following formula to calculate depreciation for a period:

Min((cost - total depreciation from prior periods) * (factor / life), (cost - salvage - total depreciation from prior periods))

- Change **factor** if you do not want to use the double-declining balance method
- Use the **VDB** function if you want to switch to the straight-line depreciation method when depreciation is greater than the declining balance calculation.

Please see our example below:

	A	B	C
1	Data	Description	
2	\$2,400	Initial cost	
3	\$300	Salvage value	
4	10	Lifetime in years	
5			
6			
7	Formula	Description	Result
8	=DDB(A2,A3,A4*365,1)	First day's depreciation, using double-declining balance method. Default factor is 2.	\$ 1.32
9	=DDB(A2,A3,A4*12,1,2)	First month's depreciation.	\$ 40.00
10	=DDB(A2,A3,A4,1,2)	First year's depreciation.	\$ 480.00
11	=DDB(A2,A3,A4,2,1.5)	Second year's depreciation using a factor of 1.5 instead of the double-declining balance method.	\$ 306.00
12	=DDB(A2,A3,A4,10)	10th year's depreciation. Default factor is 2.	\$ 22.12
13			

More Excel Functions next month...

Upcoming SumProduct Training Courses

Location	Course	Date	Duration
Sydney	Excel Tips and Tricks	15 Jul 2019	1 Day
Sydney	Financial Modelling	16 - 17 Jul 2019	2 Days
Sydney	Power Pivot, Power Query and Power BI	22 - 24 Jul 2019	3 Days
Sydney	Excel Tips and Tricks	19 Aug 2019	1 Day
Melbourne	Financial Modelling	20 - 21 Aug 2019	2 Days

Sydney	Financial Modelling	20 - 21 Aug 2019	2 Days
Melbourne	Power Pivot, Power Query and Power BI	26 - 28 Aug 2019	3 Days
Sydney	Power Pivot, Power Query and Power BI	26 - 28 Aug 2019	3 Days
Melbourne	Excel Tips and Tricks	17 Sep 2019	1 Day
Sydney	Excel Tips and Tricks	23 Sep 2019	1 Day
Sydney	Financial Modelling	24 - 25 Sep 2019	2 Days
Sydney	Power Pivot, Power Query and Power BI	7 - 9 Oct 2019	3 Days
Melbourne	Financial Modelling	14 - 15 Oct 2019	2 Days
Melbourne	Power Pivot, Power Query and Power BI	22 - 24 Oct 2019	3 Days

Key Strokes

Each newsletter, we'd like to introduce you to useful keystrokes you may or may not be aware of. This month, we thought we look at adding and subtracting:

Keystroke	What it does
CTRL + Add (+)	Open 'Insert Dialog' dialog
Subtract (-)	Extend Selection mode
SHIFT + Subtract (-)	Add to Selection mode
CTRL + Subtract (-)	Delete cells

There are over 540 keyboard shortcuts in Excel. For a comprehensive list, please download our Excel file a www.sumproduct.com/thought/keyboard-shortcuts. Also, check out our new daily **Excel Tip of the Day** feature on the www.sumproduct.com homepage.

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- **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

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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.

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