

Sum Product

NEWSLETTER #120 - November 2022

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As the end of the year gets closer we bid adieu to our eighth conference, Excel Virtually Global 2022. I hope you attended and found it worthwhile. It will be back in 2023 for sure.

Other than that it's business as usual. With heads down and full steam ahead, we have another Beat the Boredom Challenge to keep your Excel brain nimble, alongside fellow articles on Charts & Dashboards, Visual Basics, Power Pivot Principles, Power Query Pointers and Power BI Updates. We go all Yorkshire in our A to Z of Excel functions series (a good joke, INT it?) and finish off with another set of **CTRL + SHIFT** keyboard shortcuts.

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

Liam Bastick, Managing Director, SumProduct



Excel Virtually Global This Month - Been There, Done That, Bought the T-Shirt...



EXCEL VIRTUALLY GLOBAL 2022

We came, we saw, we conked out.

Excel Virtually Global, our annual Excel / Power BI event now being held for its seventh successive year in its different guises, has been and gone. With over 40 presenters and hosts, we learned a lot about Power Pivot, Power Query, Power BI, PowerPoint, Excel and financial modelling.

The presenters waived their magic and engaged the audience. If you missed it, it's still possible to watch many of the sessions. Simply go to bit.ly/EVG2022Videos (please note this is case sensitive) for further details.

Please don't forget, this event was for charity. We'd love you to donate to a worthy cause of your choice and just let us know by filling in the form using the QR code: →



or else use the link bit.ly/EVG2022Charity (this is case sensitive and should be typed in "as is").



Beat the Boredom Challenge

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

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

You may be aware of the basic concept of 'Center Across Selection', the ability to make it look like a group of cells has been merged and centred for the purposes of displaying a result.

	A	B	C	D
1				
2		This is centered across selection		
3		This is merged		

The advantage of using 'Center Across Selection' is that the cells are not actually merged, meaning that they can be appropriately formatted and styled, as well as not running into common issues when trying to navigate and copy/paste around merged cells.

However, one common feature that is frequently complained about as being missing from Excel is to be able to do the same thing vertically without merging the cells:

	A	B	C	D
1				
2	This Way	This is centered across selection		
3		This is merged		

So, how is this possible?

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

Charts and Dashboards

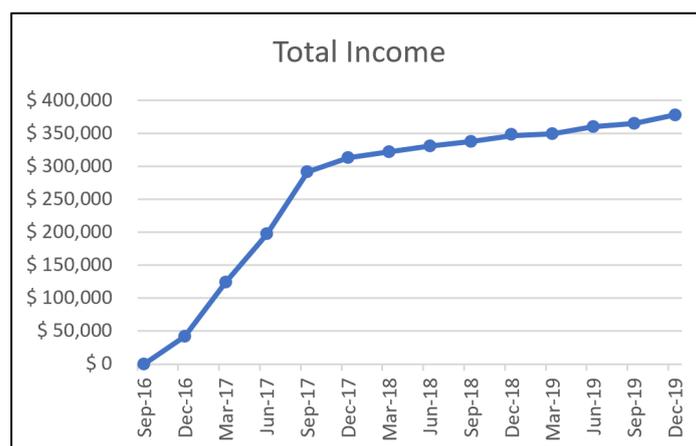
It's time to chart our progress with an introductory series into the world of creating charts and dashboards in Excel. This month, we consider how we may highlight one or more data points in a chart.

Charts are an effective way to presenting data, and one of the more informative methods is to highlight specific data points we wish to

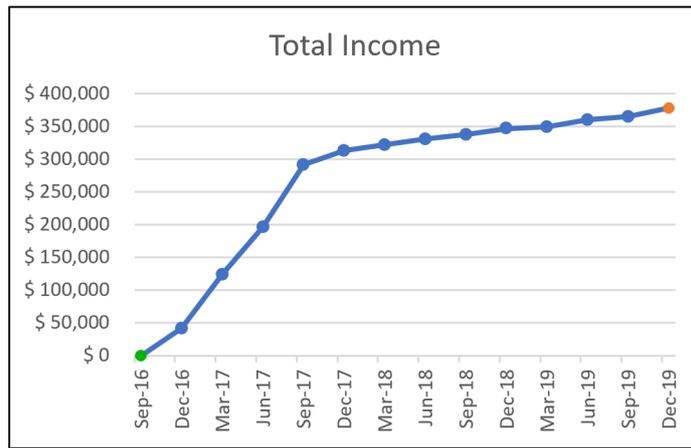
emphasise and make them stand out. For example, consider the following data of quarterly income for a company:

Quarter	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19
Total Income	\$ 0	\$ 41,935	\$ 124,075	\$ 196,546	\$ 291,455	\$ 313,351	\$ 321,939	\$ 330,837	\$ 337,383	\$ 346,794	\$ 348,851	\$ 359,896	\$ 364,554	\$ 377,573

From the provided data, let's plot a Line Chart as the one below, which has a clear minimum and maximum on Sep-16 and Dec-19, respectively:



If we wish to highlight these points on the graph, it would be easy enough simply to highlight them and change the format of the points, e.g.



But what if the data changes? We would have to go back and edit the chart points each time there is a new maximum and minimum point. In this situation, let's create dynamic highlights for the chart. To do that,

we're going to use two "helper" data series: one series is to calculate the maximum and the other, the minimum (surprise, surprise):

Quarter	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19
Total Income	\$ 0	\$ 41,935	\$ 124,075	\$ 196,546	\$ 291,455	\$ 313,351	\$ 321,939	\$ 330,837	\$ 337,383	\$ 346,794	\$ 348,851	\$ 359,896	\$ 364,554	\$ 377,573
Max	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	377,573
Min	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

The 'Total Income' series represents the original series data that we used to construct the chart. Formulae are used to construct the **Max** and **Min** series; the **Max** series is calculated with the following formula:

`=IF(G15>=MAX($G15:$T15),G15,NA())`

The **Min** series is calculated with this formula:

`=IF(G15<=MIN($G15:$T15),G15,NA())`

This results in the series only displaying the Maximum and Minimum value in the original chart data, and #N/A for everything else. Using formulae allows the two series to be dynamic, so when there is new data the **Max** and **Min** series will update accordingly.

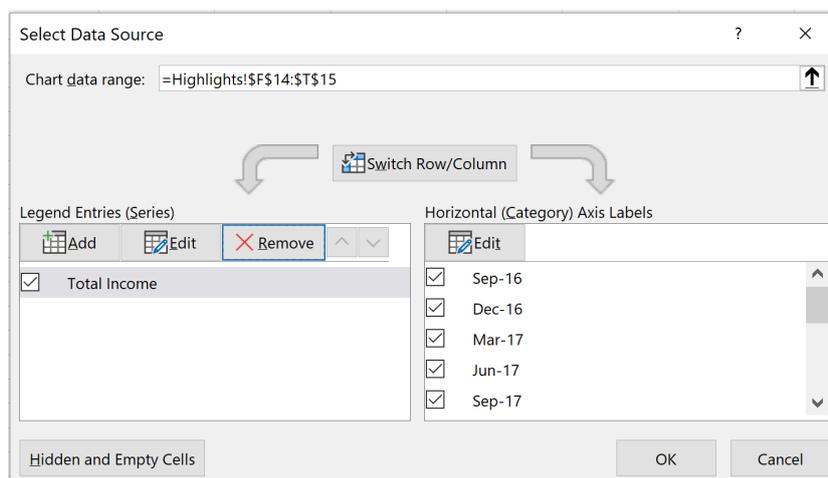
Now that we have the data series, we may include them in the chart. We can do that by clicking on the original chart, and Excel will highlight the relevant data series:

Quarter	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19
Total Income	\$ 0	\$ 41,935	\$ 124,075	\$ 196,546	\$ 291,455	\$ 313,351	\$ 321,939	\$ 330,837	\$ 337,383	\$ 346,794	\$ 348,851	\$ 359,896	\$ 364,554	\$ 377,573
Max	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	377,573
Min	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

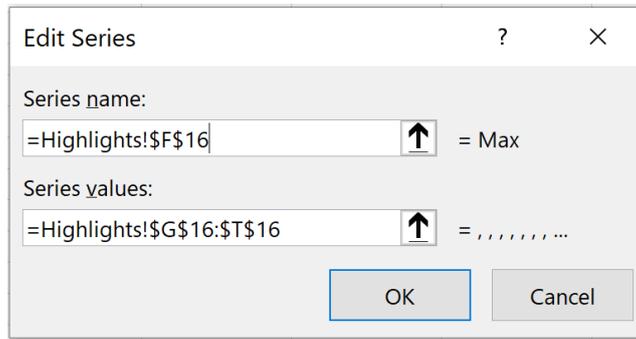
We can then drag the values down:

Quarter	Sep-16	Dec-16	Mar-17	Jun-17	Sep-17	Dec-17	Mar-18	Jun-18	Sep-18	Dec-18	Mar-19	Jun-19	Sep-19	Dec-19
Total Income	\$ 0	\$ 41,935	\$ 124,075	\$ 196,546	\$ 291,455	\$ 313,351	\$ 321,939	\$ 330,837	\$ 337,383	\$ 346,794	\$ 348,851	\$ 359,896	\$ 364,554	\$ 377,573
Max	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	377,573
Min	-	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

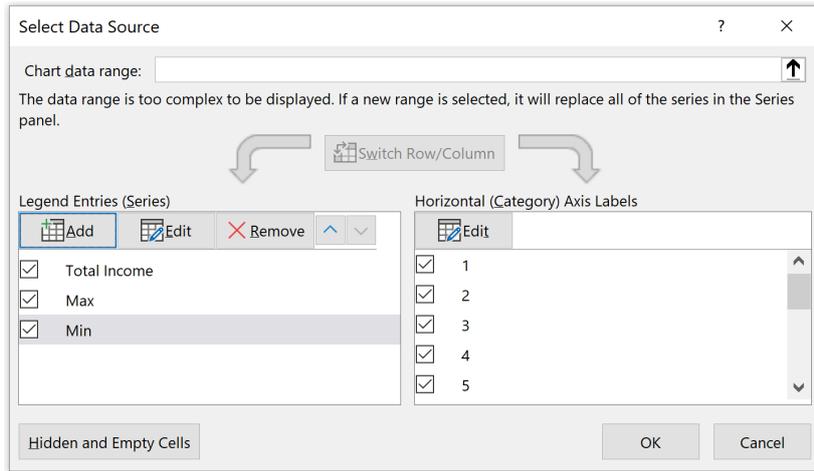
Alternatively, we may right-click on the original chart and select the 'Select Data' option. Then, the 'Select Data Source' dialog will appear. We can then add new series by clicking on the 'Add' button on the left side of the dialog box:



The next step is to fill out the 'Edit Series' dialog box accordingly for **Max** and **Min** series:

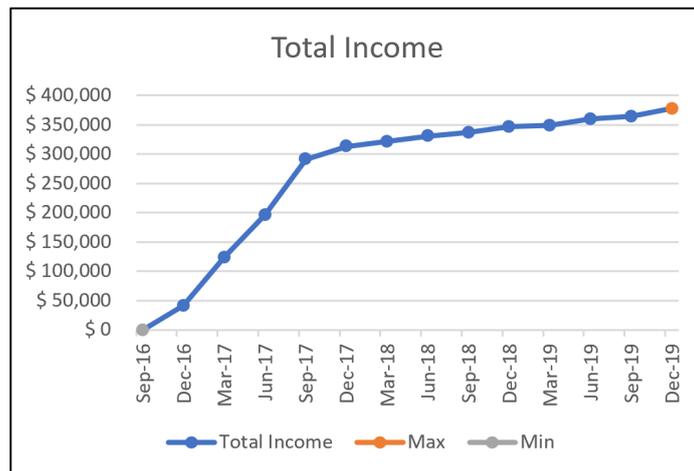


The two additional series are now added and shown in the 'Legend Entries (Series)' box:



Do remember to reference the 'Horizontal (Category) Axis Labels' if the dates are replaced with sequential integers as illustrated above otherwise this may cause charts to display incorrectly in alternative scenarios.

The chart is now shown as the one below, with **Max** and **Min** are now chart series and will be changed dynamically depending on the data:



More next month...

Visual Basics

We thought we'd run an elementary series going through the rudiments of Visual Basic for Applications (VBA) as a springboard for newer users. Let's see what we **Find** out this month...



It's easy to get lost in a sea of data, but at times we want to find something in particular, be it a word, number or formula. AutoFilters may help us do that. In Excel, the Find & Select (**CTRL + F**) function helps us do specific value / formula searches. But how can we automate this in VBA?

Enter the **Find** method.

Find finds a specific information in a range, so it can only be used on **Range** objects. Let's have a look at its parameters.

Parameter	Type	Description	Values
What	Required	What we are looking for	Any VBA data type, can be a string "find me", or integer 42
After	Optional	A single cell after which you want the search to begin; this will not be searched until the search loops around and returns to it. Defaults to the cell in the upper-left corner of the range	Range("A1")
LookIn	Optional	What type of thing we want to look in; this defaults to xlValues	xlValues for searching values, e.g. "51" xlFormulas for searching formulae, e.g. "=A5" xlComments for searching within the Review Comments
LookAt	Optional	Defines a complete or partial search; defaults to xlPart	xlWhole matches the entire contents of the field xlPart matches part of the field
SearchOrder	Optional	The search order; defaults to xlByRows	xlByRows to go across the rows first xlByColumns to go down the columns first
SearchDirection	Optional	The search direction; the default is xlNext	xlNext going forwards in direction xlPrevious going backwards in direction
MatchCase	Optional	True makes the search case sensitive, whereas the default value is False	
MatchByte	Optional	Used in double-byte language searches and irrelevant if the language in Excel is single-byte. Double-byte languages include Korean, Japanese etc.	True to have double-byte characters match only double-byte characters False to have double-byte characters match their single-byte equivalents (default)
SearchFormat	Optional	Searching by format which must be set first using Application.FindFormat	Values are True or False (default)

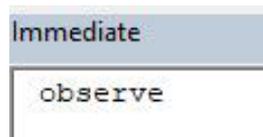
Let's start with some data:

	A	B	C	D	E	F
1	detect	turn up	observe	come up with	scare up	
2	discover	uncover	perceive	dig up	smoke out	
3	encounter	unearth	pinpoint	fall in with	stumble upon	
4	identify	collar	recognize	ferret out	trip on	
5	locate	corral	sight	happen upon		
6	meet	descry	arrive at	lay fingers on		
7	notice	discern	bring to light	light upon		
8	recover	distinguish	bump into	make out		
9	spot	espy	chance upon	run across		
10	strike	expose	come across	run into		
11						

This month, we are going to start with the most basic search. Let's ignore all the other parameters and use their default settings for the time being.

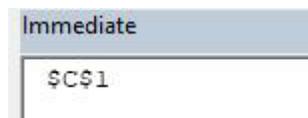
```
Sub TestFind()  
    Dim searchRange As Range  
    Set searchRange = Range("A1:E10")  
    Debug.Print searchRange.Find("observe")  
End Sub
```

We get the following result:



It gives us the value of the cell that has the first match. However, what if we wanted to know the address of the cell? As the **Find** method returns a **Range** result, we can simply use the **Address** property.

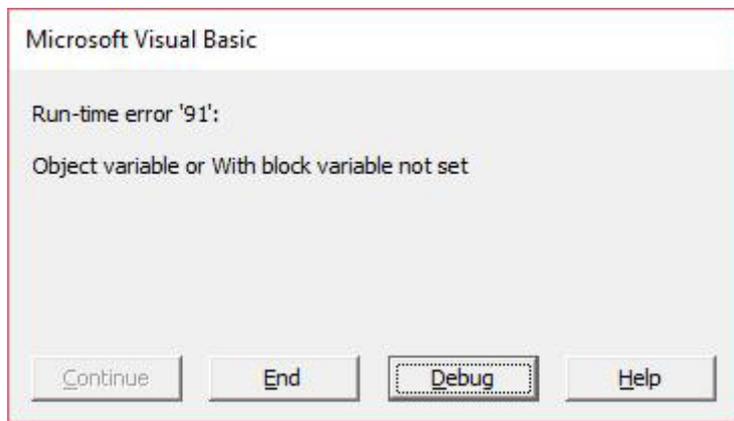
```
Sub TestFindAddress()  
    Dim searchRange As Range  
    Set searchRange = Range("A1:E10")  
    Debug.Print searchRange.Find("observe").Address  
End Sub
```



But what happens we try to search for something that isn't in our range?

```
Sub CantFind()  
    Dim searchRange As Range  
    Set searchRange = Range("A1:E10")  
    Debug.Print searchRange.Find("lost").Address  
End Sub
```

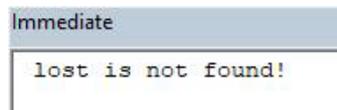
In this instance, we will get an error:



This is because there was no **Range** returned. To prepare for this contingency, a little checking is required to determine if there was a result. This is where the **Nothing** keyword would be utilised. **Nothing** represents the default value of a data type. For example, a **Nothing** string would be "".

As a result, if the **Find** method cannot return a result, it will return a default value which is **Nothing** and our code can be adjusted as follows:

```
Sub CantFindNothing()
    Dim searchRange As Range
    Set searchRange = Range("A1:E10")
    If searchRange.Find("lost") Is Nothing Then
        Debug.Print "lost is not found!"
    Else
        Debug.Print searchRange.Find("lost").Address
    End If
End Sub
```



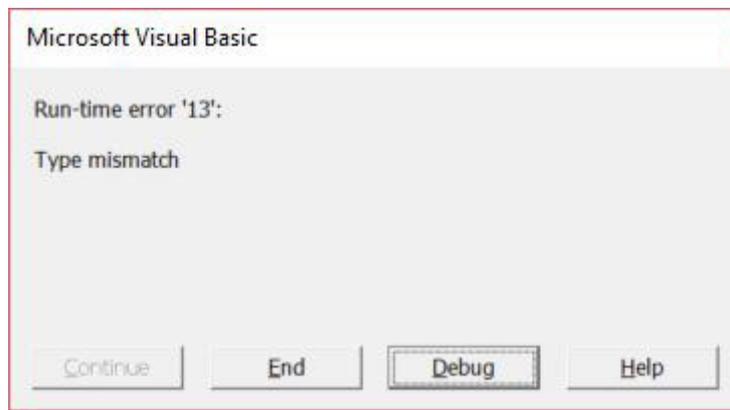
It doesn't seem to be difficult to **Find** things using VBA!

If we were to perform a simple search for the string "up" on this **Range**,

	A	B	C	D	E	F
1	detect	turn up	observe	come up with	scare up	
2	discover	uncover	perceive	dig up	smoke out	
3	encounter	unearth	pinpoint	fall in with	stumble upon	
4	identify	collar	recognize	ferret out	trip on	
5	locate	corral	sight	happen upon		
6	meet	descry	arrive at	lay fingers on		
7	notice	discern	bring to light	light upon		
8	recover	distinguish	bump into	make out		
9	spot	espy	chance upon	run across		
10	strike	expose	come across	run into		
11						

using the subroutine from above, it would return "turn up" in cell **B1**. This is because the **Find** method starts from the upper left corner from the range. Notice how the cursor is on **C5**. If we were to press **CTRL + F** in Excel and use the Find dialog, it would start the search from that cell. What if we wanted to find a string with "up" after the word "sight"? How can we tell VBA to behave in the same way as the Find dialog?

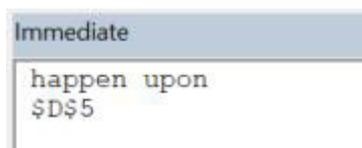
This is where the **After** parameter comes in handy. After takes a **Range** of a single cell to use as the basis to search from. If you give **After** a range that is bigger than 1x1, then it will generate the following error:



After is the second parameter of the **Find** method, so we can simply pass it after our search string. We can amend our code as follows:

```
Sub FindAfter()
    Dim searchRange As Range
    Set searchRange = Range("A1:E10")
    Debug.Print searchRange.Find("up", Range("C5"))
    Debug.Print searchRange.Find("up", Range("C5")).Address
End Sub
```

This will result in:



Success! Notice that **Find** went across the row, which is the default.

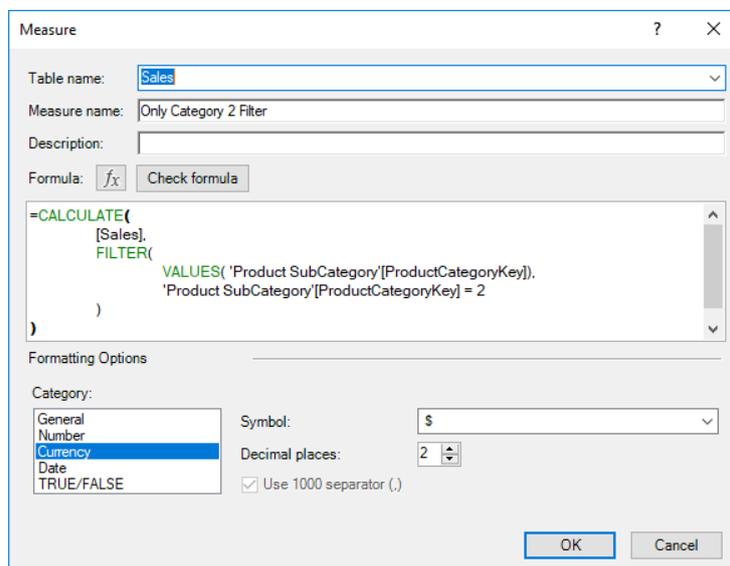
Next month, we will continue looking at alternative ways to use **Find**.

More next time.

Power Pivot Principles

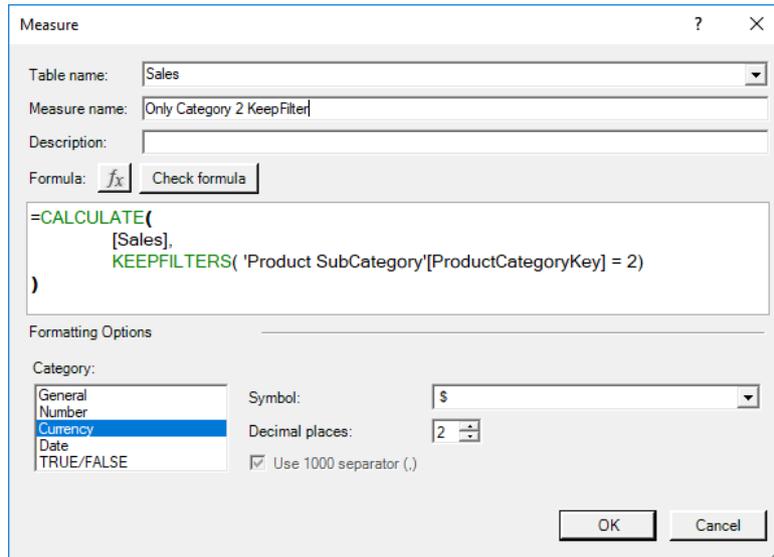
We continue our series on the Excel COM add-in, Power Pivot. This month, we continue to consider how to stop the **CALCULATE** function from overwriting row filters, this time using **KEEPFILTERS**.

Last month, we looked at using the **CALCULATE**, **FILTER** and **VALUES** functions to stop measures from overriding the row context values. As a reminder, here is how we used the three functions last time:



There is an alternative way to avoid the measure from overriding row context values. This may be achieved by employing the **KEEPFILTERS** function. We can use the **KEEPFILTERS** function directly after the **CALCULATE** function, as in this following example:

```
=CALCULATE(
    [Sales],
    KEEPFILTERS( 'Product SubCategory'[ProductCategoryKey] = 2 )
)
```



As you can see (below), we have achieved the same result in fewer steps, which is usually the better option when coding!

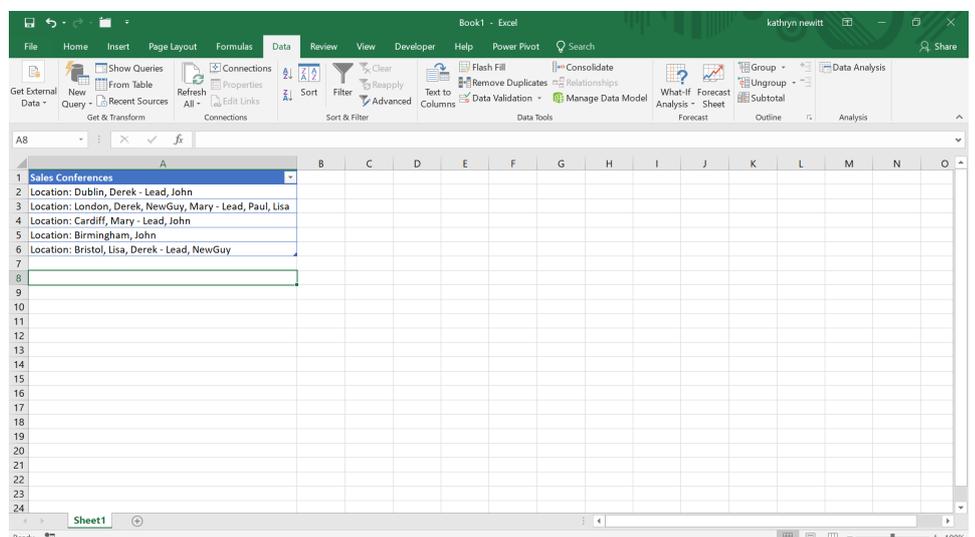
	A	B	C	D	E
1		SalesTerritoryCountry	All		
2					
3		ProductCategoryKey	Sales	Only Category 2 Filter	Only Category 2 KeepFilter
4			1	\$477,377.15	
5			2	\$653,603.95	\$653,603.95
6			3	\$600,252.55	
7			4	\$89,364.90	
8		Grand Total		\$1,820,598.55	\$653,603.95
9					
10					
11					
12					

More *Power Pivot Principles* next month.

Power Query Pointers

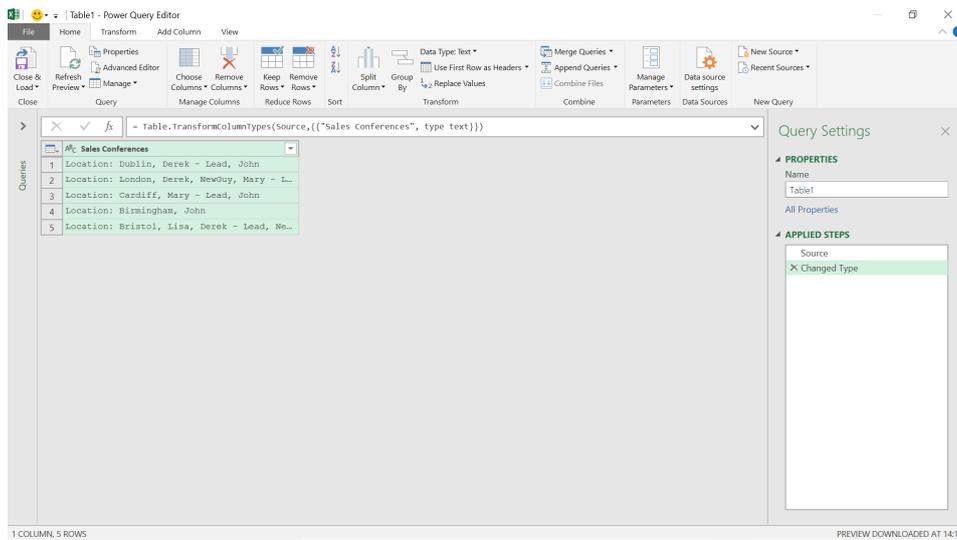
Each month we'll reproduce one of our articles on Power Query (Excel 2010 and 2013) / Get & Transform (Office 365, Excel 2016 and 2019) from www.sumproduct.com/blog. If you wish to read more in the meantime, simply check out our Blog section each Wednesday. This month, we look at splitting data using a variety of delimiters.

Let's have some data for our ever-reliable fictional salespeople. As usual, the data is not in a format we would like!



Basically, we have a list of which salespeople are attending sales conferences and who is in charge at each one. We'd like to put this data into a more useful table. What we would prefer is a list of pairings. Therefore, we need to make sure we have a way of identifying which data

is our sales conference location, which is why we have put 'Location:' before each city. We start by creating a query 'From Table' in the 'Get and Transform' section on the 'Data' tab.



We want to convert this data into a list of pairings, and the best way for us to do this is to tell Power Query what the delimiter is. However, we don't want to actually split the column up at this point, so we won't be

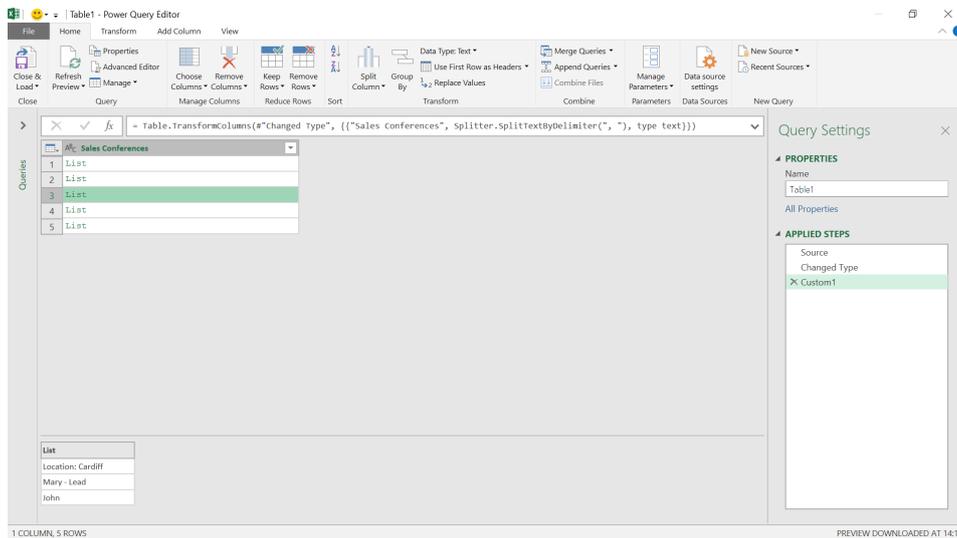
using the 'Split Column' on the UI (user interface). Instead, we will be using M code. The function we'll be using is

Table.TransformColumns(table as table, transformOperations as list, optional defaultTransformation as nullable function, optional missingField as nullable number) as table

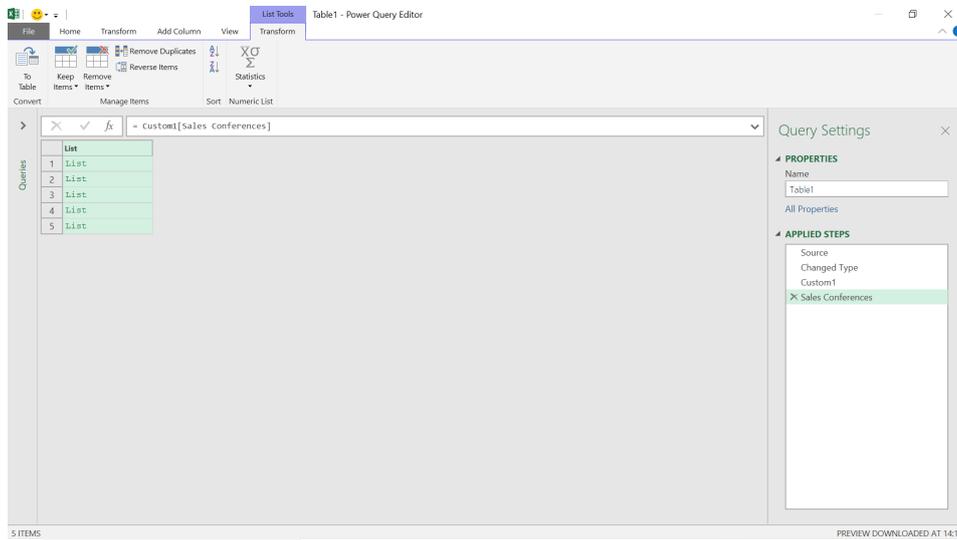
We have a similar step already created for us to change the type (shown on the previous screenshot), so we may work out what our function needs to be.

= Table.TransformColumns(#"Changed Type", {{"Sales Conferences", Splitter.SplitTextByDelimiter(", ", type text)}}

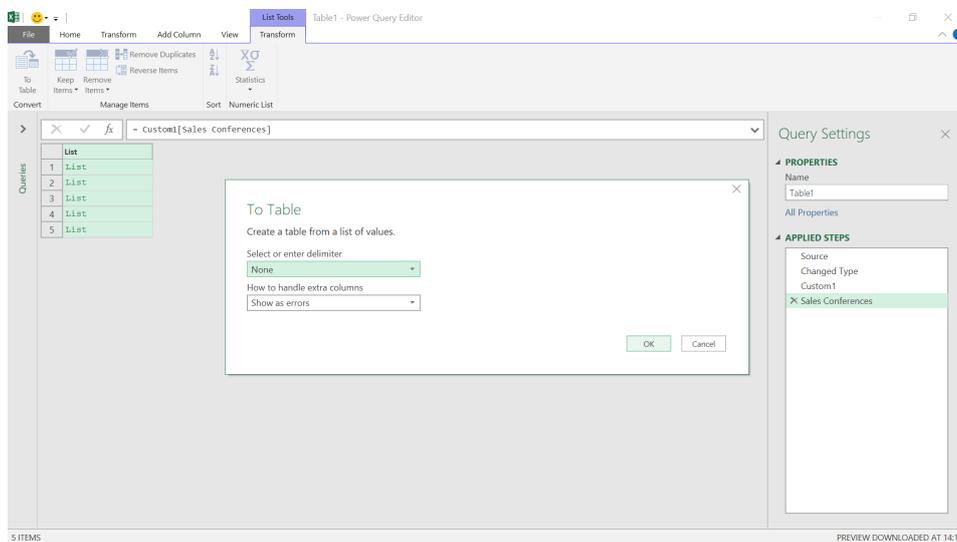
This converts each of our column entries into a list as shown below:



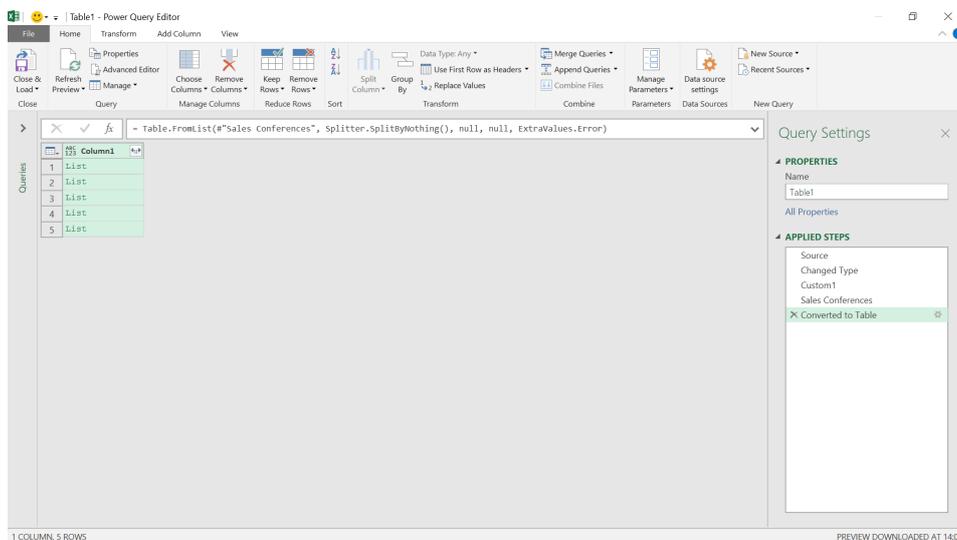
Now, we need to extend this so that we have a long list, with all our lists contained therein. In order to do this, we'll convert our table to a list in the Transform tab.



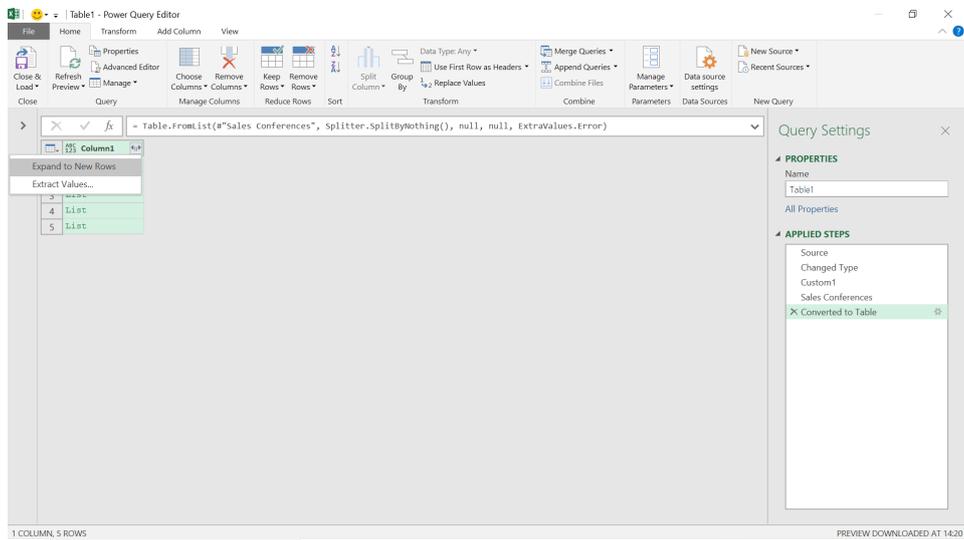
Our data is now a list of lists, and we need to convert it back to a table so that we may have one long list. This is made possible by the ability to expand the data, as will be shown shortly.



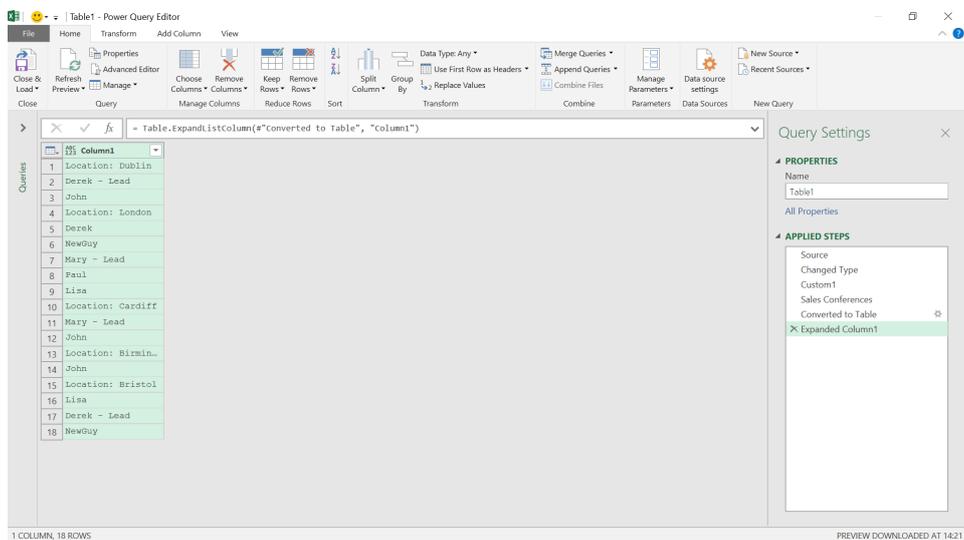
We don't need a delimiter for this part, so let's take the defaults.



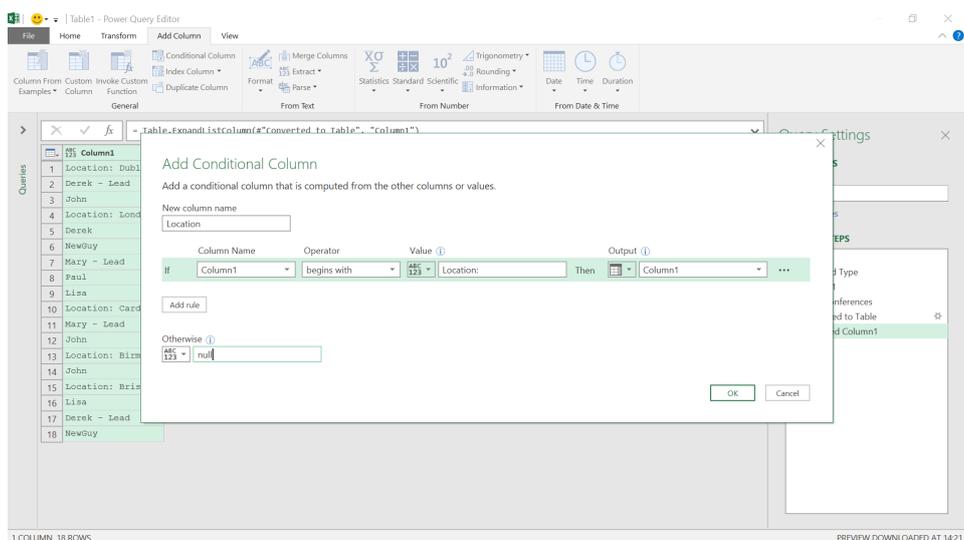
Now we have our table again, but we have the option to expand our columns, allowing us to view the separated data in one long column.



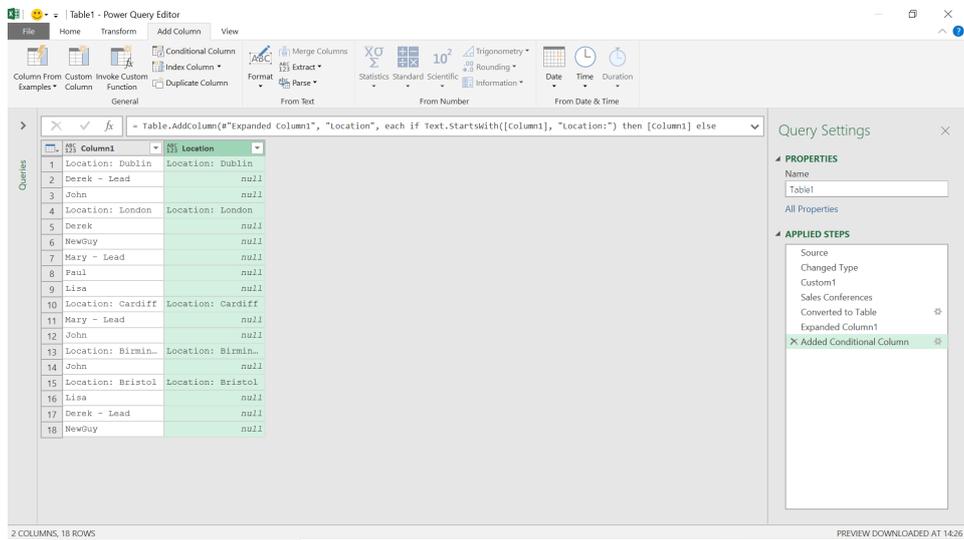
Once we 'Expand to New Rows' we can see all of our data.



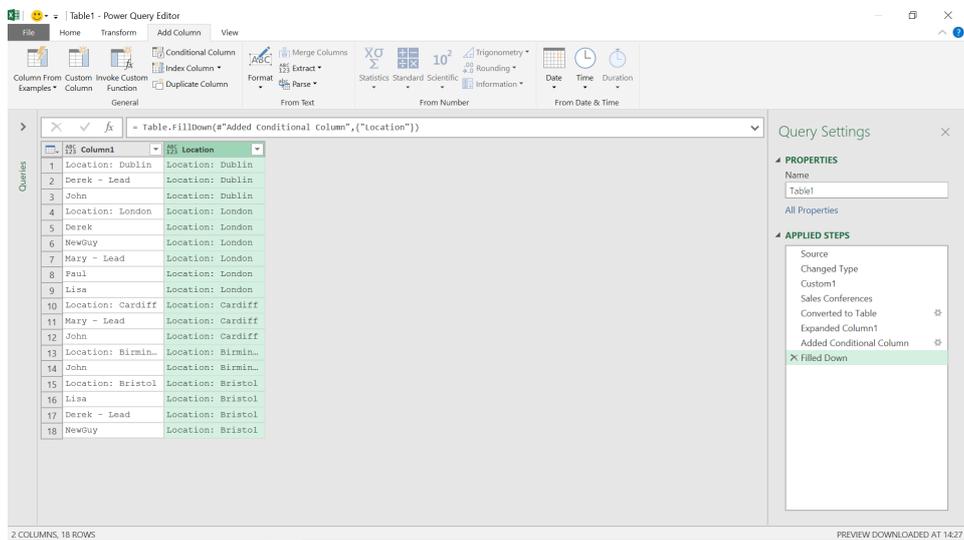
We need to pull out the sales conference locations and to do this, we create a 'Conditional Column' from the 'Add Column' tab.



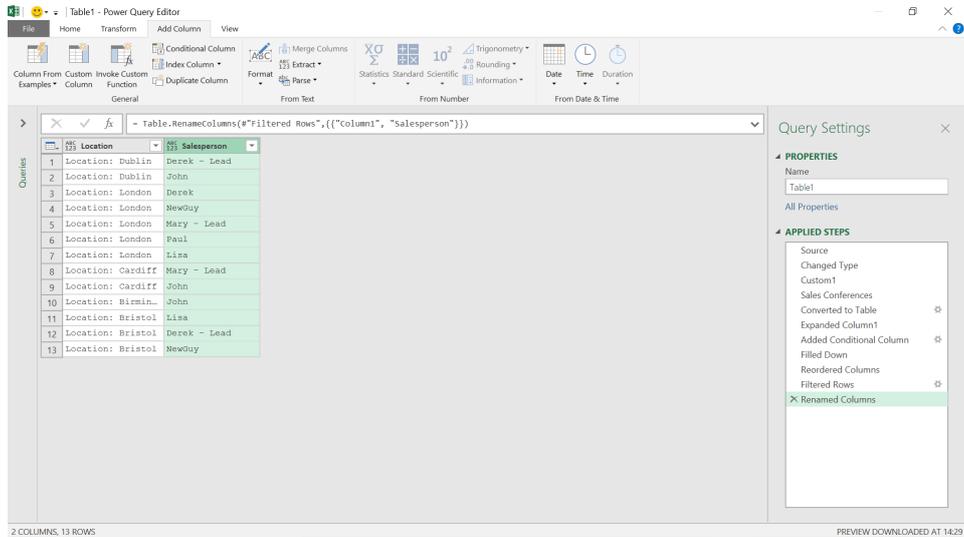
This new column will be populated with the location if the text contains 'Location:'



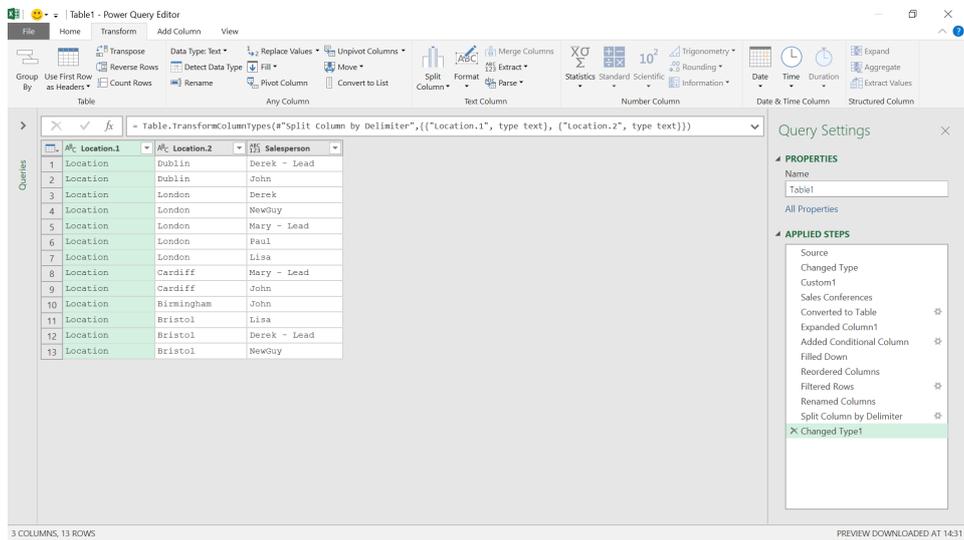
We can right-click on the new column and 'Fill Down'.



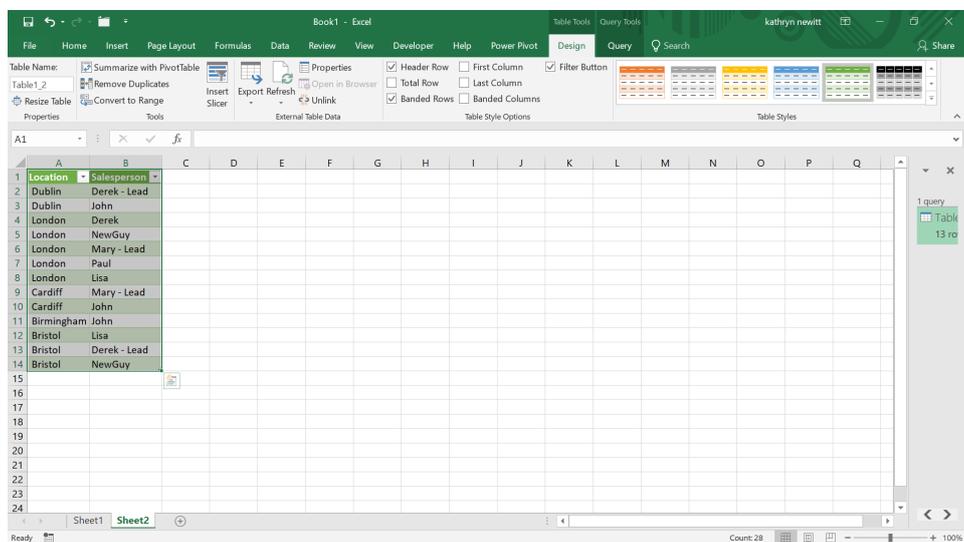
This is starting to look like our goal. Now, we may swap the columns around and remove anything where **Column1** contains 'Location:'. We then rename **Column1**.



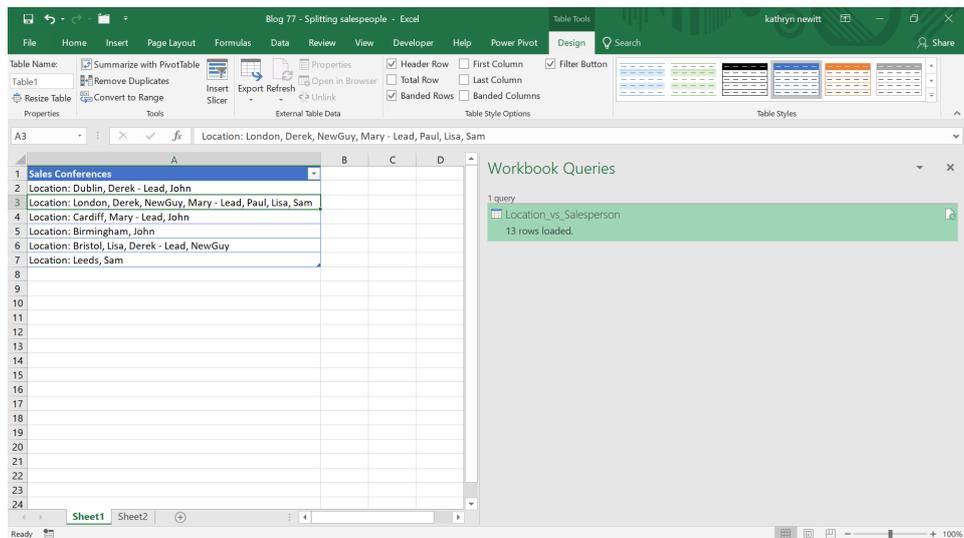
Let's decide that the 'Location:' has been useful to identify the cities, but now it has to go! We split the column by delimiter (right-click or use the transform menu).



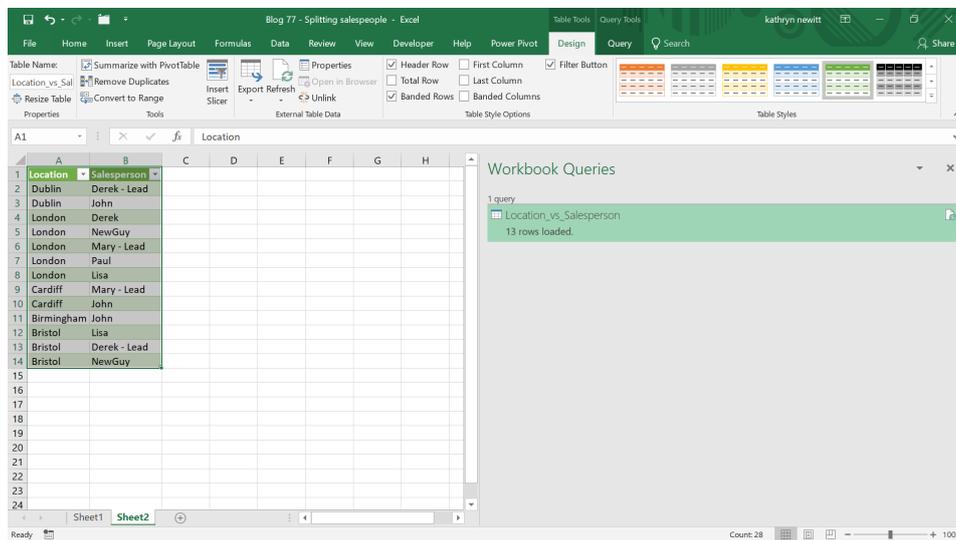
We may now get rid of the **Location.1** column and rename the other location column. 'Close & Load' to Excel.



Now to test our query. In our original Excel data, try adding a new location (Leeds) and a new salesperson (Sam), who will attend the conferences in Leeds and London:



After refreshing the query, the new salesperson Sam appears in both locations:



More next month.

Power BI Updates

This month's update includes Power BI metrics, Modeling (*sic*) updates, deployment pipelines and more. The full list is as follows:

Reporting

- Reverse stack order for Stacked Column charts
- Query performance improvements:
 - Indexing imported string columns on-the-fly
 - Pushing Top N filter to DirectQuery sources
- Power BI Metrics:
 - Roll ups
 - New API to retrieve scorecards for administrators

Analytics

- Quick measure suggestions – experimental feature in Preview

Modelling

- Relationship editing in the properties pane in Preview
- DAX Formula bar support for Desktop Model view

Data connectivity and preparation

- Introducing tenant setting for Power BI Datamarts in Preview
- Eduframe Reporting
- Socialbakers Metrics

Service

- Guest users can now create their own email subscriptions
- Downloading a PBIX is now available for more scenarios
- Administration and governance:
 - Introducing tenant setting for email subscriptions to external users
- Deployment pipelines:
 - Deployment History
 - Azure DevOps extension now Generally available
 - Changes to UpdateApp REST API

Developers

- Custom visuals API version 5.1

Visualisations

- New visuals in AppSource
- Zebra BI Tables 6.0
- Inforiver Enterprise SaaS Edition
- PowerGantt Chart by Nova Silva
- Drill Down Network PRO by ZoomCharts

Other

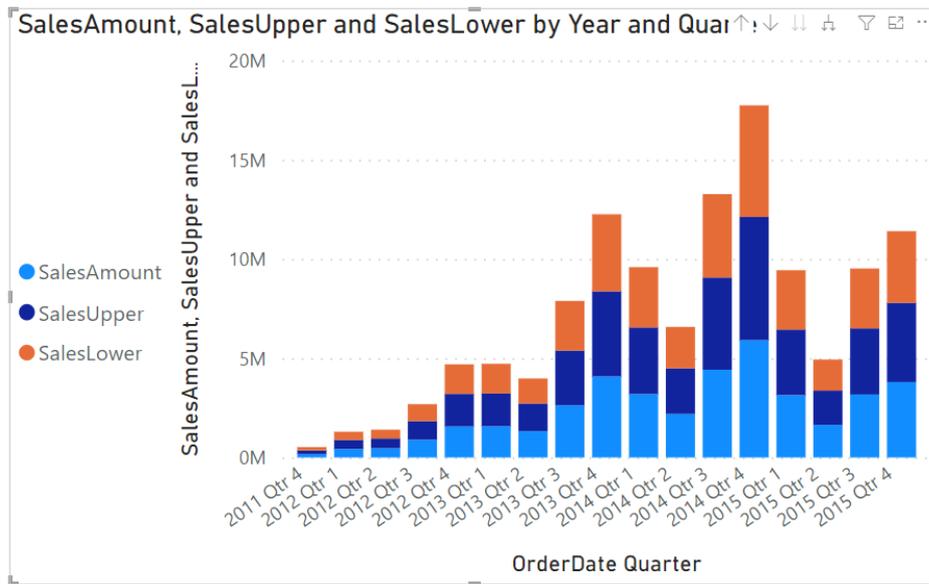
- Update to release notes.

Let's now go through each in turn.

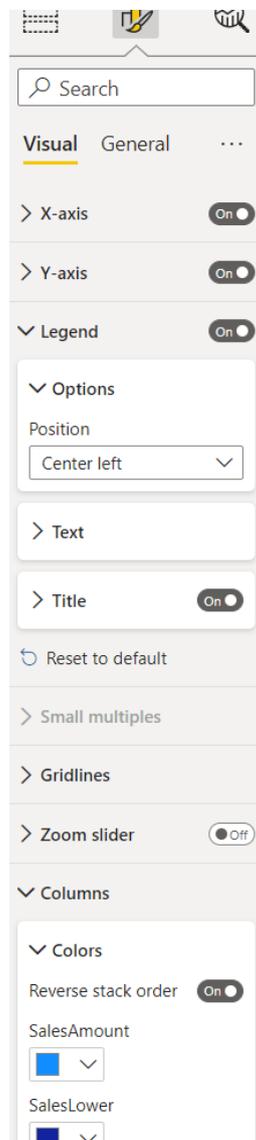
Reverse stack order for Stacked Column charts

This update now sees you able to reverse the order in which segments are rendered in Stacked Column and Bar charts. This can be particularly helpful to help users match the category groupings of strictly positive columns against vertically aligned legends. Power BI usually draws

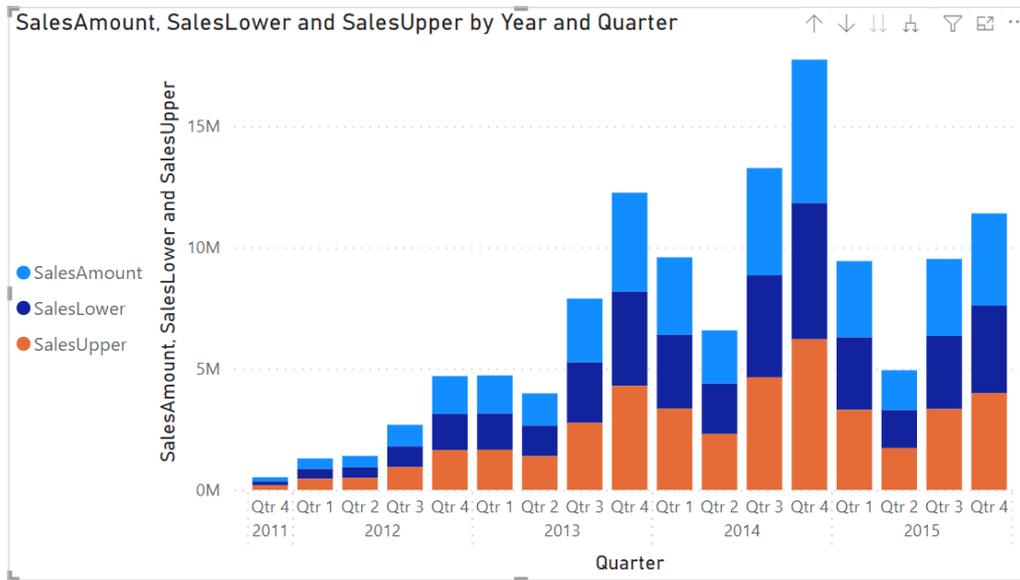
column segments from the zero line upwards, but now those categories will be listed in legends in left-to-right, top-to-bottom order. This can sometimes lead to the feeling that their orders have been "reversed."



With this release, you will find a new Formatting pane option to reverse stack order of your stacked Column and Bar, Area, Ribbon and Combo charts.



The toggle will be off by default. Turning it on will flip the order in which your segments are stacked.



It should be noted that due to an issue Microsoft found late in development, this feature might not be available in Power BI Service for published reports when you read this. You will still be able to set the

toggle in Desktop, but report behaviour in Power BI Service will only start rolling out mid to late October.

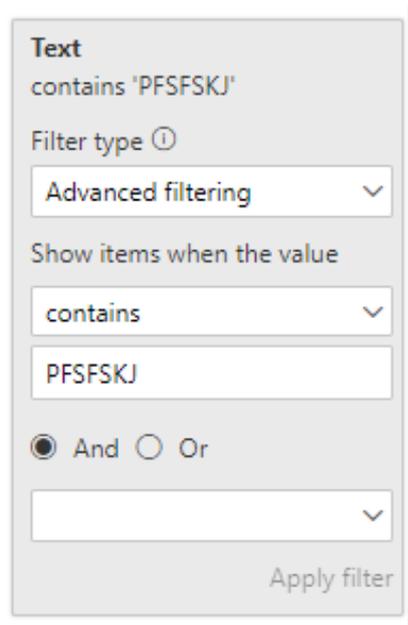
Query performance improvements

There are some query performance improvements of note this month.

INDEXING IMPORTED STRING COLUMNS ON-THE-FLY

Microsoft has been building indices on imported string columns to improve query performance of substring searches, *i.e.* when using the **ContainsString** function, **Search** function or a filter to look for a string

literal in a text column. For example, here is an illustration of a text filter set using the Filter pane:



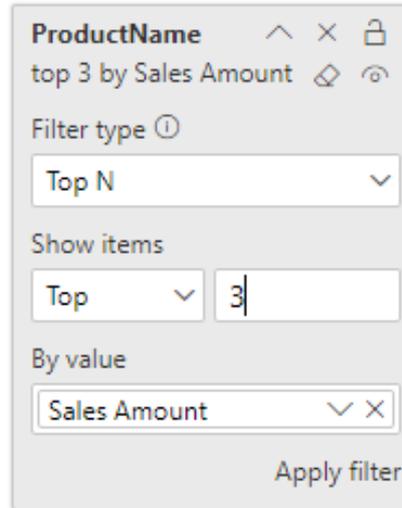
Power BI builds the index when the first query that requests a substring search on the column is executed. The index is built for text columns that contain ASCII characters only. Once the index is built, the substring

search becomes instant. You should note that the index is not persisted between restarts of Power BI Desktop.

PUSHING TOP N FILTER TO DIRECTQUERY SOURCES

Up until now, when using the **TOPN** function or a top **N** filter on a column from a DirectQuery source all values of the column would be retrieved.

The top **N** filter would then be applied within the DAX engine. Here's an example of a top **N** filter set using the Filter pane:



To improve performance, Microsoft has changed that behaviour: as of this release, Power BI is pushing the top **N** filters to DirectQuery sources whenever possible. When the top **N** filter is constructed on a measure, the measure has to be based upon one of the following aggregations:

- **COUNT**
- **COUNTROWS**
- **DISTINCTCOUNT**
- **MAX**
- **MIN**
- **SUM.**

Power BI Metrics

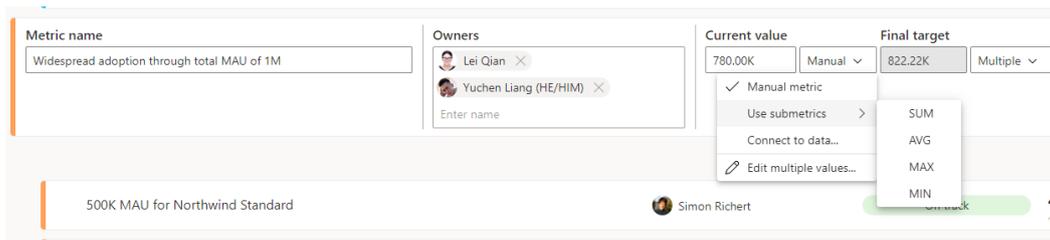
There are two updates to note for Power BI metrics this month. There are the additions of metric roll ups for current and target values and the 'Get Scorecard' admin API.

ROLL UPS

Previously in Metrics, there was no way to automatically aggregate a group of submetrics' values to the parent metric value. You could work around this by connecting values to data, but before this update, there was no way to automatically roll up manual values – all non-connected metrics required check-ins to update the values.

Now, with this release of current and target roll ups, you have the ability to set an aggregation of your submetrics to show in your parent metric. You can select from a few aggregation types:

- **AVERAGE**
- **MAX**
- **MIN**
- **SUM.**



Whichever aggregation you choose will automatically update the value to show the correct aggregation value of its direct submetrics. Roll ups work on connected values as well: if your submetrics are connected to

data, Power BI will take the aggregations of those values and show it in the parent metric. This makes it easier to stay on top of your manual parent metrics.

NEW API TO RETRIEVE SCORECARDS FOR ADMINISTRATORS

Power BI this month sees the release of a new administrative Application Programming Interface (API) that is instrumental in helping administrators with their many administrative tasks. This is critical in examining the state of existing scorecards.

This new get scorecard API is enabled for administrators in Power BI and will retrieve all scorecards within an organisation. The API will retrieve scorecard metadata as well as metadata for each metric on the scorecards.

Quick measure suggestions – experimental feature in Preview

Some time ago, Power BI released a feature called 'Quick Measures' that allowed Power BI Desktop users to create DAX measures using a built-in template instead of writing the DAX from first principles. This feature helped users quickly get started with common measure scenarios. However, the number of templates and flexibility of those templates

left much to be desired. Now, Power BI has introduced Quick Measure Suggestions, which is a new way to assist the creation of DAX measures using natural language instead of using templates or writing DAX from scratch.

Quick measures

Select a calculation to create a measure or describe the measure you need and we'll generate suggestions in DAX, which you can customize later.

Calculations **Suggestions**

Sales amount for California in 2020

Generate

Suggested measures

Total sales amount where state-province is California and year of date is 2020

Preview value

\$1,785,099.77

DAX ?

Measure =
CALCULATE(
SUM('Sales'[Sales Amount]),
KEEPFILTERS(
'Customer[State-Province]'))

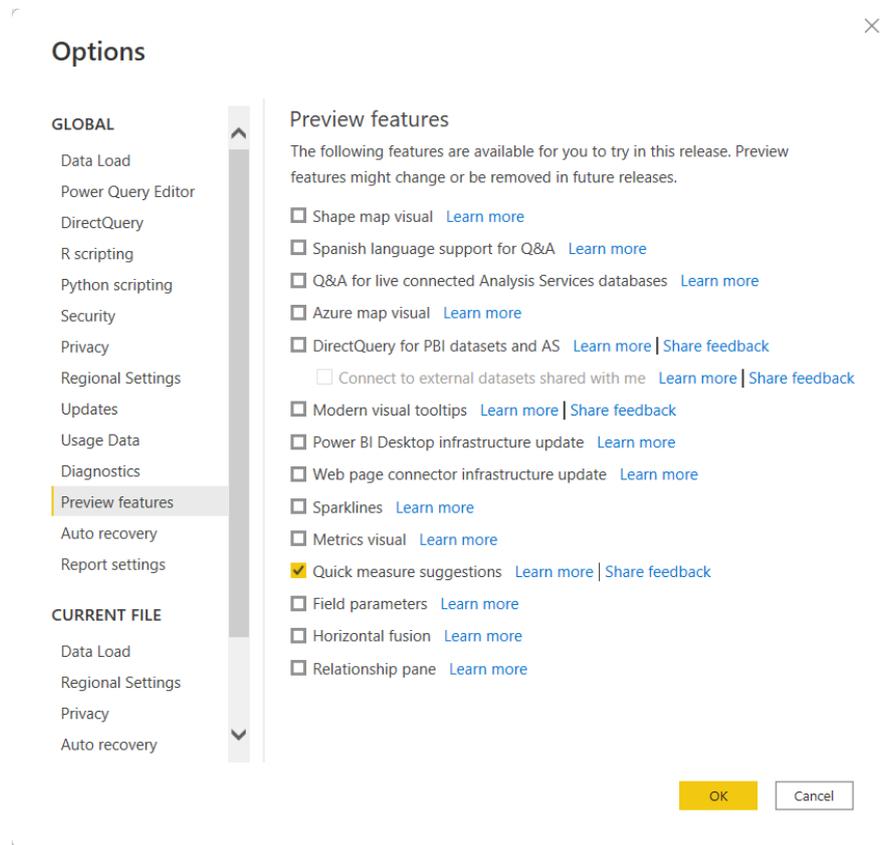
Show more

Add

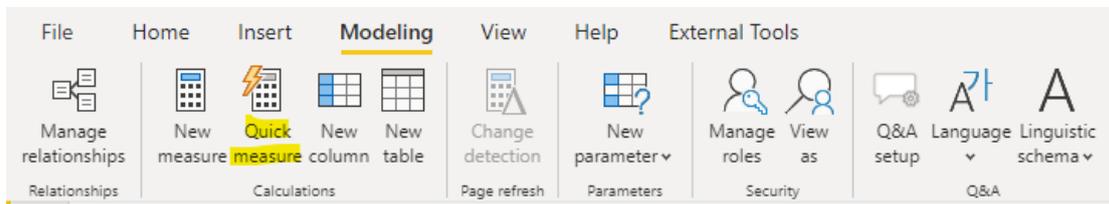
Total sales amount where state-province is California and order quantity is 2020

Total sales amount where state-province is California and extended amount is 2020

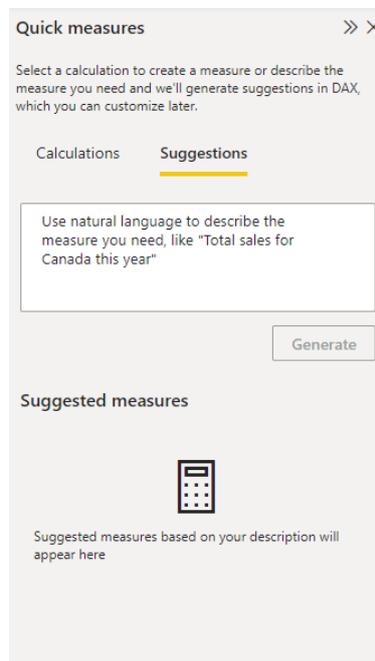
To enable the feature, you will need to first navigate to the Options menu of Power BI Desktop and turn on the preview switch for 'Quick measure suggestions':



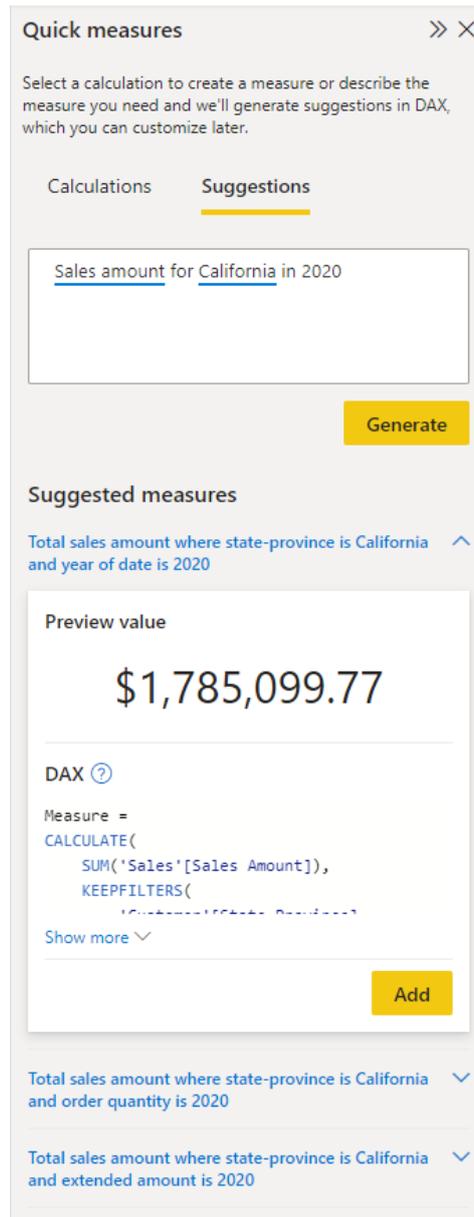
To access the Quick measure suggestions, select the Modeling tab within the Ribbon and then select 'Quick measure':



Then, select the Suggestions tab:



Here, you can describe the measure you want to create and hit Generate (or the **ENTER** key) to get DAX measure suggestions:



Don't just take it for granted though. You should always validate the DAX suggestions to make sure that it will meet your needs. If you're satisfied with the suggested measure, you may click the 'Add' button to automatically add the measure to your model.

Amongst others, these are just some of the supported measure scenarios:

- Aggregated columns with or without filters
- Count of rows with or without filters
- Aggregate per category
- Mathematical operations
- Selected value
- If condition
- Text operations
- Time intelligence
- Relative time filtered value
- Most / least common value
- Top **N** values for a category.

There are limitations though (sadly!). It should be noted that:

- 'Quick measure suggestions' should not be seen as a replacement for learning DAX. The suggestions provided by the feature are meant to help fast track measure creation. However, you will still need to validate the DAX suggestions because they may be wrong or not match your intent
- this feature is in experimental preview for users to test and give feedback. It should be noted that the design and functionality may go through significant changes – so don't rely on it *just* yet
- the feature is powered by a machine learning model that is currently only deployed to US datacenters (East US and West US). Sadly, if your data is outside the US, the feature will be disabled by default unless your tenant administrator enables the 'Allow user data to leave their geography tenant' setting:

Quick measure suggestions

- ▶ Allow quick measure suggestions (preview)
Enabled for the entire organization
- ▾ Allow user data to leave their geography
Disabled for the entire organization

Quick measure suggestions are currently processed in the US. When this setting is enabled, users will get quick measure suggestions for data outside the US. [Learn more](#)

Disabled

Apply

Cancel

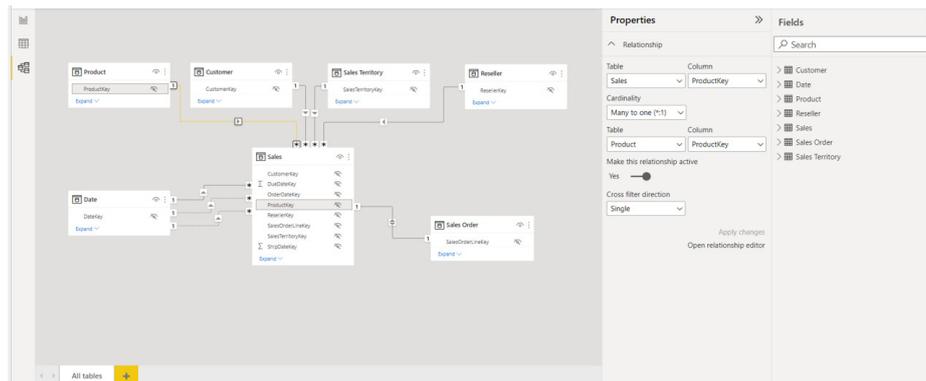
i This setting applies to the entire organization

Certainly worth more than a passing glance!

Relationship editing in the properties pane in Preview

With this update you may now quickly edit relationships in the Properties pane. In the Modeling (*sic*) view, expand the Properties pane and simply click on any relationship line to see all the relationship options. This new relationship editing experience sends minimal queries by having no data preview and validating only when you apply changes. Big data models,

especially in DirectQuery storage mode, will see the most benefit from this streamlined experience. Should you need to edit using the Relationships dialog, this is still available from the Properties pane or by double clicking any line, just like before.

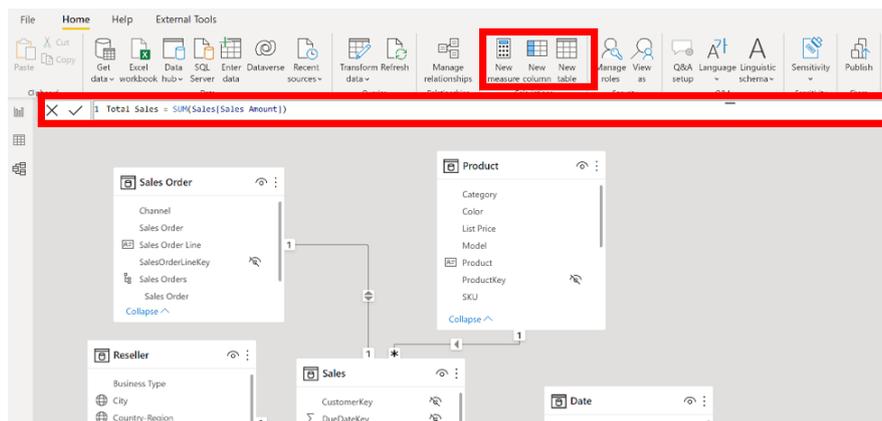


In addition, this update also introduces editing multiple relationships at once. Simply hold down **CTRL** to select multiple relationships and make changes, or even click the **DELETE** key on your keyboard to delete those

selected. You may test it out by going to **Files -> Options and Settings -> Options -> Preview features** and turn on 'Relationship pane'.

DAX Formula bar support for Desktop Model view

The DAX Formula bar is now supported in Desktop Model view. You may now create and edit measures, calculated columns and calculated tables in the Model view on Desktop.



Introducing tenant setting for Power BI Datamarts in Preview

Back in May 2022, Microsoft announced the public Preview of Power BI Datamarts, which provided a user-friendly means to ingest data from different data sources, extract, transform and load the data using Power Query, and then load it into a fully managed Azure SQL database. Based upon feedback from users, Microsoft has announced the introduction of AAD-based filtration to the Power BI Datamart preview tenant setting,

enabling Power BI Service administrators to limit the ability to create Datamarts to certain groups or individuals.

Datamart configuration settings may be accessed via the 'Tenant Settings' tab in the 'Power BI Admin Portal':

Datamart settings

△ Create Datamarts (Preview)

Unapplied changes

Users in the organization can create Datamarts

Enabled

Apply to:

The entire organization

Specific security groups

Enter security groups

Except specific security groups

Apply

Cancel

Eduframe Reporting

The Eduframe Reporting connector has been updated:

- this update has added custom fields to program editions, planned courses and orders
- changing language no longer breaks decimal and currency parsing.

Socialbakers Metrics

This month sees the release of the new Socialbakers Metrics connector.

Integrating social media insights alongside the rest of your marketing or business intelligence data gives you a holistic understanding of your entire digital strategy, all in one place. With the Socialbakers Power BI Connector by Emplifi, you may include social media data from the Emplifi Platform in your charts and graphs and combine them with other data you own.

The Power BI Connector is a layer between Socialbakers Public API and Power BI itself. It helps you to work with your data directly in the Power BI tool. The majority of data and metrics available in the Socialbakers Public API are also available in the connector.

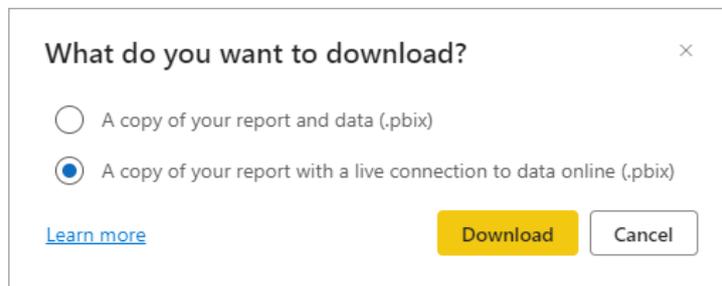
Guest users can now create their own email subscriptions

From this update, Azure Active Directory Business-to-Business (Azure AD B2B) guest users may now create their own email subscriptions in Power BI. Email subscriptions make it easy to stay on top of important reports and dashboards by receiving a snapshot in your inbox at customisable frequencies. Instead of requiring users in your organisation to create subscriptions on behalf of guest users, Power BI now empowers guest users to create their own subscriptions for Power BI reports, dashboards and paginated reports they have access to.

The requirements for a guest user to subscribe themselves to content are the same as for any user: either they'll need a Power BI Pro or Premium Per User (PPU) license, or the workspace where the content is saved must be backed by a Premium capacity. For now, guest users may only subscribe themselves, not others.

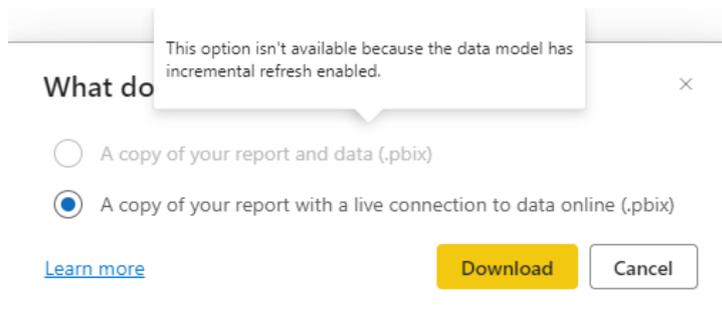
Downloading a PBIX is now available for more scenarios

Starting this release, Power BI is introducing multiple options to download a report .pbix file. Whilst downloading a report .pbix file, you will see the following dialog:



As is shown in the dialog, you may now choose between downloading the report including data as well as downloading the report without the data, but with a live connection to the data. You should note that depending

upon your exact scenario only one option might be available. In these situations, you will see the other option as disabled. A ToolTip will explain why that option is not available, as can be seen in the image below:



However, in most instances you will be able to download the report with a live connection to the data even when downloading the report with the data included is not supported. This unlocks the following situations in which you previously could not download a report **.pbix** file:

- download reports created based upon a dataset that is configured for large models
- download reports created based upon a dataset that is configured for incremental refresh
- download reports created based upon a dataset that has been modified by using the XMLA endpoint
- download any **.pbix** file that is larger than 1 GB
- downloading usage metric reports.

Administration and governance

Just the one announcement this month...

INTRODUCING TENANT SETTING FOR EMAIL SUBSCRIPTIONS TO EXTERNAL USERS

If your report or dashboard is hosted in a Premium capacity, you can include external users as recipients to your email subscriptions. External users are users outside of your organisation that have not yet been invited to become Azure Active Directory Business-to-Business (Azure AD B2B) guest users. There is now a new tenant setting that specifically controls whether email subscriptions can be sent to external users. With

the new tenant setting called 'Allow email subscriptions to be sent to external users', Power BI administrators can control who may send email subscriptions to external users, either turning this capability on or off for the entire organisation or limiting this capability to specific security groups. The external user email subscription setting may be accessed via the 'Tenant Settings' tab in the 'Power BI Admin portal':

Allow email subscriptions to be sent to external users
Enabled for the entire organization
 Users can send email subscriptions to users who are not yet Azure Active Directory business-to-business (B2B) guest users.

Enabled

Apply to:

The entire organization
 Specific security groups
 Except specific security groups

Deployment pipelines

Three areas to discuss in this section.

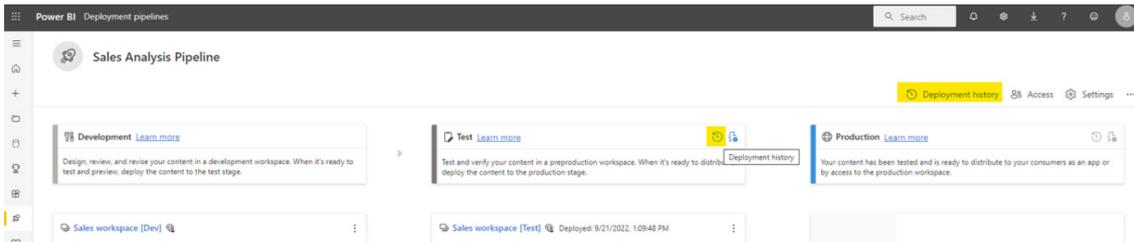
DEPLOYMENT HISTORY

If you are having troubles tracking a pipeline's deployment executions or something seems to have changed in your test environment workspace and you're not sure what and / or why, or your last deployment failed, and you have no idea how to get its ID for the support ticket, then this update is probably for you.

With the new Deployment pipeline feature 'Deployment History' all your recent months deployments are available to be reviewed, providing details on the target environment, the person who ran the deployment, the deployed items, the deployment note's content (if it has been added) and more.

'Deployment History' has also added the option to add a note as part of a deployment process. This note appears next to its deployment history record and assists with providing context when you review past deployments. This note is not editable.

The 'Deployment History' page may be accessed through either a general entry point (a new 'Deployment History' button) or through the 'Deployment History' clickable icon of a deployed stage:



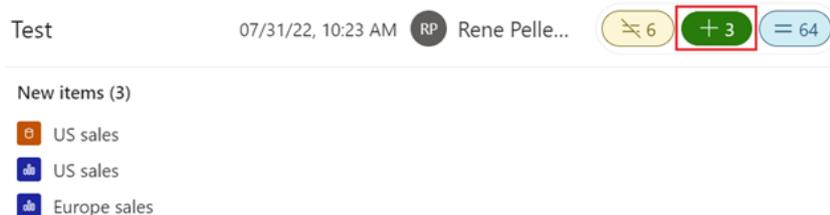
The 'Deployment History' page lists the deployments chronologically from newest to oldest:

Deployment history								×
All Development Test Production								
All								
Deployed to	Date and time	Deployed by	Items	Note	ID	Status		
Test	07/31/22, 10:23 AM	RP Rene Pellet...	6 +3 =64			✓		
Test	07/06/22, 4:58 PM	RP Rene Pellet...	+74			✓		
Test	06/06/22, 10:14 AM	RP Rene Pellet...	+1			✓		
Test	06/02/22, 4:41 PM	RP Rene Pellet...	=1			✓		
Test	06/02/22, 4:32 PM	RP Rene Pellet...	Failed			✗		

By default, all the deployments are listed on one list. However, you can narrow your scope to focus on a specific deployed target stage by filtering this list using the clickable tabs at the top of the page.

Icons on the left side of each deployment indicate whether the deployment succeeded or failed, how many deployed items were different / new /

same on the deployed stage before the deployment, whether it has a note or not and its ID. Clicking on them expands the deployment record and provides additional details such as failure reason, list of the deployed items (name and type), the note content and the ID string.



AZURE DEVOPS EXTENSION NOW GENERALLY AVAILABLE

Following the announcement in January of launching the Azure Devops (ADO) extension, this update makes this feature Generally Available. The ADO extension contains all the API operations available today for

deployment pipelines so they may be used with Azure pipelines while integrating additional capabilities into the release process such as automated testing, approvals and more.

CHANGES TO UPDATEAPP REST API

Recently, Power BI Apps announced the public Preview of 'Multiple Audiences' in the Power BI Apps, which adds the capability to manage an application's content by different audiences individually. Following

this change, Deployment pipeline UpdateApp REST API was changed to exclude the action of adding new deployed items to the application.

Custom visuals API version 5.1

Microsoft has updated the custom visuals API to version 5.1. Highlights of this update include:

- **Support for new Format pane.** Using the 5.1 version of the API, you may now define modern Format pane cards, subcategories and new properties on custom visuals using the new API 'getFormattingModel'. This API is a replacement for the old API 'enumerateObjectInstances'. This should make it easier for report creators to use custom visuals
- **Identity filter API (new).** API 5.1 introduces a new Identity filter API. This API allows you to create a visual that can filter categorical data. This is to say it filters the data using data points rather than mathematical expressions. This is useful for custom visuals that leverage group-on keys and to allow selections using identities that are opaque. Additionally, this new API makes it easier to migrate visuals to a newer API
- **Extending the subtotal API for matrix.** Power BI has added a new option to the subtotal API. The rowSubtotalsType: ('Top' or 'Bottom') allows the visual to fetch the subtotal data on top (before the rest of the data) or bottom (after all the data was fetched). This is available with 5.1 API release
- **New sorting option for Power BI custom visuals.** Previously, Power BI had two sorting options in custom visuals: default and implicit. With the 5.1 API release, a new custom option has been added. The Custom sort option gives the developers more control over the sorting options, such as sorting by multiple fields.

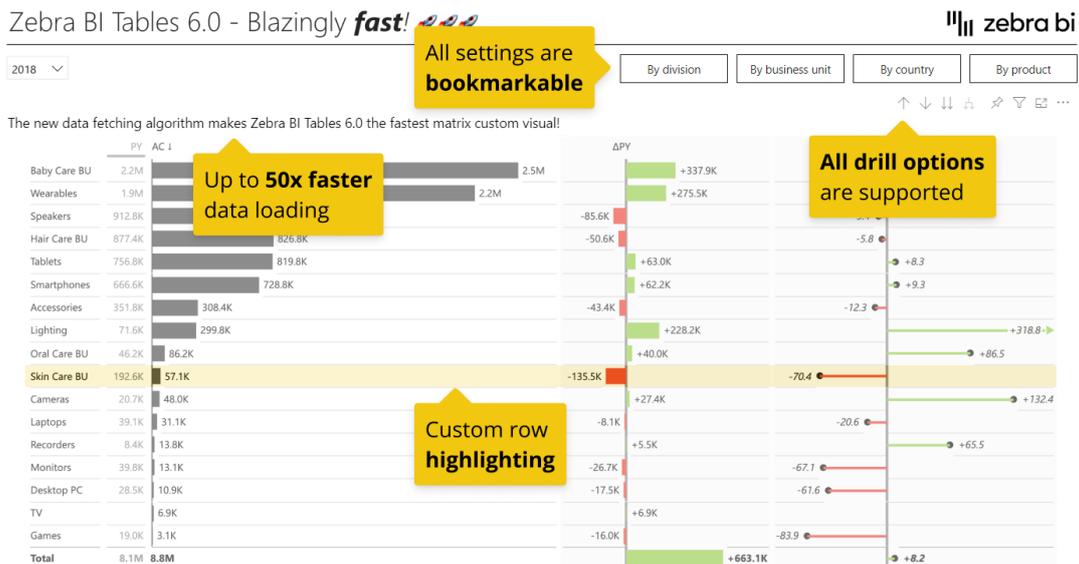
New visuals in AppSource

The following new visuals are included in this update:

- KPI CircleCard
- Plotly Waterfall Chart
- Text search slicer.

Zebra BI Tables 6.0

The Zebra BI Tables visual has been updated. There are now multiple improvements, including further optimisation improvements, new drill options, enhanced highlighting settings and bookmarking of all settings.



Zebra BI Tables 6.0 is the first visual that uses a completely new data fetching algorithm introduced by Microsoft. This means it no longer need to fetch all the data. Instead, when a user drills into rows, only the necessary data is loaded, which means that the loading time for complex matrices with several hierarchies may be c.50 times faster.

The 6.0 version introduces a new highlighting design where you may

Inforiver Enterprise SaaS Edition

The Inforiver Enterprise SaaS Edition delivers everything offered by Inforiver Premium, along with the following new capabilities:

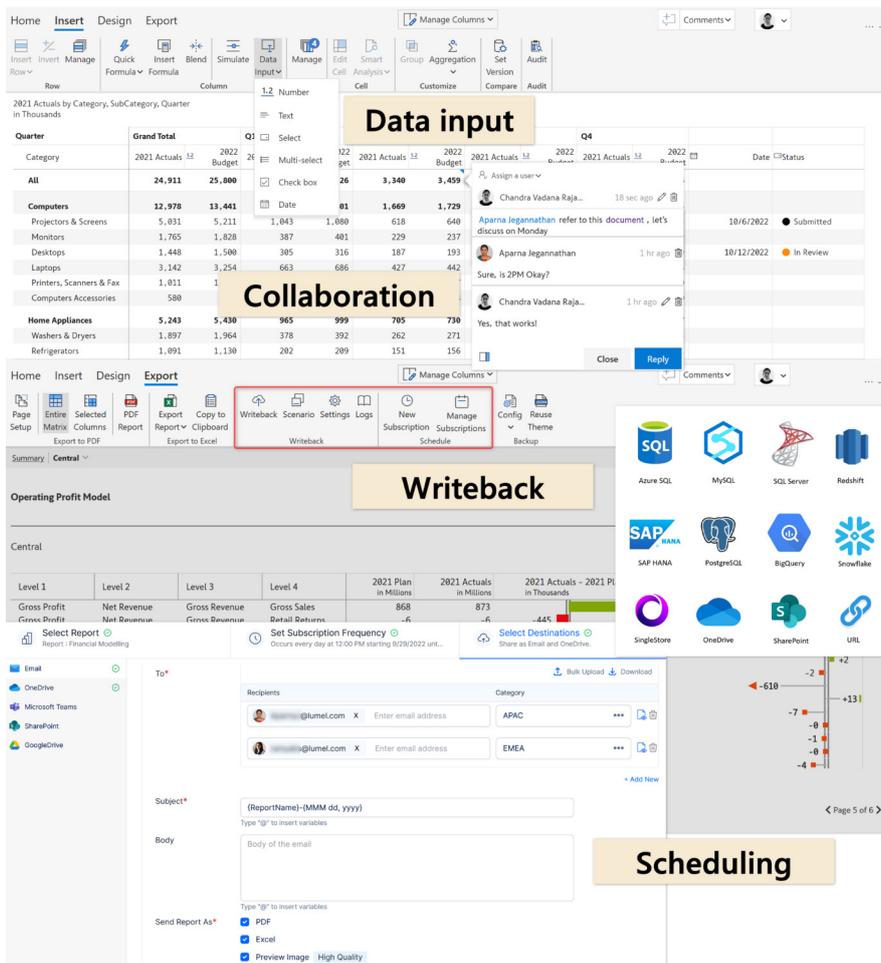
- ability to write back data to your own databases (Azure SQL, Azure Synapse, SQL Server, Snowflake, Redshift, BigQuery, ...) and shared drives (OneDrive, SharePoint)
- scheduling and distributing formatted paginated reports as PDF, Excel or Screenshot (MHTML) by email and to shared file drives

control the row hover settings. You can change the colour so that it fits the needs of your audience best or else turn it off completely.

Options such as expand and collapse, drill down, drill into, expand all down or go to next level will assist in analysing your data. Additionally, everything is now bookmarkable so you can seamlessly switch between different views within one visual.

- advanced commenting and collaboration at a cell, row and column level.

The ability to capture inputs for budget, forecasts, text comments, dropdown lists, dates in reading mode even by report viewers for write-back, snapshot reporting, tasks, notifications and enterprise themes are other key highlights.



These capabilities are powered by Azure SAAS services which are hosted and managed by Inforiver in the public multi-tenant cloud architecture. Inforiver Enterprise Matrix visual may be purchased directly with Microsoft as it is integrated with Power BI's new licensing and transactability API.

PowerGantt Chart by Nova Silva

Earlier this year the PowerGantt Chart was introduced. Now, it had been updated.

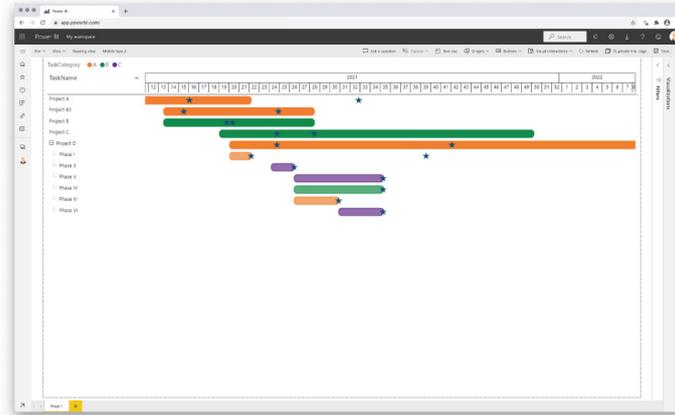
One improvement has been to add a custom-date-scale to the PowerGantt Chart. This would significantly increase the number of possibilities, because there are unlimited number of custom date / time

All of these enterprise matrix capabilities are offered with your data encrypted both at rest and in transit. For customers who have specific data residency, security and governance Inforiver also offers private and on-premises implementation.

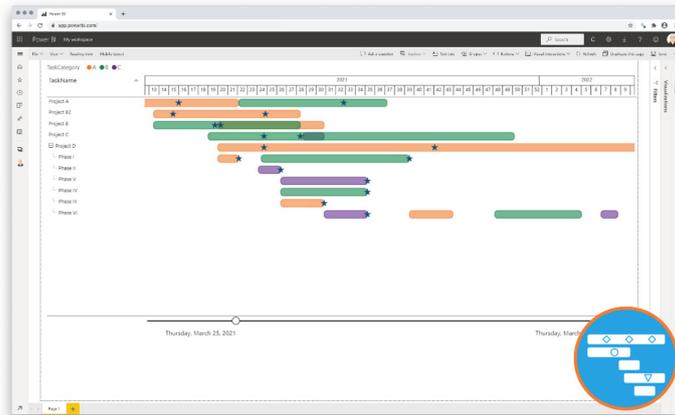
scales such as fiscal years, special week numbers, AM / PM split of the day, etc.

Furthermore, you could already include an unlimited number of tasks, hierarchy levels and milestones. Now every user of the PowerGantt can also define and include their own custom date scale.

PowerGantt Chart by Nova Silva



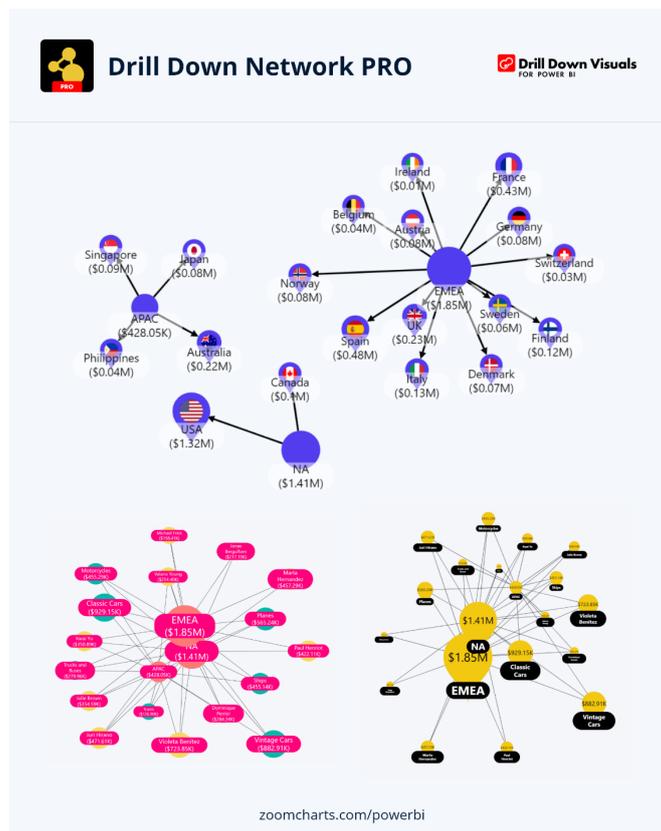
NEW: support for “custom date scale” and multiple bars per task



Drill Down Network PRO by ZoomCharts

You may explore elaborate networks of category-based data using Drill Down Network PRO by ZoomCharts. This custom Power BI visual can convert your multi-level pie chart into a network chart that automatically

detects relations among categories. Interactive zooming and touch-driven selections help spot outliers and examine data in detail.



The main features include:

- **cross-chart filtering:** eliminate slicers by selecting data points directly on the charts
- **category-based customisation:** choose node type, shape, colour and font
- **link styling:** configure 'from' and 'to' decorations and show link value
- **display up to nine [9] data categories**
- **touch-input device friendly:** explore data on any device.

Popular use cases include:

- Accounting and Finance: show cost attribution
- Human Resources: analyse salary data by department
- Production: map production volumes by product or factory
- Sales and Marketing: visualise marketing campaigns.

ZoomCharts Drill Down Visuals are known for interactive drilldowns, smooth animations and their customisation options. They support interactions, selections, custom and native ToolTips, filtering, bookmarks and context menus. You may use them to create visual, intuitive reports.

Update to release notes

Last but not least, Microsoft wanted to highlight forthcoming updates / highlights for their roadmap. These include:

- **OneDrive / SharePoint integration** including save and share from Power BI Desktop will start rolling out to a select few customers in the coming weeks. Once sufficient testing has been performed, it will then roll out to other Office rings, which will not be until 2023
- **Office installer** will start roll out by the end of the year but will take some time to reach all E5 tenants
- **On Object format and edit** will roll out into Preview to a few select users. Whilst Microsoft would like to roll this out to all customers, due to the nature of the change, it has been decided to delay putting this into production
- **Quick measure suggestions** should have shipped in the October Desktop release in experimental Preview a few of the **Metrics**
- a few of the **Metrics features** may be slightly delayed
- what is known as the **2022 Wave 2 release plan** has gone through some updates (mainly on dates) and some carryovers from what was referred to as Wave 1. The roadmap should be amended shortly.

That's it for this month. See you in December!

New Features for Excel

The latest updates see the release of Check Performance for Excel web users to help speed up your workbooks and dynamic array support for Windows users (albeit in Excel for the web and the Desktop Insiders Beta presently). For Insiders using Mac, you can now shape your data using

the Power Query Editor and manage your storage accounts for first and third party profiles. There are other additions / improvements too, with the full list as follows:

Excel for the web

- Check performance
- Sharing a section of Excel workbook
- Dynamic array support in charts

Excel for Mac

- Shape data with Power Query Editor (Insiders Preview)
- Manage your storage accounts (Insiders Preview).

Excel for Windows

- Modern comments
- Dynamic array support in charts (Insiders Beta)

Let's plough through.

Check performance

Anyone who uses Excel regularly will be familiar with the dreaded file bloating phenomenon, where file sizes suddenly increase drastically and / or unexpectedly. At long last, the Excel Performance team has created a new capability to detect and remove unwanted size bloat and speed up such workbooks.

down or become unresponsive. As a consequence, this update enables you to detect and remove these cells slowing down your workbooks, with 'Check Performance' – albeit presently available only in Excel for the Web.

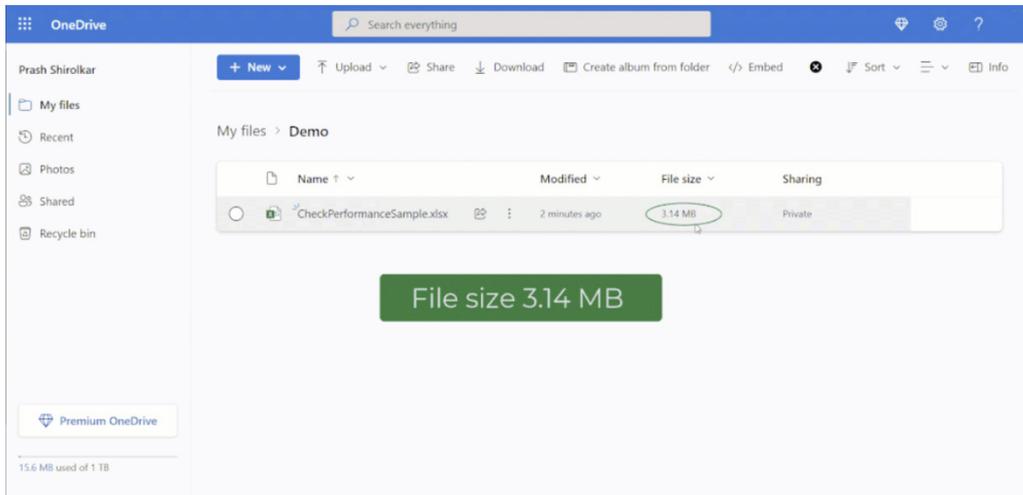
Often, a workbook can collect cells that have no data but still contain hidden information of little or no use anymore. These cells may have had data and formatting to start with, however now they do not have any data, but still take up space because they contain formatting. Consequently, too many of these cells can cause your workbook to slow

When you open your workbook, Excel now detects whether your workbook contains too many of these unwanted formatted cells. If it does, Excel shows a "Business bar" to launch the 'Check Performance' feature. This may be launched manually from **Review -> Check Performance** too.

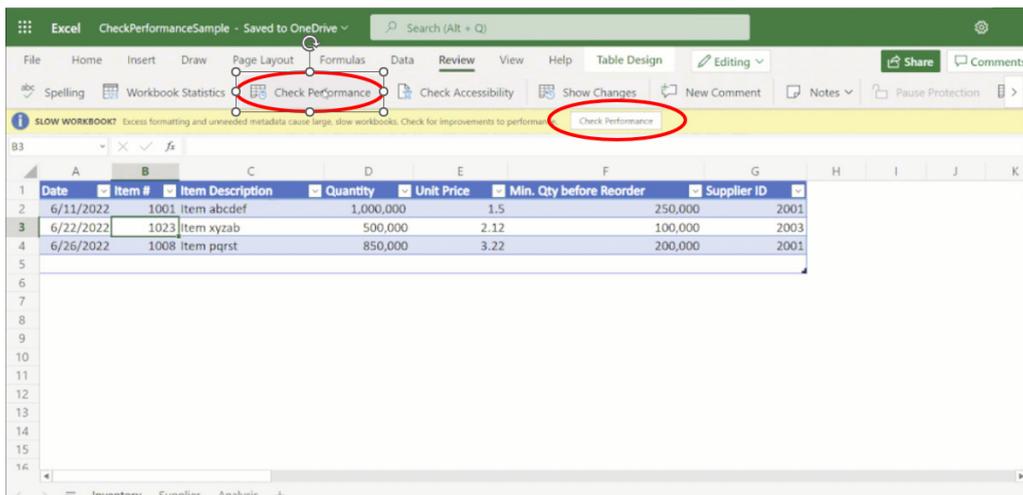
Once launched, there are two ways to remove these cells:

1. by navigating to a sheet in the task pane to review each range of these cells to optimise, and then pressing the 'Optimize Sheet' button; or
2. by pressing the 'Optimize All' button to remove all unwanted cells from all sheets in the workbook.

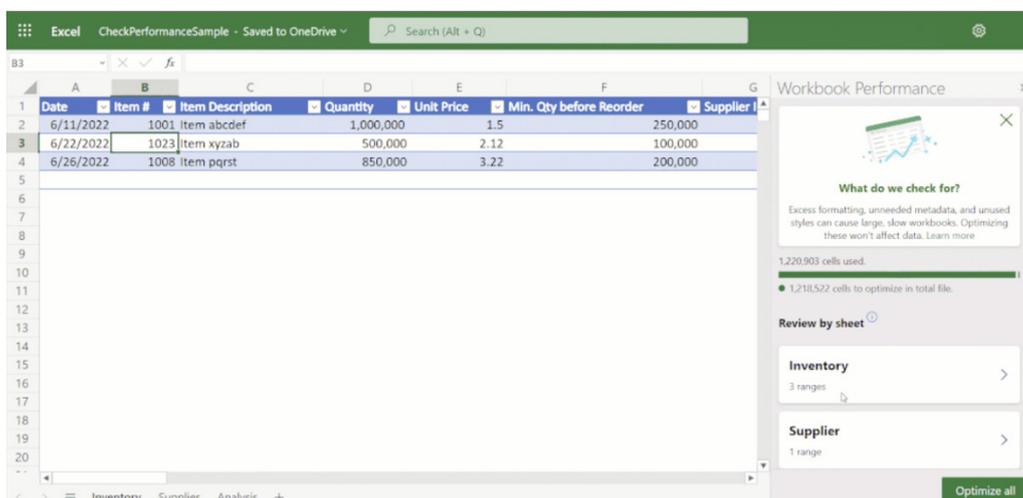
Consider the following example. Here, we have a file that has a current size of 3.14MB – not too large, but as it turns out, much larger than it *should* be.



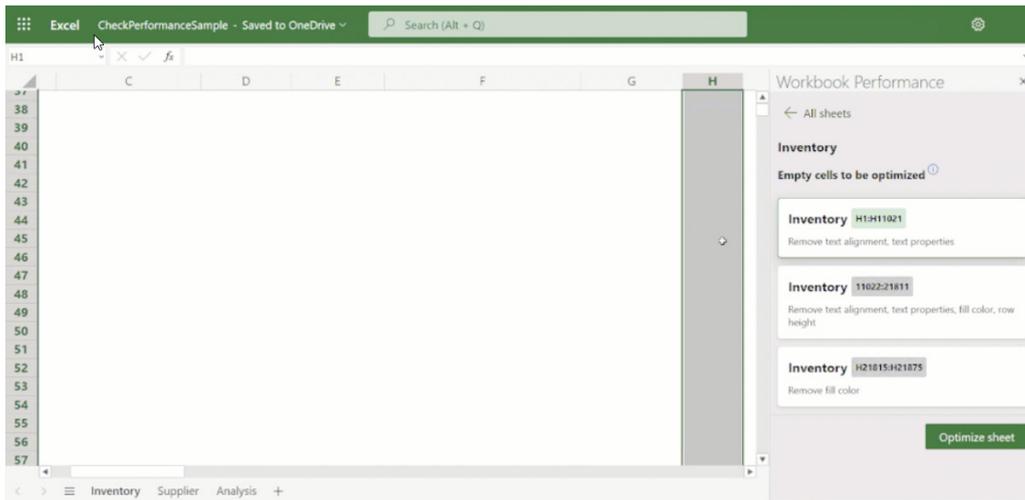
Upon opening, the Business bar (yellow bar) highlights the slow workbook and prompts you to 'Check Performance'. This may also be accessed from the Review tab, as displayed below:



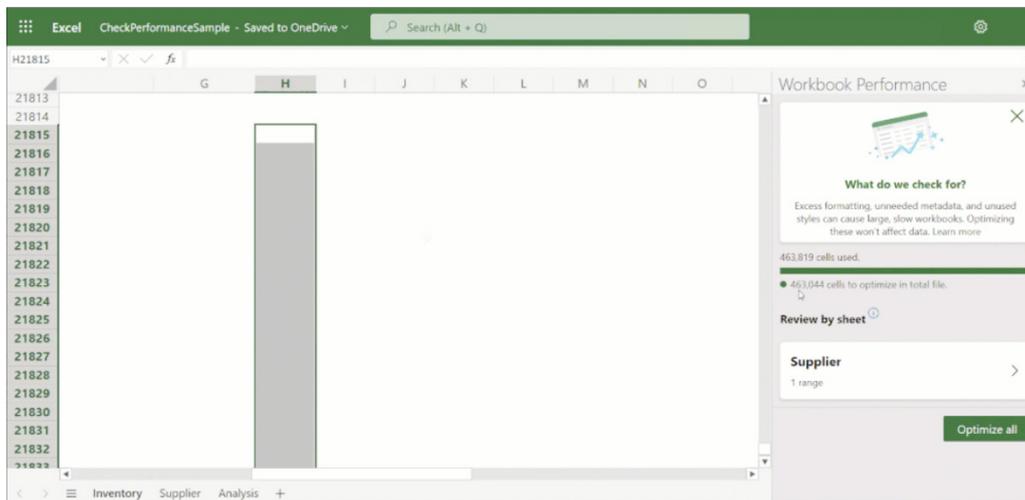
The 'Workbook Performance' pane appears and highlights two of the three worksheets may require review, citing a total of four ranges, viz.



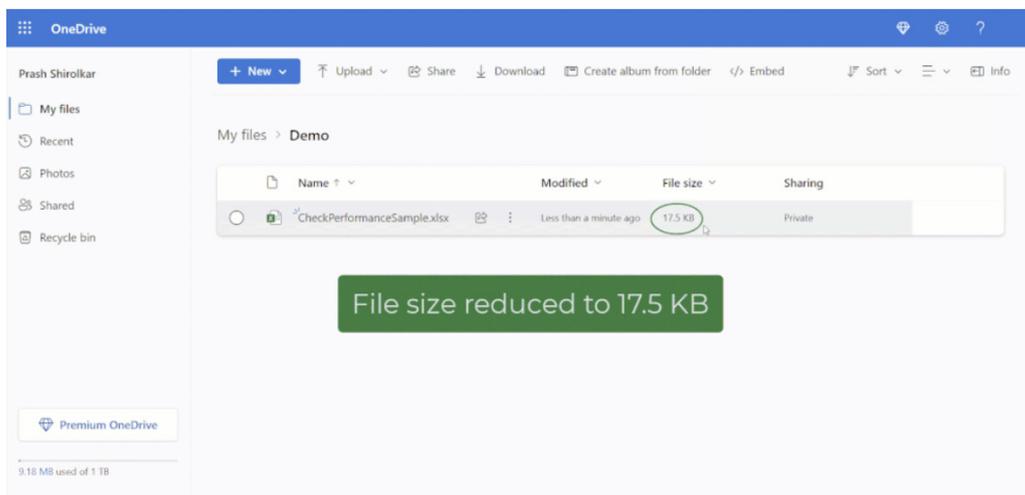
Clicking on the 'Inventory' box in the 'Workbook Performance' pane yields information on three empty cell ranges that may be optimized and prompts with an 'Optimize sheet' button (bottom right):



Similarly, the 'Supplier' sheet details one range to consider:



Following the prompts and optimising both sheets generates considerable savings in file size:



Here, 'Check Performance' has reduced a 3.14 MB file down to 17.5 KB, by detecting and removing more than a million unwanted formatted cells. Bearing this in mind, you might think, why doesn't Excel remove these cells in the background without alerting me? This is because, even though the cell has no data, removing its formatting may result in visible

changes. For example, removing yellow fill from a cell may reset its fill to 'No Color', which might not be what you want. Microsoft does not want any Excel users to be surprised by visual changes by doing this in the background without alerting hence the manual interaction.

You should note that this new feature will be enabled gradually to more and more users over time as Microsoft rolls out the update and ensures it is working correctly. Therefore, if you do not see the 'Check Performance' button in the Review menu tab, then the feature may not be enabled for you yet.

If you are thinking whether this will come to Excel Windows and Mac then we're way ahead of you. Apparently, Microsoft is investigating other areas contributing to size bloat that they can integrate into Check Performance's detection and removal capability and will roll out thereafter. Watch this space.

Sharing a section of Excel workbook

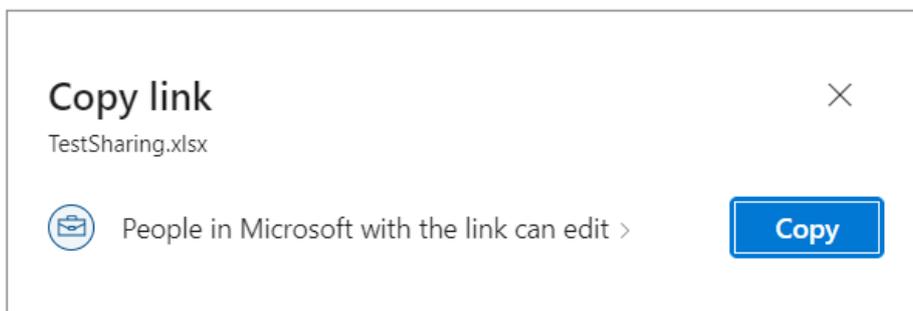
Whether collaborating through Teams or on the web, you may want to share information from a workbook. You can share the entire workbook, but sometimes you may wish to share just a section of the workbook for viewing or editing. With this update, you may easily share with others

a link to a specific range, table or chart. First you create a link to the shared section of a workbook. Then you send or make available the link to recipients. Finally, recipients may simultaneously view or edit the workbook section.

4	2017	Clothing	Bib-Shorts	\$ 4,000.0	22%
5	2015	Clothing	Shorts	\$13,300.0	56%
6	2017	Range shared with you X		\$36,000.0	100%
7	2015	Components	Handlebars	\$ 2,300.0	35%
8	2016	Clothing	Socks	\$ 2,300.0	28%
9	2016	Components	Brakes	\$ 3,400.0	36%
10	2016	Bikes	Mountain Bikes	\$ 6,300.0	40%
11	2017	Components	Brakes	\$ 5,400.0	38%
12	2016	Accessories	Helmets	\$17,000.0	90%
13	2016	Accessories	Lights	\$21,600.0	90%
14	2016	Accessories	Locks	\$29,800.0	90%
15	2016	Components	Bottom Brackets	\$ 1,000.0	23%
16	2015	Clothing	Jerseys	\$ 6,700.0	5%

To create a shared link to a workbook section:

- open the workbook in Excel for the web
- select the range, table or chart
- right-click the selection, and then select 'Copy Link to this Range, Table, or Chart'. The 'Copy Link' dialog box appears



- select 'People in your organization with the link can edit'. In the 'Link settings' dialog, you may specify: 'Anyone with the link', 'People in Microsoft with the link' or 'People with existing access'. You may also specify whether recipients have Edit or View permission
- select Apply
- select Copy.

The link will now be in the Office Clipboard. Now that this shared workbook section link is created, recipients may use it in the following common ways:

BROWSER

When a recipient receives the shared link in email, they can select it. They may also copy and paste the link into the browser address bar. The

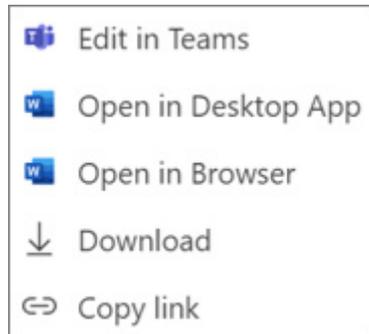
workbook will open in Excel for the web. The range, table or chart will be highlighted with a border for easy identification.

TEAMS

Once you have opened or switched to Teams, typically the copied link will be shared in the Teams chat with one or more recipients. The link may also be posted in a channel in Teams.

To open the workbook, recipients may select the link from the chat

or the channel. The shared range, table or chart will be displayed and highlighted with a border for easy identification. As a tip, right-click the workbook section to see additional commands including 'Edit in Teams', 'Open in Desktop App', 'Open in Browser', 'Download' and 'Copy Link'.



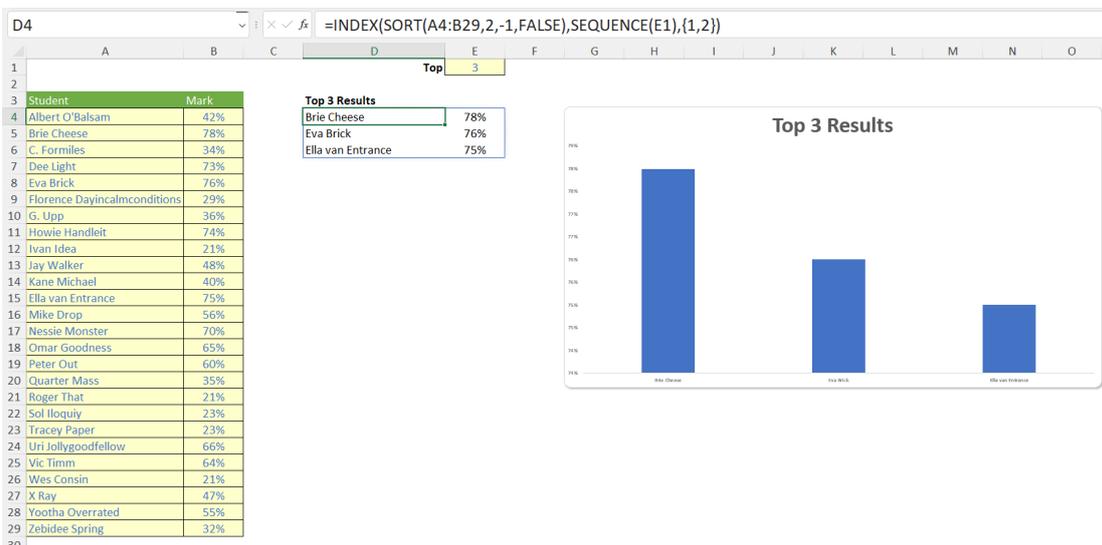
Finally, it should be noted that opening the workbook by using Excel on the desktop or by downloading the workbook removes the highlight from the range, table or chart.

Dynamic array support in charts

In Excel for the web and Excel Desktop (Insiders Beta), charts will now respond to dynamic arrays. Previously, linking dynamically required linking chart source data to an Excel Table (CTRL + T or Insert -> Table) but not anymore!

You can now create a chart with a data source range aligned to the result of an array formula. The chart will now update to capture all data whenever the array recalculates, rather than being fixed to a specific number of data points. Yippee!

For example, consider the following:

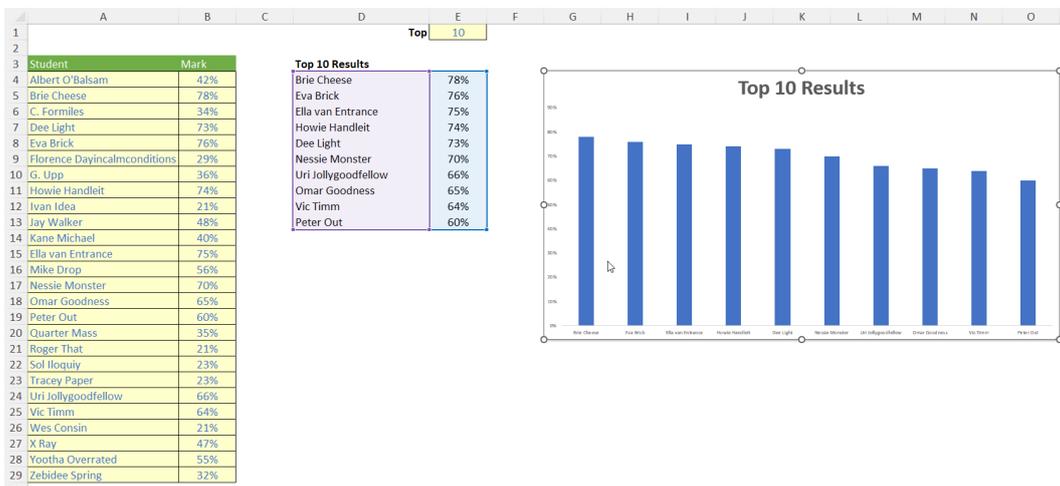


In cells **A4:B29** (purposely not placed in an Excel Table), I have entered the results of the Home Cookery & Poisoning (Joint Honours) vocational course. Cell **E1** contains an input number that specifies the top "X" students to chart, and the formula

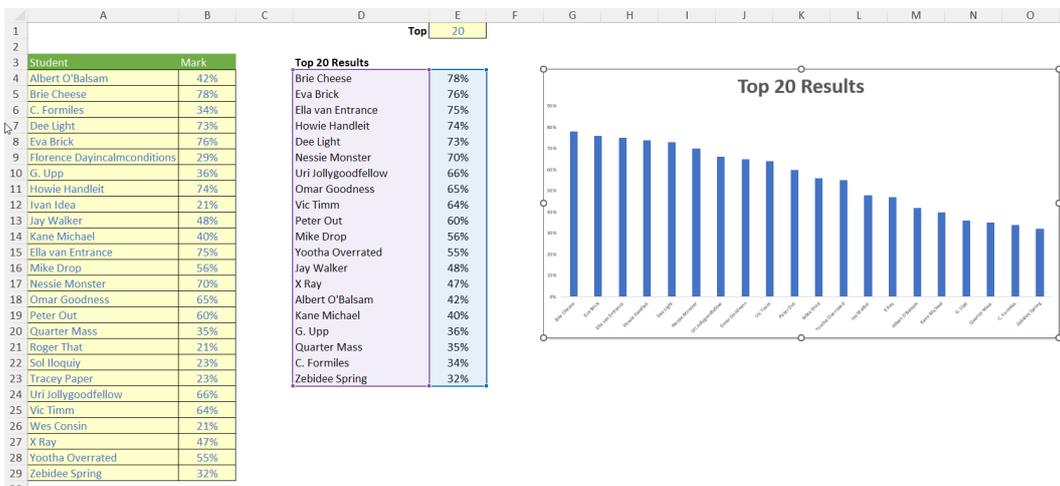
`=INDEX(SORT(A4:B29,2,-1,FALSE),SEQUENCE(E1),{1,2})`

has been entered into cell **D4** as a dynamic array formula to summarise the said top X students and their respective marks.

Finally, a chart has been inserted linking to the dynamic range (cells **D4:E6** in the above illustration) in the usual way (e.g. **Insert -> Recommended Charts**). Nothing that exciting so far, but then, let's change the value in cell **E1** to 10 (say):



or even 20:



How cool is that!? Goodbye opaque formulae using **OFFSET** and **/** or **INDEX**!

Modern comments

Modern comments in Excel for Windows are now built on the React Native framework, and you will now find people images are clickable showing their contact card details; comments can display both on the

grid and in the side pane at the same time. Furthermore, new icons for edit, resolve and reactivate are also now available on the card.

Comments have changed

Comments are now built on the React Native framework.

At the 30,000 foot level, **React/React Native gives us a way to build shared, cross-platform UI**. This has a few very real benefits, especially when it comes to comments:

UX consistency. We hear from customers they don't like it when an experience in one app or platform differs from what they see elsewhere. React ensures we have the right level of consistency at the code and UI level and now Word, PPT and Excel are coherent and consistent at the code level and comment card UI.

React Native makes it faster to deliver cross-plat experiences.

Got it

Shape data with Power Query Editor (Insiders Preview)

Yes, we know this was reported last month, but it has been updated!

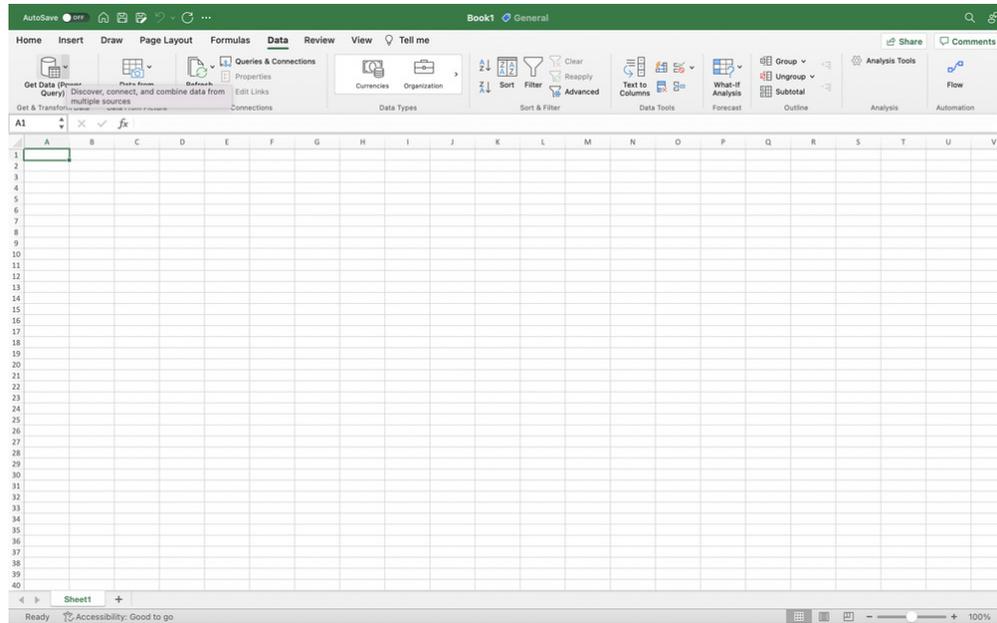
This feature is available to Insiders using either the Current Channel Preview or Beta Channel, running Version 16.64 (Build 22072501) or later.

When Power Query was first released in Excel for Mac, there was hope that it wouldn't take long for the features to mirror their Windows counterparts. It's taking time, but the capabilities are improving. Beginning with the ability to refresh data two years ago, importing data was introduced this time last year, so this does seem to be an annual

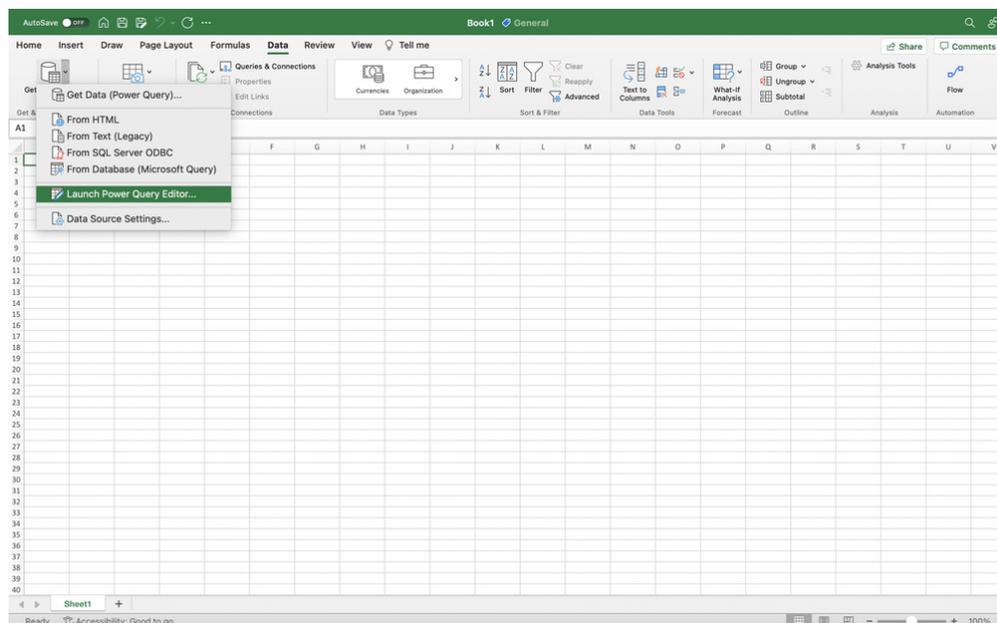
event! As you may imagine, Mac users have desperately requested the ability to transform data using the Query Editor, which would provide users with the full Power Query experience in Excel for Mac.

Well... it's getting there! You may now clean and shape your data with hundreds of transformations available in Power Query Editor in Excel for Mac.

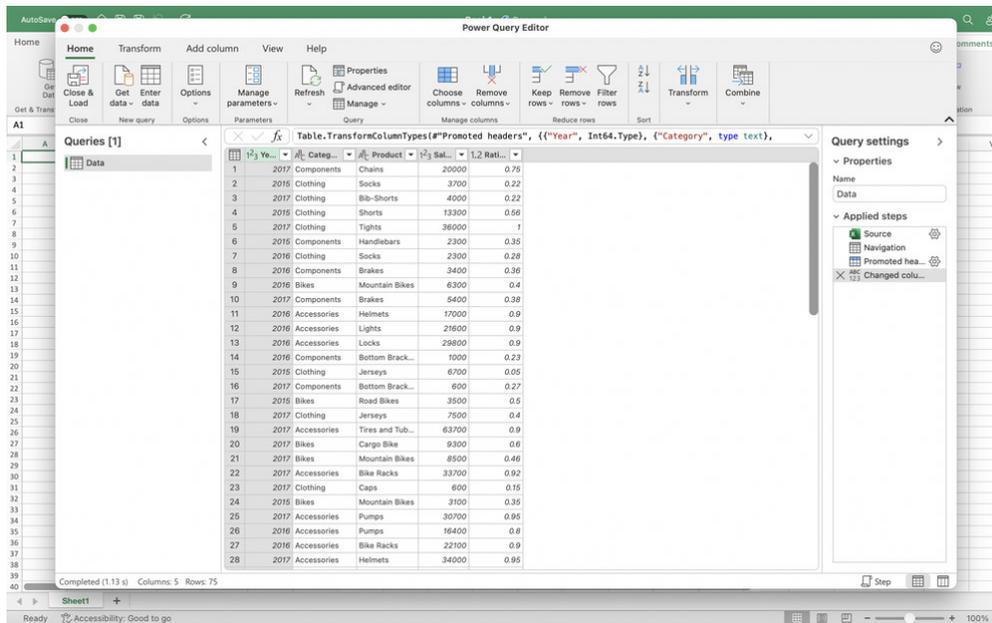
To access, on the Data tab, click the Get Data (Power Query) button.



Click Launch Power Query Editor to open the Query Editor.



You can shape and transform your data using the Query Editor similarly to Excel for Windows. When you're done, click the 'Close & Load' button on the Home tab.

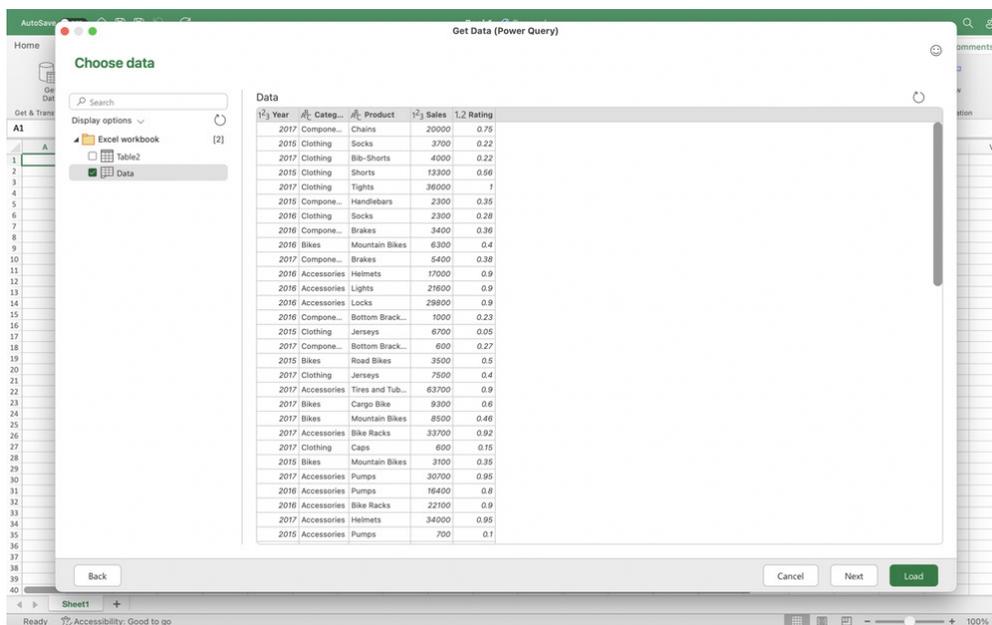


The newly imported data appears in a new sheet.

Supported data sources include:

- text, CSV, XLSX, XML and JSON files
- SharePoint, SharePoint Lists, SharePoint Folders and OData
- local tables, Tables and ranges
- Microsoft SQL Server.

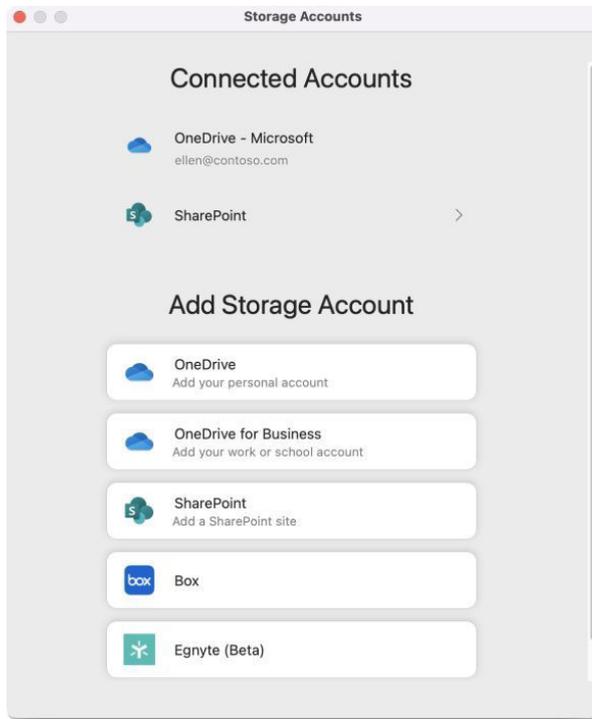
You may also access the Query Editor from the data import flow by clicking the Get Data (Power Query) button, choosing a data source, and clicking the Next button.



Manage your storage accounts (Insiders Preview)

You may now add and manage first- and third-party accounts and services in Excel for Mac, as well as others Office apps for Mac. The same 'Add Storage Accounts' feature in the Office Mobile apps is now available on a Mac. It is a redesign of the previous 'Add a Place' experience in the

Open tab. By using this feature, you may now add a SharePoint site, a OneDrive or OneDrive for Business account or even a third-party account such as Box.



Microsoft has released an 'Excel Features Availability' flyer to detail all of these items:

Excel Features Availability

Page 1 of 2

Feature	Insider		Production				Web
	Windows Find the latest Excel version for this platform	Mac Find the latest Excel version for this platform	Windows/CC Find the latest Excel version for this platform	Windows/MCC Find the latest Excel version for this platform	Windows/SA Find the latest Excel version for this platform	Mac Find the latest Excel version for this platform	
Check Performance							September 2022
Share Section of Excel Workbook							September 2022
Dynamic Array Support in Charts	Version 2209 (Build 15617.10000) or later						September 2022
Modern Comments			Version 2209 (Build 15427.20000) or later				
Manage Your Storage Accounts from Mac		Version 16.64 (Build 22082100) or later					
New Excel Functions			Version 2208 (Build 15427.20134) or later			Version 16.64 (Build 22081401) or later	August 2022
Power Query Group operations							August 2022
Improvements to the connected Power BI experience	Version 2208 (Build 15601.20028) or later						August 2022
Add and edit rich text formatting							August 2022
Sort by color or icon from auto filter menu							August 2022
Edit files with legacy data connections							August 2022
Edit files with legacy Shared Workbook Feature							August 2022
Delete chart elements							August 2022
Multiline formula bar							August 2022
IMAGE function	Version 2209 (Build 15608.10000) or later	Version 16.60 (Build 22080701) or later					
Show Changes	Version 2208 (Build 15601.20044) or later	Version 16.64 (Build 22080400) or later					March 2021

Features Flyer: aka.ms/ExcelFeaturesFlyer

CC: Current Channel; MCC: Monthly Enterprise Channel; SA: Semi-Annual Enterprise Channel. All information is subject to change.

Excel Features Availability

Page 2 of 2

Feature	Insider		Production				Web
	Windows Find the latest Excel version for this platform	Mac Find the latest Excel version for this platform	Windows/CC Find the latest Excel version for this platform	Windows/MCC Find the latest Excel version for this platform	Windows/SA Find the latest Excel version for this platform	Mac Find the latest Excel version for this platform	
Search within PivotTable Field List							July 2022
Set automatic data connections	Version 2207 (Build 15427.20000) or later						
Natural Language Query improvements			Version 2208 (Build 15538.20100) or later	Version 2208 (Build 15525.20100) or later		Version 16.63 (Build 22070801) or later	
Auto Conditional Formatting data links		Version 16.64 (Build 22070800) or later					
Data from aliases	Version 2209 (Build 15518.20000) or later						
Sheet protection							June 2022
Email select for links creation							June 2022
Add "PivotTable Connections to filter settings pane"							June 2022
Import from local text, CSV, and XLSX files						Version 16.57 (Build 22011100) or later	
Provide automatic on-link suggestions on charts and PivotCharts			Version 2209 (Build 15271.20200) or later	Version 2208 (Build 15528.20200) or later		Version 16.60 (Build 22061100) or later	
Power Query refresh for external data sources							May 2022
Changing source file for workbook links							May 2022
Improved Recommended PivotTable connections	Version 2208 (Build 15518.10000) or later						
Faster results on resource constrained devices		Version 16.62 (Build 22050804) or later	Version 2208 (Build 15519.20200) or later	Version 2208 (Build 15528.20200) or later			
Faster AutoFilter						Version 16.61 (Build 22050700) or later	
Dataflow connector							
Database connector			Version 2208 (Build 15529.20170) or later				
Database connector					Version 2208 (Build 15608.20140) or later		
Streaming data with Power Query tables	Version 16.64 (Build 22070100) or later						
Improved link display and link AI						Version 16.60 (Build 22061000) or later	

Features Flyer: aka.ms/ExcelFeaturesFlyer

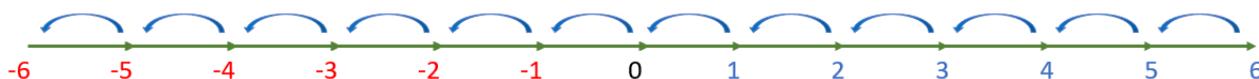
CC: Current Channel; MCC: Monthly Enterprise Channel; SA: Semi-Annual Enterprise Channel. All information is subject to change.

You can find the updated version of this grid with the interactive links at aka.ms/ExcelFeaturesFlyer.

The A to Z of Excel Functions: INT



The **INT** function is a good ol' fashioned Yorkshire function, **INT** it? **INT** rounds a number *down* to the nearest integer.



It employs the following syntax to operate:

INT(number).

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

- **number:** this is required and represents the real number you wish to round down to an integer.

It should be noted that:

- negative numbers are still rounded down: this has the effect of rounding up in order of magnitude, e.g. **INT(-9.001)** is equal to -10 (see diagram above)
- due to floating point errors, sometimes **INT** and the **ROUND** functions do not work as expected. Sometimes, you may need to experiment to get the result required.

Please see our example below:

	A	B	C
1	Data		
2	-3.80		
3	3.80		
4			
5			
6	Formula	Description	Result
7	=INT(6.9)	Rounds 6.9 down	6
8	=INT(A2)	Rounds the value in cell A2 down. Rounding a negative number down rounds it away from zero (0)	-4
9	=A3-INT(A3)	Returns the decimal (fractional) part of a positive real number in cell A3	1
10			

The A to Z of Excel Functions: INTERCEPT

Sometimes, you wish to forecast what comes next in a sequence, *i.e.* make a forecast. There are various approaches you could use:

- **Naïve method:** this really does live up to its billing – you simply use the last number in the sequence, e.g. the continuation of the series 8, 17, 13, 15, 19, 14, ... would be 14, 14, 14, 14, ... Hmm, great
- **Simple average:** only a slightly better idea: here, you use the average of the historical series, e.g. for the continuation of the series 8, 17, 13, 15, 19, 14, ... would be 14.3, 14.3, 14.3, 14.3, ...
- **Moving average:** now we start to look at smoothing out the trends by taking the average of the last **n** items. For example, if **n** were 3, then the sequence continuation of 8, 17, 13, 15, 19, 14, ... would be 16, 16.3, 15.4, 15.9, ...

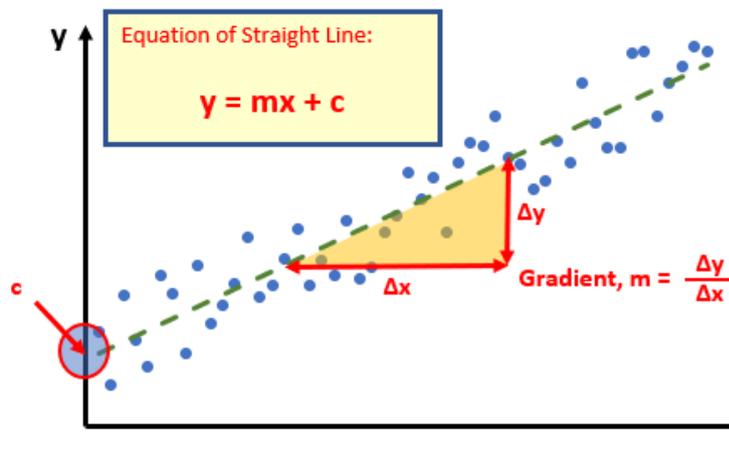
- **Weighted moving average:** the criticism of the moving average is that older periods carry as much weighting as more recent periods, which is often not the case. Therefore, a weighted moving average is a moving average where within the sliding window values are given different weights, typically so that more recent points matter more. For example, instead of selecting a window size, it requires a list of weights (which should add up to 1). As an illustration, if we picked four periods and [0.1, 0.2, 0.3, 0.4] as weights, we would be giving 10%, 20%, 30% and 40% to the last 4 points respectively which would add up to 1 (which is what it would need to do to compute the average).

Therefore the continuation of the series 8, 17, 13, 15, 19, 14, ... would be 15.6, 15.7, 15.7, 15.5, 15.6, ...

All of these approaches are simplistic and have obvious flaws. We are using historical data to attempt to predict the next point. If we go beyond this, we are then using forecast data to predict further forecast data. That doesn't sound right. We should stick to the next point. Since we are looking at a single point and we can weight the historical data by adding exponents to the calculation, this is sometimes referred to as **Exponential Single Smoothing**.

A slightly more sophisticated method is called **regression analysis**: well, that takes me back! This is a technique where you plot an independent variable on the **x** (horizontal axis) against a dependent variable on the **y** (vertical) axis. "Independent" means a variable you may select (e.g. "June", "Product A") and dependent means the result of that choice or selection.

For example, if you plotted your observable data on a chart, it might look something like this:



Do you see? You can draw a straight line through the data points. There is a statistical technique where you may actually draw the "best straight line" through the data using an approach such as Ordinary Least Squares, but rather than attempt to explain that, I thought I would try and keep

you awake. There are tools and functions that can work it out for you. This is predicting a trend, not a point, so is a representative technique for **Exponential Double Smoothing** (since you need just two points to define a linear trend).

Once you have worked it out, you can calculate the gradient (**m**) and where the line cuts the **y** axis (the **y** intercept, **c**). This gives you the equation of a straight line:

$$y = mx + c$$

Therefore, for any independent value **x**, the dependent value **y** may be calculated – and we can use this formula for forecasting.

Of course, this technique looks for a straight line and is known as **linear regression**. You may think you have a more complex relationship (and you may well be right), but consider the following:

- Always split your forecast variables to logical classifications. For example, sales may be difficult to predict as the mix of products may vary period to period, for each product, there may be readily recognizable trends
- If the relationship does not appear to be linear, try plotting **log x** against **log y**. If this has a gradient of two then **y** is correlated with **x²**; if the gradient is three, then **y** is correlated with **x³** etc.

One way of defining this is with the **INTERCEPT** (i.e. where the trendline cuts the **y**-axis, or the value when **x** is zero [0]) and **SLOPE** (i.e. the gradient) functions.

The **INTERCEPT** function calculates the point at which a line will intersect the **y**-axis by using existing **x**-values and **y**-values. The intercept point is based on a best-fit regression line plotted through the known **x**-values and known **y**-values (as described above). You should use the **INTERCEPT** function when you want to determine the value of the dependent variable when the independent variable is zero (0). For example, you can use the **INTERCEPT** function to predict a metal's electrical resistance at 0°C when your data points were taken at room temperature and higher.

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

$$\text{INTERCEPT}(\text{known_y's}, \text{known_x's}).$$

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

- **known_y's**: this is required and represents the dependent set of observations or data
- **known_x's**: this is also required and denotes the independent set of observations or data.

It should be noted that:

- the arguments should be either numbers or names, arrays or references that contain numbers
- if an array or reference argument contains text, logical values or empty cells, those values are ignored; however, cells with the value zero are included
- if **known_y's** and **known_x's** contain a different number of data points or contain no data points, **INTERCEPT** returns the #N/A error value
- The equation for the intercept of the regression line, **a**, is:

$$a = \bar{y} - b\bar{x}$$

where the slope, **b**, is calculated as:

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

and where **x** and **y** are the sample means **AVERAGE(known_x's)** and **AVERAGE(known_y's)**

- the underlying algorithm used in the **INTERCEPT** and **SLOPE** functions is different than the underlying algorithm used in the **LINEST** function. The difference between these algorithms can lead to different results when data is undetermined and collinear. For example, if the data points of the **known_y's** argument are zero (0) and the data points of the **known_x's** argument are one (1):
 - **INTERCEPT** and **SLOPE** return an #DIV/0! error. The **INTERCEPT** and **SLOPE** algorithm is designed to look for one and only one answer, and in this case there can be more than one answer
 - **LINEST** returns a value of zero (0). The **LINEST** algorithm is designed to return reasonable results for collinear data, and in this case at least one answer can be found.

Please see our example below:

	A	B	C
1	known_x's (independent)	known_y's (dependent)	
2	6	2	
3	5	3	
4	11	9	
5	7	1	
6	5	8	
7			
8			
9	Formula	Description	Result
10	=INTERCEPT(B2:B6,A2:A6)	Point at which a line will intersect the y-axis by using the x-values and y-values above	0.0483871
11			

The A to Z of Excel Functions: INTRATE



First introduced in Excel 2007, the **INTRATE** function will calculate the interest rate for a fully invested security. For example, it is particularly useful in calculating the interest rate of an unlisted bond.

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

INTRATE(settlement, maturity, investment, redemption, [basis])

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

- **settlement**: this represents the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer
- **maturity**: this is the security's maturity date, *i.e.* when the security expires
- **investment**: this is the amount invested in the security
- **redemption**: this is the amount to be received at **maturity**
- **basis**: the type of day count basis to use. This is the only optional argument. There are five options:

Basis	Day count basis
0 or omitted	Day count basis
1	US (NASD) 30 / 360
2	Actual / actual
3	Actual / 360
4	Actual / 365

It should be further noted that:

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900
- dates should be entered using the **DATE** function, or as results of other formulae or functions. For example, use **=DATE(2020,2,29)** for the 29th of February, 2020. Problems may occur if dates are entered as text
- the settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, 30 years after the January 1, 2008, issue date
- **settlement**, **maturity** and **[basis]** are truncated to integers
- if **settlement** or **maturity** is not a valid date, **INTRATE** returns the **#VALUE!** error value
- if **investment** ≤ 0 or if **redemption** ≤ 0, **INTRATE** returns the **#NUM!** error value
- if **basis** < 0 or if **basis** > 4, **INTRATE** returns the **#NUM!** error value
- if **settlement** ≥ **maturity**, **INTRATE** returns the **#NUM!** error value
- **INTRATE** is calculated as follows:

$$INTRATE = \frac{\text{redemption} - \text{investment}}{\text{investment}} \times \frac{B}{DIM}$$

where:

- **B** = number of days in a year, depending upon the **basis**
- **DIM** = number of days from **settlement** to **maturity**.

Please see our final example for this month below:

	A	B	C
1	Description	Data	
2	Settlement date	15-Feb-20	
3	Maturity date	15-May-20	
4	Investment	\$1,000,000	
5	Redemption value	\$1,014,420	
6	Actual / 360 basis	2	
7			
8			
9	Formula	Description	Result
10	=INTRATE(B2,B3,B4,B5,B6)	Discount rate for the terms of the bond	5.77%
11			

More Excel Functions next month.

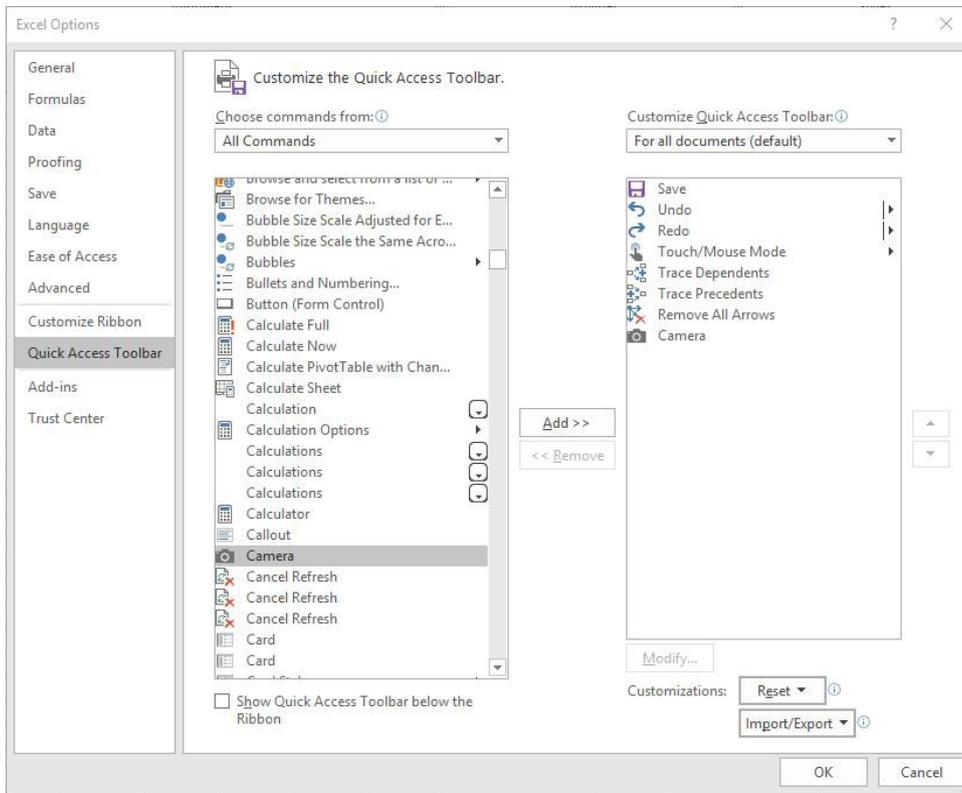
Beat the Boredom Suggested Solution

To recap, the problem we had for this month's newsletter was the inability of the 'Center Across Selection' feature to vertically align content in cells. We highlighted that we were unable to 'Center Across Selection' a selection of cells vertically to have them appear merged and aligned vertically:

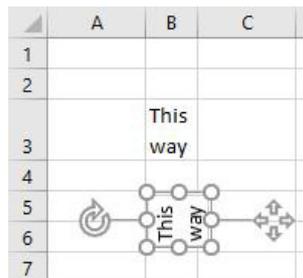
	A	B	C	D
1				
2	This way	This is centered across selection		
3	This way	This is merged		

Camera Solution

The first solution we are going to present uses the 'Camera' command in Excel. The Camera command can be accessed by enabling it in the 'Customize the Quick Access Toolbar' through Excel options:



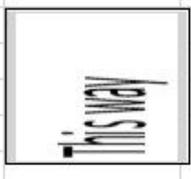
With the Camera command enabled we can take a 'picture' of the cells we wish to have vertically aligned, then create a picture on Excel. We can then rotate the picture so that the text is aligned vertically.



However, this method has its drawbacks. Formatting the picture to be aligned with the cells is tricky. Any attempts at alignment cause the cells to look odd:

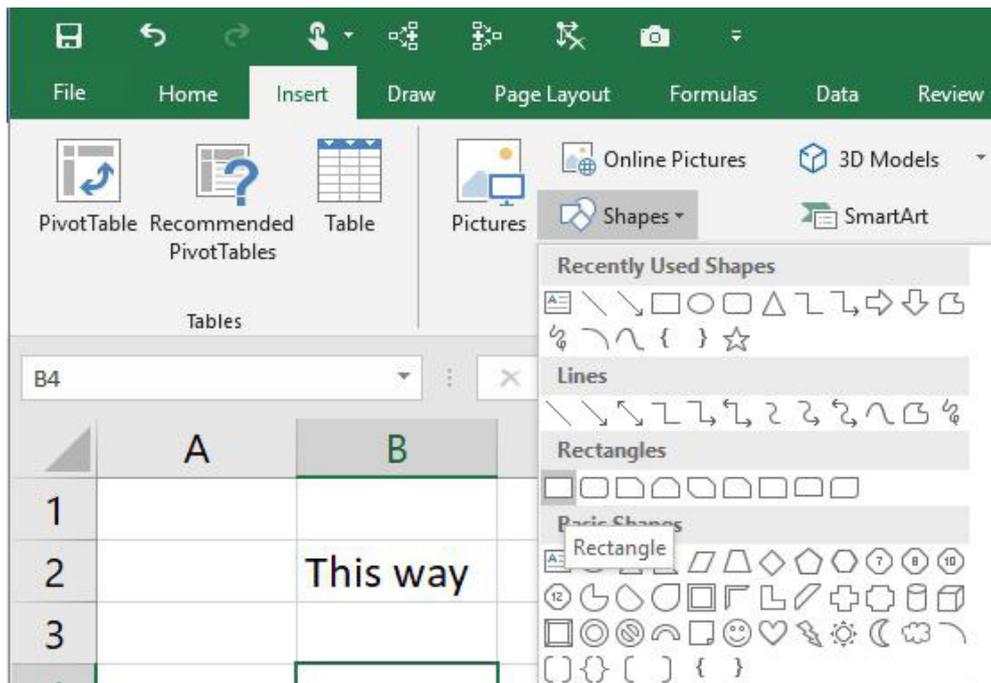
	A	B
1		
2		
3		This way
4		
5		
6		
7		

The picture also does not respond to adding or removing columns, and changing the dimensions for the cell that was originally referenced breaks the picture:

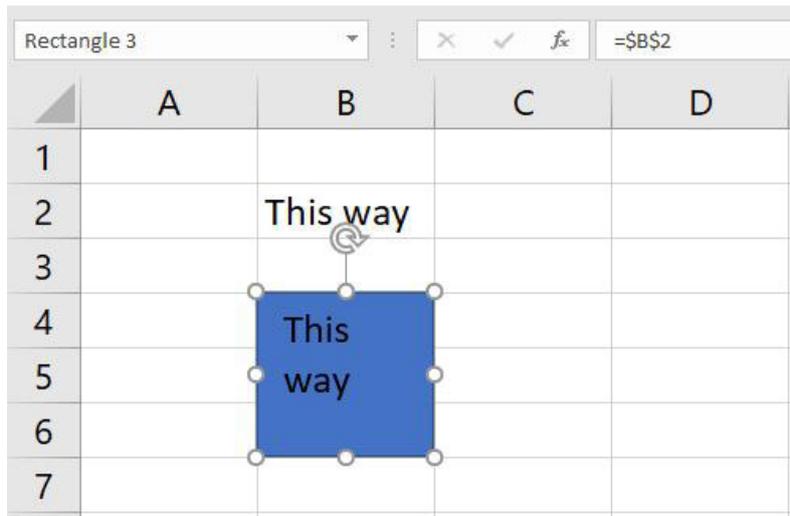
	A	B
1		
2		
3		This way
4		
5		
6		
7		
8		
9		

Shapes Solution

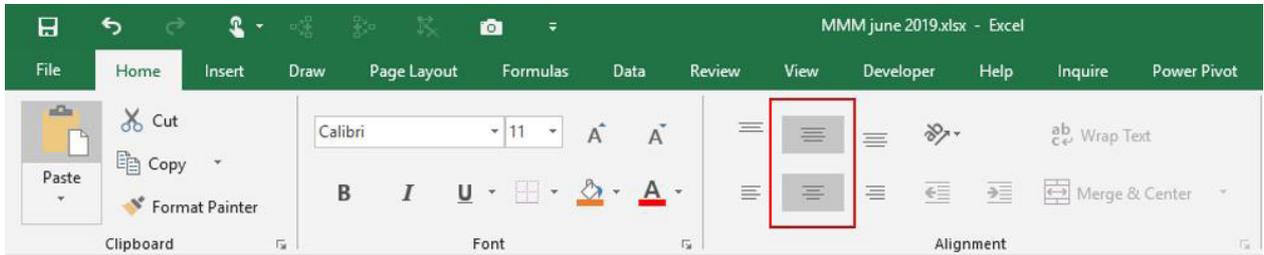
We can use shapes to achieve vertical alignment without running into any of the problems encountered from using a picture from the Camera command. The first step is to create a 'Rectangle' shape:



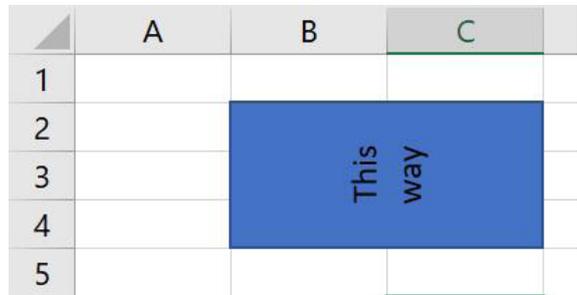
Draw the rectangle out, then click on it and reference the cell we wish to have aligned vertically (**B2**):



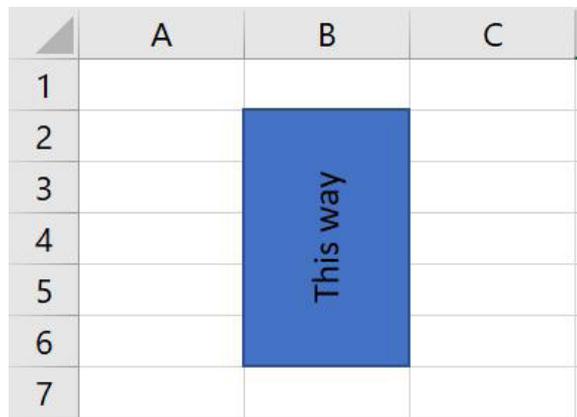
Centre the text using the alignment settings on the Home tab:



Place the rectangle over the cell it is currently referencing (**B2**), and rotate the rectangle so that we have it vertically aligned and place it over the cells that we wish to cover (**B2:C4**):



Once snapped to grid, the shape will respond to adding or removing columns or rows, and resize itself accordingly:



Do note that if you wish to change what the cell says we have to use the arrow keys on the keyboard to navigate to the cell as clicking on the cell with the mouse will result in Excel selecting the shape instead.

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	9 - 11 Nov 2022	09:00-17:00 AEDT	(-1 day) 22:00-17:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	16 Nov 2022	09:00-17:00 AEDT	(-1 day) 22:00-17:00 GMT	1 Day
Online (Australia)	Financial Modelling	17 - 18 Nov 2022	09:00-17:00 AEDT	(-1 day) 22:00-17:00 GMT	2 Days
Online (Australia)	Power Pivot, Power Query and Power BI	7 - 9 Dec 2022	09:00-17:00 AEDT	(-1 day) 22:00-17:00 GMT	3 Days
Online (Australia)	Excel Tips and Tricks	14 Dec 2022	09:00-17:00 AEDT	(-1 day) 22:00-17:00 GMT	1 Day
Online (Australia)	Financial Modelling	15 - 16 Dec 2022	09:00-17:00 AEDT	(-1 day) 22:00-17:00 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 month, we look again at the **CTRL** and **SHIFT** keys, but this time combined with various special characters that Excel uses:

Keystroke	What it does
CTRL + SHIFT + A	Insert arguments into a formula
CTRL + SHIFT + B	Address Book (only when emailing not as an attachment)
CTRL + SHIFT + F	Font face
CTRL + SHIFT + L	Toggle AutoFilter
CTRL + SHIFT + O	Select Comments
CTRL + SHIFT + P	Font size
CTRL + SHIFT + T	Toggle Total Row
CTRL + SHIFT + U	Expand / collapse Formula bar

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.

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